

Analysis of EU Level Initiatives and their Synergies with the Circular Economy Action Plan and Skills Gap Analysis

Deliverable 2.1

30-11-2024

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BECOME

Document history

Version	Date	By whom	Main Area of changes
0.1		HU	Conclusion added, CEC model explained
1.0		Marina Schmitz, project manager	Last check before submission

Summary sheet

Project Name	BECOME
Title of the document	Analysis of EU level initiatives and their synergies with the Circular Economy Action Plan and skills gap analysis
Deliverable	D 2.1
Work Package	2
Programme	ERASMUS+
Coordinator	HU
Website	https://becomeproject.eu/
Authors	Yvette Lanting, Suzanne van Osch en Marjoke de Boer
Status	1.0
Dissemination level	Public
Reviewed by	Martijn Rietbergen, Marjoke de Boer, Marina Schmitz, Annika Holmbom, Vihra Andonova
Submission date	30 November 2024
Starting date	April 1, 2024
Summary	Deliverable 2.1 analyses the regional CE Ecosystems and learning communities. It starts with an international benchmark of literature and EU level initiatives to find synergies relevant to CE learning communities and building blocks. This is followed by a regional benchmark of CE learning communities in the regions. Consequently, a needs analysis of stakeholders is presented to discuss skills gaps and mismatches. These insights are combined to requirements for CE learning communities and CE learning building blocks.

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Introduction

The BECOME project aims to develop the skills and knowledge of Circular Economy (CE) experts to facilitate the transition to a circular economy. In line with the goals of the Paris agreement and the Circular Economy Action Plan, there is a need to transition towards a more sustainable and competitive economy by promoting a regenerative growth model that minimises resource use and waste generation. This requires a systematic change. Recently, CE has become a buzzword difficult to implement on grassroot level. Striving for CE means that actors on the labour market need the right skills to be able to bring about this systematic change. To realise this, close cooperation between Higher Education Institutes (HEIs), Vocational Education and Training (VET) and the labour market is necessary to skill (potential) employees. The BECOME project contributes to these challenges by analysing CE learning communities, deriving skills needs from key stakeholders, developing training materials and setting up knowledge HUBS (learning communities) in each of the regions.

Objective

The objective of work package 2 is to analyse the status quo of the circular economy eco system and identify gaps. This means that stakeholders will be consulted to identify skills mismatches and gaps between VET, HEIs and the labour market. The status quo analysis will not only be determined by looking at the participating regions Slovenia, Bulgaria, The Netherlands and Finland, but also more generally to understand the discourse on a broader (European) level and synergies will be identified. The gaps resulting from this analysis will be used by work package 3 to develop building blocks and learning materials. This report is a result from the joint collaborative efforts of all regions and partners in the BECOME report and reflects the regional insights on CE ecosystems and skills mismatches. The views expressed are these of the authors only.

Outline

This document is divided in 4 chapters and a conclusion. Chapter 1 outlines the methods used by this work package to analyse regional CE ecosystems and learning communities. Chapter 2 'benchmarking circular economy learning communities' will provide a literature analysis and definition of circular economy learning communities. Adding to this review, existing European-level initiatives will be analysed to find synergies. Consequently, this chapter will make a first attempt at defining requirements and building blocks to circular economy learning communities. Chapter 3 'Regional benchmark of Circular Economy Learning Communities', will continue this exploration by focusing on the regional context in all of the participating partner countries. This chapter will analyse regional best practices, training programmes and carry out an ecosystems analysis on learning communities. Chapter 4 'Circular Skill needs and gaps' will focus on the skills needs in each of the BECOME regions'. Using the ESCO (European Skills, Competences, Qualifications, and Occupations) and Circular Economy Competence (CEC), technical and transversal skills are defined based on a regional literature review and verified with stakeholders during an ecosystem analysis. The outcomes of these chapters will be summarized in the conclusion, providing a future outlook of and requirements for circular economy learning communities.

Chapter 1: Methodology

This chapter explains the methodology for the analysis of regional CE ecosystems and learning communities (work package 2). To understand the tasks and timeline of this work package, a Miro board was created, see [Appendix 1](#), and presented during the kickoff meeting of the project in Sofia, in March 2024. The suggested approach and steps were agreed upon by the consortium and bi-weekly meetings were hosted to keep track of the results by the work package leader (HU). Due to the short timeline of work package 2 and its co-occurrence with the summer break, an extension was requested of the project officer to carry out the needs analysis with stakeholders.

1.1 Benchmarking

The first task (T2.1) in work package 2 was to analyse the existing EU level initiatives to find synergies relevant for the CE learning communities and building blocks. This benchmarking task has been split up in four different sub-tasks:

1. Literature research on circular economy education. This review has helped to establish a working definition of circular economy learning communities (chapter 2). Based on this research a template was developed for each region showcasing their CE definition, focus and definition of a learning community (chapter 3). The template for this research has been included in [appendix 2](#).
2. Review of European initiatives based on the Erasmus+ database and four initiatives mentioned in the proposal. Having analysed these initiatives a set of requirements for circular economy learning communities were derived (chapter 2).
3. Regional best practices. Each region has selected two examples of circular economy learning communities. Analysing these best practices, an extra set of requirements for circular economy learning communities was presented (chapter 3). The template for the regions to complete is included in [appendix 3](#).
4. Overview of existing education. Each region has made an inventory of education programmes on circular economy. This has helped to gain insight in the state of circular economy education in the regions and current focus of the circular economy learning communities (chapter 3). The inventory has been included in [appendix 4](#).

1.2 Identify needs of stakeholders

The second task (T2.2) concerns the identification of needs through interviews and surveys of key actors. A first step was to identify relevant stakeholders. Each region has collected contact details of these stakeholders and compiled a stakeholder database (template in [appendix 5](#)). Following this analysis, desk research was carried out by stakeholders reviewing relevant documentation on skills needs. The regions were asked to perform a skills needs analysis using a circular skill framework (CEC) and a generic skill framework (ESCO). These frameworks will be introduced in chapter 4. The template for this analysis is included in [appendix 6](#).

Following the desk research, a survey and interview guide was established to verify and complement the skills needs analysis with key stakeholders. The survey was completed in a Microsoft Forms and shared amongst stakeholders by each of the regions directly contacting their stakeholders. The questionnaire was developed in English. In Bulgaria and Finland the survey was completed in English by the participants. For better participation of stakeholders in The Netherlands, the survey was translated to Dutch. In Slovenia, some of the participants used the English version, whereas other stakeholders completed the survey in Slovenian. All the interviews were carried out in the local

language. Each region carried out 2-3 interviews and between 11 and 16 surveys were completed in each region. The survey is included in [appendix 7](#).

1.3 Outlook BECOME

The ecosystem analysis of tasks 2.1 and 2.2 have resulted in a set of requirements for the CE Learning Communities and CE Learning Building Blocks. The benchmarking results of task 2.1 (in chapter 2 and 3) have provided characteristics of existing CE learning communities on different (inter)national levels. These results help to set clear requirements on CE learning communities. Tasks 2.2 focused on the skills need an mismatch, linking existing research to needs identified by stakeholders. This has helped to understand the actual skills need for the CE learning communities. Together, these results provide an outlook for the BECOME project and the basis for the CE building blocks and trainings in work package 3 and 4.

Chapter 2: Benchmarking circular economy learning communities

This chapter will benchmark the topic of circular economy learning communities. Starting with a literature review, key elements of circular economy will be identified to establish a common definition. Furthermore, this chapter will analyse existing EU-level initiatives on circular economy learning communities, providing an in-depth analysis to find synergies relevant for circular economy learning communities and building blocks.

2.1 Role of Benchmarking for the project

The project aims to create the right conditions to foster green skills of future experts in the circular economy. The importance of green skills for the circular economy is recognised by policy makers (Crippa & Drąsutė, 2012) and academics (Romero-Luis et al., 2021). However, research indicates that these actors hold different perspectives on green skills or circular economy definitions.

The role of industry

The shift towards a CE requires a fundamental shift in industry's design, production and consumption patterns of goods and services. This involves cross-sectoral adaptation of processes to produce and process resource flows, aiming for waste minimization, increasing product life cycles and maximising resource efficiency through reuse and recycling (Menta et al., 2016). The shift to a CE demands a workforce proficient in interdisciplinary skills such as systems thinking, life cycle assessment (LCA), collaboration across value chains, and innovation in design and production processes. Therefore, industries need professionals capable of integrating sustainability into decision-making processes and stress the necessity for entrepreneurial skills to drive sustainable business model innovations (Bocken et al., 2014; Del Vecchio et al.).

The role of education

Education can act as a driver for CE transition; a perspective in which lecturers are considered strategic agents to contribute to CE transition processes (Renfors, 2024). However, a condition to fulfil this role is awareness and knowledge of educators on skills and competencies necessary to be integrated into curricula (Tiippana-Usvasalo et al., 2023). This condition is currently not being met: there is a gap between the skills that are developed in education and skills required for CE (Renfors, 2024).

Mismatch between Industry & Education

The importance of education in building skills necessary for transition processes is illustrated by a pilot on International Business Management Studies students on vocational schools and University colleges in the Netherlands. Student teams were tasked to develop business plans for sponsor companies to transition toward circularity. The result was a group of disappointed companies, as the produced outcome of students' application of the taught theory did not match industry expectations (Kopnina, 2017).

CE transition requires adaptations of multiple industries across sectors, thereby creating a demand for a shift in educational activities, so that the skills and knowledge of workforce influx are tailored to industry activities necessary for efficient transition. The current mismatch between knowledge and skills fostered in the educational system and those required by industry has created a need for more knowledge on where this mismatch lies. Benchmarking the knowledge, skills and models

dominant in the educational system across Europe against industry needs will support successful collaboration across educational and industrial institutions to allow for efficient transition.

This chapter presents a benchmark for learning communities against industry needs. The following sections report the conclusions of an academic literature assessment exploring relevant concepts; defining CE and presenting the working definition for CE as applied in the project. Relevant skills will be presented, as well as the development path and educational approaches as identified in literature.

2.2 CE integration & definition

The concept of CE is described by (Pearce & Turner, 1990) as a positive addition to their critique of the dominant neoliberal economic approach. They suggest a shift away from the traditional linear economic system towards a closed circular economic system that is based on a material-and energy flow model that is cyclical in nature.

CE Development

The CE concept has since developed by practitioners, including policymakers, business owners, consultants, activists and citizen interest groups, by direct application of the term in society. CE has evolved into an overarching approach that is integrated into visions, strategies and policies across sectors under the increasing importance of responsibilities beyond profitability and employment. This is demonstrated by the uptake of Corporate Social Responsibility (CSR), which involves the incorporation of environmental concerns, human rights and community involvement as part of corporate standards, with CE as one of the core methods ([Hens et al., 2018](#)).

In contrast, the academic discourse surrounding the concept of CE remains unresolved on its definition ([Romero-Luis et al., 2021](#)) and lacks consensus ([Korhonen et al., 2018](#)). Discussions on terminology are multifaceted ([Prieto-Sandoval et al., 2018](#)), with existing approaches either focusing on ecologic systems ([Haupt & Hellweg, 2019](#); [Geissdoerfer et al., 2017](#)) or economic growth ([Hysa et al., 2020](#)), business models ([Bocken et al. 2014](#)) or CE effects on social ([Padilla-Rivera, 2020](#)) and political ([Valenzuela & Böhm, 2017](#)) aspects.

Working definition

The lack of academic conceptual clarity could be one explaining factor to the lack of educational development of CE skills and the active CE integration within business-and policy communities. This fuels the risk that activities do not contribute to actual CE development ([Korhonen, 2018](#)) and a growing need to establish a working definition that is suitable to CE learning communities.

The consortium highlighted applicable theories that could function as a working definition. These are theories such as the doughnut economy of [Kate Raworth \(2017\)](#), the butterfly model(Elle Mac-

Arthur Foundation, 2021) and the R-strategies (Malooly & Circularise, 2023). Combining these theories results in a working definition for circular economy.

This definition is presented by Metabolic:

"Circular economy; In a circular economy, all activities take place within the boundaries of the earth, while at the same time ensuring that certain minimum social conditions are met (Raworth, 2013). These conditions relate to health and well-being, added value that goes beyond money alone, support of culture and society and the maintenance of the living environment. The circular economy simultaneously ensures that materials and raw materials are continuously recycled at a high level and a resilient region that adapts to changes and external shocks" (Circular indicators, Metabolic, 2016).

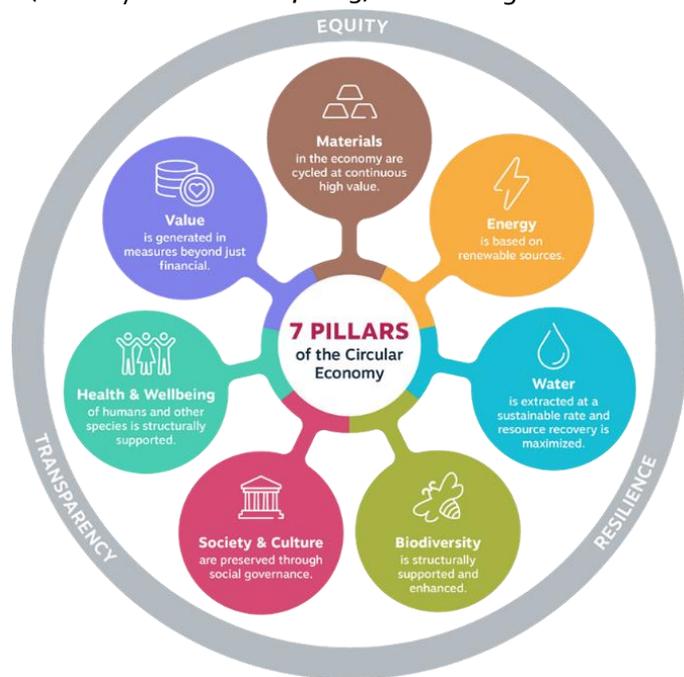


Figure 1: Definition of Circular Economy (Metabolic, 2016)

This definition is agreed upon by all partners and leaves room to highlight each region's focus for circular economy. Furthermore, by using this definition we can compare regions and identify potential overlaps or areas that regions can benefit from peer learning. To support the development of a shared understanding of a learning community, the definition of HU is adapted with an addition by the consortium; all are welcome and learning from peers is supported. This produced the following definition of learning communities:

"Learning Communities connect learning, working, innovation and research. In doing so, they also connect the three functions of 'lifelong learning': learning for a diploma, learning on the job and learning to innovate. Learning communities are hybrid." (HU, 2021) Learning communities are inclusive, open for all interested, welcoming, innovative, creative and enable learning from peers.

Learning Communities are considered inclusive and transdisciplinary networks highly applicable to facilitate system transition. Research in Finland (Tiipana-Usvasalo et al., 2022) found that educational redesign most effectively takes place bottom-up, starting with teachers rather than national education strategies or institutional boards. This is particularly true in the development of a supportive role of education in promoting circular economy (Tiipana-Usvasalo et al., 2022). Learning Communities are therefore selected as principal medium to support CE transition.

2.3 Key elements of CE integration

The transition to a circular economy (CE) emphasizes sustainable practices, resource efficiency, and systems thinking. However, a significant barrier lies in the misalignment between industry-required skills and those developed in educational systems. Research on CE integration into higher education (HE) is limited, with little cross-institutional collaboration. Existing research reports isolated aspects of education, focusing primarily on identifying learning activities that effectively integrate CE into HE; including supportive classroom management, technical aspects, defining relevant learning output and product design (Melati et al., 2023).

Several barriers are identified out of studies and identified trends, out of which the most central can be summarised as:

1. **Lack of Circular System Thinking in Curricula:** Teaching is based on developing the traditional skillset that does not involve circularity
2. **Lack of Practical Experience:** Education often provide theoretical knowledge without exposing students to real-world CE challenges.
3. **Fragmentation of Knowledge:** The siloed nature of traditional education inhibits the integration of CE concepts, which leads to future professionals' development of isolated skills that are hard to integrated in the complex transdisciplinary world of system change
4. **Limited Interdisciplinary Approaches:** Teaching tends to remain rooted in single disciplines, which does not align with the complex multifaceted reality of system transformation

The shift to a CE demands a workforce proficient in interdisciplinary skills such as systems thinking, life cycle assessment (LCA), collaboration across value chains, and innovation in design and production processes. Studies highlight that industries need professionals capable of integrating sustainability into decision-making processes and stress the necessity for entrepreneurial skills to drive sustainable business model innovations ([Bocken et al. 2014](#)). Despite the clear shift in skill demand from industry, educational systems often emphasize traditional skills that fail to address CE complexities. Curricula frequently lack focus on the practical application of CE principles.

Development path

Research identified the following potential solutions:

1. **Curriculum Reform:** Rethinking curricula is required to successfully integrate circularity into education. CE-focused modules and interdisciplinary teaching methods can equip students with relevant skills.
2. **Industry-Academia Partnerships:** Collaborative programs, and co-designed courses ensure that educational outputs align with industry needs
3. **Policy Support:** Government policies can play a role in incentivizing CE education and create supportive tools for collaboration, such as publicly accessible platforms for stakeholder collaboration
4. **Redesign educational tools:** The development and application of novel educational tools can better support skills required for complex multi-dimensional activities for economic transformation. These approaches include flipped classroom, particularly in combination with challenge-based learning for circular economy thinking (Rodriguez-Chueca et al., 2020).
5. **Interdisciplinary Learning:** Breaking down barriers across disciplines supports system thinking and applied methods utilizing co-design.

Research stresses the need for active collaboration between academia and industry to ensure that education aligns with rapidly evolving industrial needs. Particularly design studies would benefit from direct integration of circular design into the curricula ([Leube & Walcher, 2017](#); [Graf et al. 2022](#)). The optimal path to reform curricula to integrate CE into teaching is through the stimulation of industry-academia partnerships. Such collaboration allows students to work on real-world tasks, which has proven to benefit students through the development of soft skills ([Graf et al. 2022](#)) and problem-based teaching as vehicle for academic learning ([Williams et al., 2018](#)). This involves collaboration across industry and educators, and preferably also society and governments to support and co-create (life-long) training programmes (Circle Economy, 2021; Rodriguez-Chueca et al., 2020). Collaboration can however be hindered by different vocabularies across disciplines, as

variations in interpretations of CE definitions ultimately hinders system transformation. Transdisciplinary system thinking can therefore support CE transformation ([Sauvé et al., 2016](#)). Breaking down the barriers between educational disciplines is especially useful for problem-based learning (Rodriguez-Chueca et al., 2020)

2.4 Benchmarking existing EU level initiatives

The previous paragraphs explored the literature and definitions of circular economy learning communities. To continue these benchmarking efforts, this paragraph will dive into existing EU level initiatives to find synergies for the CE learning communities and learning blocks. The approach is twofold. First, a complete analysis of Erasmus+ initiatives is carried out, followed by a more in-depth analysis of four educational engagement practices mentioned in the project proposal.

Erasmus+ initiatives

Based on the Erasmus+ database there are at least 682 Erasmus+ projects on circular economy, circular/green or sustainable skills and or learning communities. This is a rather high amount of projects to benchmark. Therefore, a selection was made of projects to include in this benchmark. The first step was to analyse the projects involving Vocational Education and Training Institutes (VET) projects and Higher Education Institutions (HEIs). About 195 of these projects are VET projects and 85 projects included HEIs. To narrow down this benchmark even further, the projects linked to the involved regions in the BECOME project (Slovenia, Bulgaria, The Netherlands, Finland) were selected. This has led to a database of 50 projects. The last step of this analysis was to check how many projects used the word 'circular' in their title or summary. This has narrowed down the benchmark to 16 projects. We have included a table in [appendix 8](#) with the full details of all these programmes, key action, action types, funding year etc. In the table 1 below the participating country, project name and characteristics of the projects have been summarised. The most important takeaways from the benchmark have been underlined.

Table 1: Summary of contents CE learning communities of 16 Erasmus+ initiatives

Region	Project	Characteristics
Slovenia	<ul style="list-style-type: none"> • SP - Boosting youth entrepreneurship in rural areas through co-working and start-up incubators in the era of circular economy • "Building bridges for circular economy by fostering youth entrepreneurship" • Circular Economy In Practice • Environmental change in European start-uppers thinking and acting – the solution for common sustainable development • "Activation of youth to circular and zero-waste economy and promotion of European circular youth networks" 	<p>The projects highlight that circular skills are at the crossroad between <u>citizenship</u> competencies and <u>entrepreneurial</u> competencies (source). Specific knowledge and skills connected to CE learning communities are <u>resource efficiency</u> and reduction of energy use, water, carbon and transport within production and consumption processes; <u>life cycle thinking</u>; knowledge about <u>sharing</u> product services; green <u>product design</u> (minimising materials); <u>circular business models</u>; <u>public awareness</u>; <u>governance</u> EU frameworks; <u>recycling</u> waste (source & source). Many of these projects have either developed or provided overviews of training programmes including an environmental guide for VET providers</p>

	<ul style="list-style-type: none"> • Building a European Zero Waste Academy 	to include the topic in education (source); zero waste competencies (source) and sustainable development (source).
Bulgaria	<ul style="list-style-type: none"> • Family Learning To Drive Demand for A Circular Economy • Eco Circle 	CE learning communities are about adopting CE practices. This means a <u>behavioural change</u> and the learning community is therefore focused on <u>practical activities</u> with families or youth work associations. Low key training materials such as comic strips (source) have been developed and practical (small scale examples) of <u>circular business models</u> and <u>waste management</u> highlighted (source).
The Netherlands	<ul style="list-style-type: none"> • Building green skills for circular economy • Strategic partnership for fostering circular economy approach in extractive industry related study programmes • CIRCULAR SME SCAN • Building a European Zero Waste Academy • Circular Thinking in Action - New skills for young adults through circular business models and digital storytelling • Agile leadership transformation for business in circular economy • Skills for transition to circular economy 	The learning communities created by the projects focus on <u>different target groups</u> such as young adults, SME professionals, municipalities, trainers, low-qualified professionals, unemployed people and/or job seekers. Most of these projects have resulted in the development of <u>training materials</u> varying from mastering circular skills based on the interpretation of the world economic forum (using skills longer to <u>avoid waste</u> , <u>reusing</u> products to reduce consumption; <u>sharing</u> products with others to reduce consumption; repairing old products to increase their <u>lifespan</u> ; <u>recycling</u> materials that can't be reused; <u>upcycling</u> old materials to create new products) (source); waste management and <u>circular business models</u> in master, postgraduate and open online course (source); understanding <u>circular value chains</u> in online learning platform and workshops (source); handbook for <u>zero waste cities</u> (source); <u>circular business models</u> skills including understanding business model canvas, implementation of circular business models, managing <u>networks</u> of companies and conveying circular message, <u>life cycle analysis</u> and cost implications and calculations (source); setting up circular businesses focusing on <u>creativity</u> and <u>innovative</u> skills training available as MOOC

		(source) and online learning space created (source).
Finland	<ul style="list-style-type: none"> • Circular Skills 	CE education bridges curricula and requires <u>interdisciplinary teaching</u> . Challenge based learning, to <u>connect theory to practice</u> , is an essential part of the learning community. Skills that are important are rethinking, redesign and rediscovering. <u>Serious gaming</u> is considered an important tool to support critical thinking (source).

The findings highlight the critical role of circular skills and learning communities to foster sustainable behaviour. Innovative and practical skills are significant in implementing circular solutions, blending theoretical insights with hands-on activities to build sustainable and entrepreneurial mindsets.

Core knowledge and skills in CE mentioned are resource efficiency (reducing energy, water, carbon, and transport use in production and consumption), life cycle thinking, green product design, circular business models, waste management (recycling, upcycling and zero waste), creativity in circular business setups and governance (understanding EU frameworks and policies). The learning communities are focused on different target audiences. For example, to include unemployed, low-skilled or families the communities should focus on practical activities and use innovative training materials such as comic strips, serious gaming, small-scale best practices and creative, low-key resources to engage learners. On the other hand, professionals and trainers benefit from more in-depth courses and resources such as MOOCs (massive open online courses), online platforms and handbooks. Main aspect of CE learning communities is the interdisciplinary approach incorporating challenge-based learning to connect theory with practice.

Exploration of existing learning communities in HEIs

The proposal of the BECOME project mentioned four existing educational engagement practices provided at HEIs in Europe:

- Erasmus+ CYCLE project
- Cycle Competence Centre
- Erasmus Mundus Master's Programme on Circular Economy (CIRCLE)
- Circular Economy Club

These practices will be shortly revisited and their characteristics summarised to understand whether (or not) they complement the requirements for the CE learning communities and their focus mentioned in the previous paragraphs.

1. Erasmus+ CYCLE Project

The CYCLE project (Circular Economy Competences: Making the Case for Lifelong Learning) focuses on equipping individuals with the skills and knowledge necessary to participate effectively in the

Circular Economy (CE). It promotes lifelong learning as a pathway to building competencies that align with sustainable development and resource efficiency. The project aims to bridge gaps in CE education by enhancing interdisciplinary teaching, and inspire systemic change by enabling individuals and communities to adopt and implement circular practices in their communities and workplaces. Target groups are young adults, SMEs, municipalities, and low-skilled workers. Core objective of the project is to promote circular skills, skills mentioned are:

- Develop skills for resource efficiency, waste reduction, and life cycle thinking.
- Focus on competences such as sharing services, recycling, upcycling, and green product design.

The educational materials and training programmes developed should be created for diverse audiences to be relevant to young adults, SMEs and low- and high-skilled workers. Linked to this is the recommendation to integrate CE concepts into (existing) curricula at all levels of education and vocational training. Innovative learning tools and approaches suggested by the project include:

- Design accessible materials like comic strips, MOOCs, and online platforms.
- Focus on practical examples of circular business models and waste management.
- Use challenge-based learning and tools like serious gaming to connect theoretical understanding with real-world applications.

2. Cycle Competence Centre

The Cycle Competence Centre is an initiative dedicated to equip individuals (educators, unemployed and job seekers), businesses (SMEs), and communities (municipalities) with the skills and knowledge to adopt and implement CE practices. The focus is on lifelong learning and interdisciplinary education to drive sustainable development. The Centre is a hub for education, training and collaboration.

The educational tools, resources and skills described are:

- Provide access to online courses, workshops, and training programs on topics like resource efficiency, waste reduction, and circular business models.
- Offer practical tools such as life cycle analysis guides, cost-calculation frameworks, and examples of CE practices.
- Focus on tailoring training to specific needs, such as zero-waste city planning, sustainable entrepreneurship, and vocational education.

Innovative learning tools and approaches suggested by the project include:

- Promote hands-on learning through challenge-based activities, serious gaming, and practical demonstrations.
- Encourage critical thinking and creativity in designing sustainable solutions.

The learning community should act as a central point for stakeholders to share knowledge, best practices, and resources. It should also support and facilitate the development of partnerships between businesses, educational institutions, and policymakers.

3. Erasmus Mundus Master's Programme on Circular Economy (CIRCLE)

The Erasmus mundus master's programme on circular economy (CIRCLE) is an interdisciplinary and international programme designed to equip students with the knowledge, skills, and experience

needed to address global sustainability challenges through the principles of the Circular Economy (CE). The programme takes two years and involves multiple universities in Netherlands, Scandinavia, Australia, China and Japan. Including disciplines such as environmental science, engineering, economics, and policy-making, the programme prepares graduates (both students and professionals) for careers in academia, industry, policy-making, or entrepreneurship within the CE framework.

The skills and competencies taught during the course are:

- Understanding and applying CE principles such as waste reduction, resource efficiency, life cycle thinking, and circular business models.
- Addressing real-world challenges through sustainable product design, value chain analysis, and innovative waste management strategies.
- Exploring economic and governance aspects of CE, with emphasis on policy frameworks like the EU's circular economy agenda and global sustainability challenges.

The learning approach combines theoretical knowledge with practical applications through case studies, hands-on projects, and industry placements. There is a strong emphasis on challenge-based learning, interdisciplinary collaboration, and the development of creative and innovative solutions. The global perspective of the programme enables students to experience diverse cultural and professional environments. The programme nurtures future leaders and innovators capable of driving the transition to a sustainable, circular economy. Graduates are equipped to tackle complex environmental and societal challenges, fostering systemic change across industries and communities worldwide.

4. Circular Economy Club

The Circular Economy Club (CEC) is a global, non-profit network dedicated to advancing the principles of the Circular Economy (CE). It connects individuals (entrepreneurs), organisations, and communities to foster collaboration, knowledge-sharing, and innovation in sustainability. This global network operates as a decentralised network with over 280 chapters in more than 140 countries, providing local platforms for collaboration and action. Members come from different industries such as including academia, industry, government, and non-profit. The circular economy club highlights the importance of interdisciplinary collaboration to advance CE education and professional development.

The chapters of the circular economy club act as a learning community and focus on:

- Knowledge sharing: providing free, open-access resources, including reports, tools, workshops, webinars and case studies on CE practices.
- Hosting events and workshops: conferences, meetings, and training sessions to foster learning and networking facilitating connections between members to encourage partnerships, co-creation, and the development of innovative circular solutions.
- Initiates and leads projects and campaigns: initiatives such as the Circular Economy Mapping Week, which identifies circular solutions and challenges in local communities.
- Guidance: guidance and mentorships for startups and businesses to transition to circular models.

The four practices highlight the importance of lifelong learning, interdisciplinary collaboration and practical implementation in diverse sectors and communities. The integrated approach suggested

highlights the importance of education, skills development and international partnerships in advancing CE.

Critical knowledge (future) professionals should obtain are resource efficiency, waste reduction, life cycle thinking, circular business models (e.g. cost-calculation frameworks) and green product design. Tailor-made trainings should be developed to facilitate lifelong learning using innovative tools including MOOCs, online platforms, comic strips and serious gaming to connect theory with real-world applications. The emphasis should be on challenge-based learning, critical thinking and creativity to foster practical solutions and systemic change. Learning communities should highlight small-scale examples of waste management, zero-waste city planning, and sustainable entrepreneurship to empower individuals (whether it is students, employees or job seekers), businesses (SMEs) and communities (e.g. municipalities) to adopt CE practices. Learning communities should act on a global and local level to act as hubs for sharing knowledge, best practices and resources facilitating partnerships between educational institutions, policymakers, industry, and non-profits to scale CE initiatives.

2.5 Insights

Based on the literature review, Erasmus+ database benchmark and the four existing educational engagement practices, requirements for CE learning communities can be identified. First of all, key knowledge and skills mentioned are resource efficiency, life cycle analysis or thinking, circular business models, governance, innovation and creativity. This means that emphasis is placed on technical knowledge as well as associated business strategies. Furthermore, more generic skills such as creativity and innovation are significant in empowering stakeholders to design practical solutions. Particular emphasis is placed on challenge-based learning to connect theory to practice in an interdisciplinary approach, fostering critical thinking, creativity and systemic change. The learning communities reviewed cater for different audiences such as unemployed, low-skilled workers, families, professionals, trainers and students. When targeting groups such as unemployed, low-skilled workers, jobseekers or families, activities and materials should be practical and accessible (e.g. comic strips, serious games or small-scale examples). For professionals and trainers in depth resources are necessary. Nevertheless, to inspire and connect it remains important to share small-scale examples or best practices on a circular topic (e.g. zero-waste city planning or sustainable entrepreneurship) to inspire practical adoption of CE practices.

Learning communities should act as hubs to share knowledge, for example by providing MOOCs, online platforms and/or handbooks for specialised knowledge and application. On top of that, sharing of best practices and resources, promoting partnerships between education, policy, industry and non-profits should be a main priority to close the skills gap. Learning communities are active on both a local and global level. Consequently, the main requirements for CE learning communities are the focus on lifelong learning, interdisciplinary collaboration and practical implementation to drive systemic change. Tailored educational tools and international partnerships are essential to equipping individuals, businesses, and communities with the competencies needed to scale CE initiatives globally. This approach empowers stakeholders at all levels to adopt sustainable solutions and foster a regenerative economy.

Chapter 3: Regional benchmark of Circular Economy Learning Communities

Chapter 3 builds on the benchmark of chapter 2 and provides an in-depth analysis of the CE learning communities in the four participating countries (Slovenia, Bulgaria, The Netherlands and Finland). Each of the regions will be introduced and the guidelines established in D5.1 'Operating guidelines/structures and strategy for the CE Learning Communities' will shortly be revisited (paragraph 3.1). An ecosystem analysis will be carried out, by analysing regional best practices (paragraph 3.2) and reviewing existing training programmes on circular economy (paragraph 3.3). This will be complemented by summarising the results from the survey and interviews on requirements to understand stakeholder needs and requirements for CE Learning Communities (paragraph 3.4).

3.1 Ecosystem Analysis of Circular Economy Learning Communities

Slovenia

In Slovenia, the circular economy is emerging as a key focus in the nation's sustainability agenda, The Slovenian Development Strategy 2030, supported by ambitious policies and community engagement. This strategy outlines several key factors and strategic pillars relevant to advancing a circular economy such as low-carbon economy, sustainable natural resource management, energy transition, sustainable mobility and transport education and stakeholder engagement (Government of the Republic of Slovenia 2017). Furthermore, the Slovenian government has committed to transitioning from a linear to a circular economy model. While progress is notable, there are ongoing efforts to build the infrastructure and regulatory frameworks needed to scale circular practices nationwide. Policies like the "Roadmap Towards a Circular Economy in Slovenia" aim to achieve this by addressing to reduce waste, encourage recycling, and support eco-friendly production methods (Republic of Slovenia 2018).

Amongst the stakeholders interviewed and surveyed, there is a shared understanding that CE aims to eliminate waste and maintain resource value through practices like reusing, recycling, and reducing material use. Most respondents emphasize the importance of transforming waste into a resource and creating a sustainable flow of materials within the economy. However, respondents vary in how they frame CE, with some focusing more on its practical mechanisms (reuse and recycling), while others emphasize its role as a broader economic model that redefines resource flows. Additionally, a few respondents stress lifecycle optimization and value maintenance, suggesting a focus on prolonging product life rather than simply reducing waste.

Bulgaria

Bulgaria developed a Strategy and Action Plan for the transition to a circular economy for the period 2022–2027. The strategy is a cross-sectoral document which builds on measures set out in different strategies and programmes in the field of economy, environmental protection and regional development. It aims to achieve resource efficiency through the implementation of the waste management hierarchy, preventing waste generation, promoting material and reuse through recycling, reducing landfilling and limiting the harmful impact of waste on the environment and human health. Three strategic objectives are set out in the strategy: a green and competitive economy; less waste and more resources; and an economy that benefits consumers

Stakeholders see CE as an economic approach that seeks to prevent waste by maximizing the efficient use of raw materials and energy. Common denominators are designing out waste and

pollution i.e. waste reduction, keeping products and materials in use as long as possible and regenerate natural systems not underestimating the importance of social aspect like creating well-being. In the context of mining, applying circular economy principles means reducing the environmental impact of resource extraction, encouraging the reuse and recycling of materials, and fostering innovation in how natural resources are managed throughout the supply chain.

The Netherlands

In Utrecht both the municipality and the province have developed strategies on circular economy. Both strategy documents focus on themes such as circular building, food sector, healthcare, public procurement, business models and waste management ⁸ & (Utrecht Circulair Ruimte, 2023). Utrecht city is committed to become a circular city in 2050, using 50% less primary resources (minerals, metals and fossil) by 2030 already (Utrecht Circulair Ruimte, 2023). The municipality of Utrecht links its strategic goals to practical activities for inhabitants referring them to amongst others repair cafes, thrift shops and sharing services. Furthermore, inhabitants are connected to the learning community 'cirkelregio Utrecht' where they can ask for help and find existing projects and initiatives they can participate in (Alliantie Cirkelregio Utrecht). Similar services are available for local entrepreneurs.

Stakeholders interviewed and surveyed answered that CE focuses on closing raw material cycles by keeping materials in use for as long as possible while minimizing waste. The goal is to reuse, repair, remanufacture, and recycle products and raw materials, without unnecessarily depleting natural resources or polluting the living environment. This economic model replaces the traditional linear approach ("make, use, dispose") with a system in which waste does not exist and raw materials are reused. It strives for a sustainable society in which social and ecological aspects are taken into account, and a balance is found between human needs and the carrying capacity of the earth. This definition shows that most respondents link circular economy to materials.

Finland

Turku's goal is to be carbon neutral by 2029 when the city of Turku celebrates its 800th anniversary. Resource wisdom will follow, with achievement by 2040 at the latest. Turku region is very active when it comes to circular economy activities. More than 700 circular economy stakeholders and approx. 300 companies have been identified in the region. Already many significant solutions in the area, for example in energy production, water system, waste management and industry development are actively implementing the principles of the circular economy. Circular economy road map describes the targets and measures done by 2029 and is used to implement circular economy in the region. The roadmap builds on the following local and regional policy documents: Turku's City Strategy, the Turku Climate Plan 2029, The Baltic Sea Challenge, the Action Program for Biodiversity Protection of the city of Turku and the Environmental Program 2030 for Southwest Finland. The priority areas are resource efficient energy systems, food value chains, water cycles, transport and logistics and building and construction (Local governments for Sustainability)

Stakeholders define CE as a transformative, sustainable economic model that contrasts with the traditional "take-make-dispose" linear model by focusing on minimizing waste, preserving natural resources, and maximizing resource efficiency. Key themes include designing products and services for longevity, reusability, and recyclability, enabling materials to stay in circulation safely for as long as possible. Many respondents emphasize CE's systemic, collaborative nature, requiring cross-sectoral cooperation to enable a green transition, retain material value, and respect ecological limits. Additionally, CE is seen as a solution framework that promotes sustainability, moderation, and regeneration, positioning waste treatment as a last resort. Furthermore, circular economy requires versatile skills. In the efficient reuse of materials – such as recycling paper, plastic and

electric car batteries – skills in chemistry and process engineering are essential. In addition, the circular economy requires expertise in logistics, digital technologies, and economic and technological innovations. At the EU level, this transition is supported by regulations and directives, which increases the need for political and legal expertise, especially in companies with increasing compliance and reporting obligations. Expertise in responsible communication, carbon footprint assessment and taxonomy is also becoming critical.

Focus of each CE learning community

Following the regional context, each of the regions has established an approach and focus for their CE learning communities. This has been explained in deliverable 5.1 'Establish operating guidelines/structures and strategy for the CE learning communities'. This deliverable was developed in work package 2, to create a starting point for CE learning community analysis. We shortly revisit the focus of each of the regions in the table 2 below.

Table 2: Overview of approach to CE and focus of learning communities

Region	Approach to circular economy	Focus of the learning community
Slovenia	<ul style="list-style-type: none"> • Focus on social and environmental responsibility of CE • Reducing usage and recycling technical and biological materials • Focus on developing circular business models 	<ul style="list-style-type: none"> • Connecting members across industry associations: providing insight • Basic understanding of Circular economy and knowledge dissemination • NGO collaboration and societal exchange • Political interaction and supporting formats • Business practices and opportunities
Bulgaria	<ul style="list-style-type: none"> • Focus on materials, society, culture and water • Exchange of practices with regards to recycling construction and agricultural waste • Food waste • Consumer awareness (deliberate choices) 	<ul style="list-style-type: none"> • Basic understanding of Circular Economy • Learning skills to work with circularity • Learning skills to work with different circular business models • Sharing best practices in raw material industry
The Netherlands	<ul style="list-style-type: none"> • Technical and biological materials (recycling and reusing materials), energy, water, biodiversity and value 	<ul style="list-style-type: none"> • Teach students and employees circular skills (focus in the region on innovative skills, technical skills, digital skills, practical and research skills) • Knowledge exchange (technical innovations, business models, chain cooperation)
Finland	<ul style="list-style-type: none"> • Materials and value main focus (circular value chains), all pillars in teaching 	<ul style="list-style-type: none"> • Teach and learn sustainable circular economy practices • Create sustainable and circular value chains

What becomes evident from this overview in table two is that all of the regions focus on 'materials' in their circular economy learning communities. In Slovenia, Finland and The Netherlands 'values' or 'circular business models' are also mentioned as an important aspect. 'Water' and 'energy' are also mentioned by Slovenia and The Netherlands. There is therefore, some overlap in focus between the regions. One of the potential areas where the learning communities could learn from each other concerns the topic of construction waste. Heijmans (construction company, The Netherlands) is already quite far advanced, whereas in Bulgaria knowledge and good practices on this topic are lacking. This could provide an interesting area for exploration between the regional learning communities.

3.2 Regional best practices of circular economy learning communities

Each region has selected two local best practices in circular economy learning communities. A template ([annex 3](#)) has been designed for each region to complete. Since each of the regions has a local focus, no set criteria were given to the regions to select their best practices other than that they had to focus on Circular Economy. There are differences in the availability of networks throughout the regions. Furthermore, the best practices selected are strongly linked to the involvement of partners in the BECOME project, meaning that they are a member of these learning communities already. This paragraph will show the regional variety in CE learning community and provide an in-depth benchmark.

3.2.1 Slovenia

Instead of selecting two best practices, Slovenia has described five different organisations working in sustainability and circular economy. Even though these organisations have their own networks, there is no clear learning community on circular economy in Slovenia yet. Objectives of the organisations mentioned are educational and promotional. They try to provide general knowledge about key green topics. All selected organisations are a good starting point to start discussing about the green transition. They are a good tool for companies that begin to think and act green. However, most of them don't offer practical education or services that could be helpful in the industry. These organisations focus on these target groups: general public, companies at the beginning of green transition and networking organisations. The two most relevant to CE learning communities have been selected, the other best practices have been included in [appendix 9](#).

CER

Established in 2018, CER is a private non-profit organisation with a strong international network serving as the best entry point for circular economy projects across Europe. They encourage companies of all sizes to bravely embark on the path to green transformation by reducing emissions, introducing circular business models, and measuring and reporting ESG data. They look for ways to change business models and help design new products and services that will have a reduced negative or even positive impact on the environment and climate. CER encourages companies to actively take part in development and research projects and to strengthen employees' competences through the competence centres. They organise monthly activities.

Circular Change

Circular Change offers a range of services which enable their partners to design their own unique circular transition. They engage with small and large companies, government agencies, cities, non-

profits, researchers, creatives and the media in collaborative projects to co-create Circular Economy solutions, projects, reports, events and more. Established in 2017, they host monthly activities.

3.2.2 Bulgaria

The two selected best practices are Sustainability Specialists Association ([SSA](#)) and Cluster Sofia Knowledge City ([CSKC](#)). Both best practices were established in the past 10 years, respectively in 2016 and 2018. While SSA is slightly more business-oriented compared to CSKC, both learning communities are focused on competencies and in the case of SSA, also on new professions for sustainability specialists. The SSA learning community is concerned with creating a network to raise awareness for sustainability, whereas CSKC main objective is to share knowledge. Both best practices cover a broad range of (sustainable) topics, however they do not focus on circular economy specifically. Establishing a CE learning community to share knowledge on circular economy and skills as well as to share best practices is an added value to existing best practices in Bulgaria. Synergies can be found in the development of competencies and professions in the existing learning communities. The best practices will be discussed in greater detail below.

1. Sustainability Specialists Association (SSA)

SSA was established in October 2018. The association consists of corporate social responsibility and sustainability specialists from Bulgarian companies, such as most Bulgarian Universities, Aurubis, AMPECO, Hewlett Packard Enterprise, BCause, Overgas etc. The SSA conducts specialised research and creates projects in the field of corporate responsibility to inform Bulgarian industries, such as raw material industry, brewers, pharmaceuticals, telecommunications, accounting, and non-governmental organisations. Furthermore, they organise meetings, seminars, training, and other public events both in Bulgaria and abroad as well as publish and distribute newsletters, reference books, and other instructional and practical guides. The organisation concentrates on the following objectives:

- Raising public awareness and knowledge of the profession, as well as its ethical norms and standards;
- Establishment and development of an information network between professionals from the country and abroad, as well as cooperation with similar national and international organisations;
- Enabling all members to develop new competencies and professional skills;
- Creation of a professional and social environment of understanding and a positive attitude towards the profession of CSR.
- Improving the quality of education, authority, professional, and social significance, as well as the academic circles that teach corporate social responsibility.
- Validating high professional standards in corporate sustainability and social responsibility specialist practice
- Intermediation between state, educational, and economic organizations is critical for the profession's development and the environment in which it operates.

The association's most significant contribution is that the Standing Interagency Committee on the National Classifier of Occupations and Positions (NCOC) approved the Association of Sustainability Professionals (ASU's) proposal to include four new professions in the field of sustainability. Many years of research by ASU (formerly BAXOS) and the association's efforts culminate in this decision, which started this year with the announcement of the Roadmap for the validation of the profession

of sustainability specialists. The newly introduced professions of **Sustainability Coordinator**, **Sustainability Specialist**, **Sustainability Manager**, and **Internal Sustainability Auditor** are emerging in response to the growing demands for sustainable practices in business and the public sphere. Global standards and the needs of today's marketplace, where sustainability is increasingly central to strategic planning and business management, have led to the development of these roles.

Established in October 2018, the events are being organised more than twice a year. The most significant event of the Association is the patented ESG Academy. The ESG Academy is the first holistic national qualification programme for CSR and Sustainability specialists and covers the following topics: ESG approach to business management, ESG reporting and data requirements, Energy and climate policy, Climate adaptation and resilience, Green, circular and social economy, Sustainable finance and Business and human rights. The goal of the ESG Academy is to prepare sustainability specialists to be equipped to meet the changes and developments in the sustainability reporting area. The tools and practical exercises provide interactive ways of learning and applying the materials to real work problems.

2. Cluster Sofia Knowledge City (CSKC)

CSKC was established in 2016 and combines the efforts of the knowledge-based industries with the municipality, R&D organisations, NGOs, universities and financial institutes for transforming the city of Sofia from a traditional administrative capital into a Smart and Knowledge City. The Cluster Sofia Knowledge City (CSKC) brings together companies, institutes, and universities from ICT sector and other knowledge-based industries. It coordinates projects and initiatives in support of the implementation of the Innovation Strategy for Smart Specialisation, the strategy of the digital transformation of Sofia and Green Sofia. This is to be done through implementing smart technologies, new business models, and mobilizing investments in smart city infrastructure and technologies. The cluster has 52 members and 37 of them are SMEs.

Following its objectives, CSKC organizes regular events in the form of workshops with different focuses but with a common denominator Green, Sustainable, Innovative, Circular, Smart. Each quarter (on average) an event is organised. The flagship events are the Annual Sofia Knowledge City Conference and Sofia Smart City Exhibition. The target group of the learning community are municipality staff, businesses knowledge institution, teachers, students, and businesses involved in innovation, digitalization, green transition and circular economy.

The Cluster Sofia Knowledge City (CSKC) as an organization promotes the development of cities as "knowledge cities" adopts the concept of green and circular economy as the basis for the development of such cities. Therefore, the cluster often participates in international projects related to the topic of knowledge and skills for a sustainable and green economy, which is believed should be the basis of the urban development.

GO GEEN – is a project supporting the acquisition of Green Skills in VET through work based learning - ERASMUS +. The project started in September 2022 and will end in September 2024. The aim of the project is to support students in secondary and higher vocational education and training schools to develop green skills and competences during their apprenticeships in companies, following the global need for a gradual change in our attitudes and daily behavior towards the implementation of green practices.

Development of Green Skills for Better Employability (DEGREBE), ERASMUS+ - running project aiming to develop a digital educational package for developing innovative approaches, digital technologies and entrepreneurial skills for a green economy.

Digiskill-Retail, ERASMUS+ - running project aiming to establish a program and materials for developing digital competences for employees and trainers in the retail sector.

Smart Skills for Smarter Cities (Skills4Cities), ERASMUS+ - the project ended in October 2023 and aimed to develop training tools and validate knowledge and skills for smart city professions.

Towards Green Transition Facility (TGTF) – COSME. The cluster received free technical assistance for its members under the European Cluster Collaboration Platform (ECCP) program. The aim of the project was to popularize the theme of “green” transformation and to provide direct support for the development, introduction and cooperation in the use of “green” business models. The project achieved its goals through dissemination, conducting thematic workshops, obtaining direct consultations for cluster members and developing a Green transition road map for the city.

The main objective of CSKC is sharing knowledge. Through its activities, the cluster supports the implementation of the Sofia Digital Transformation Strategy and the Innovation Strategy for Smart Specialization of Sofia for smarter and more efficient use of the human and material resources of the city. Within the structure of the cluster there is Innovation Hub to provide support to innovative startups. Members of the cluster are Universities and VET organizations who actively participate in the Cluster projects. The cluster organizes regular surveys among its members and a broader range audience on topics such as:

- Green competences and the possibilities for these competences to be transferred from trainers to trainees and from workers to apprentices;
- Towards green transition to explore the awareness and readiness among companies and public sector regarding green deal and circular economy business models;
- Smart City Competences Mapping

The network of the cluster, effective communication among stakeholders and expertise gained during CSKCs existence is of added value to the BECOME project.

3.2.3 The Netherlands

The two selected good practices are [Leren voor Morgen](#) (translated to Learning for the Future) and SPARK Campus. Both good practices are focused around promoting education for sustainable development. Learning for the Future provides opportunities for synergies on circular skills, since they are working on defining sustainable skills similar to BECOME project. Furthermore, the existing network provides an opportunity for dissemination and joint activities. SPARK provides an actual physical space to experiment with circular solutions and bring together stakeholders. Therefore, both good practices are in line with the objective of the circular economy learning community defined in the BECOME project. Additionally, The Netherlands identified another good practice called Cirkelstad. This is a network for policymakers and entrepreneurs connecting them to create an inclusive and circular construction sector. This good practices has been included in [appendix 9](#).

1. [Leren voor Morgen \(Learning for the Future\)](#)

Learning for the Future cooperative is a network of organizations working together with a shared mission: to foster learning for sustainable development, both inside and outside of formal education, from early childhood to professional levels. Sustainable education empowers learners to have knowledge and awareness of sustainability, to feel a sense of commitment, and to act sustainably in a sustainable society. The education system is nurturing to this end: it ensures that learners find education challenging, meaningful and fun, and that it is relevant and fun for teachers

to teach in light of the challenges of the 21st century. Thus, the cooperative aims for a different education, rather than integrating sustainability into the current education system. An education in which the voice of the future is heard. This approach is called, Learning for Sustainable Development.

The cooperative is established (and receives financial support) by the ministry of Agriculture and Food Quality, Ministry of Infrastructure and Water Management, the Dutch Enterprise Agency and the Goldschmeding Foundation. It brings together teachers, schools, and organizations that are eager to advance sustainable development within education. By means of their networks, events, and collaborative projects, connections are fostered and progress made. Projects are carried out in close partnership with members, who bring their practical experience and grounded perspective to ensure meaningful impact. Members include HEIs, VET schools, NGOs, companies, municipalities network organisations, social enterprises across The Netherlands.

The goal of the cooperative is to include sustainability in the DNA of education. To achieve this, Learning for the Future employs an integrated strategy called the 'Whole School Approach' (WSA). The WSA is an integrated approach to sustainable education, consisting of six components. For each WSA component, the cooperative has determined the impact they want to realize:

- Vision: Schools have formulated their own vision of learning for a sustainable society and are applying the WSA to flesh out that vision.
- Surrounding: Schools are part of regional networks with all kinds of players and are closely connected to sustainable development in society.
- Professionalization: Schools are expert at Learning for Sustainable Development, self-learning, and making purposeful decisions about how to move forward.
- Didactics: Teachers structurally apply the pedagogical didactic principles of Learning for Sustainable Development in lessons, projects, internships and other school activities.
- Curriculum: Schools are leveraging a cross-curricular curriculum to integrate all aspects of sustainable development into their teaching (the SDGs).
- Operations: Schools have sustainable business practices that structurally support learning for sustainable development and have been established with all stakeholders.

As a foundation for sustainable development, the cooperative follows the framework of the Sustainable Development Goals (SDGs). This comprehensive approach allows to not only address environmental concerns but also social dimensions of sustainability, such as equality and inclusiveness. Additionally, the cooperative serves as the national coordinator for the Alliance on SDG4.

2. Spark Campus

[Spark Campus](#) is a hub dedicated to accelerating the digital transition, facilitating circular and sustainable practices in construction, and equipping people with skills for the future. SPARK campus helps companies and educational institutions to innovate living environments. It was established 10 years ago.

SPARK has a network of 50 partners, varying from companies, educational and knowledge institutions in the design, construction and engineering sector. Educational institutes involved are HEIs, VETs, but also secondary schools. Companies and industry partners that have joined the network vary from multinational construction companies, to housing associations and SMEs. Also national research organisations are involved as well as municipalities. These partners are involved in

the learning community, that connects questions, challenges and issues to potential solutions that young talent and innovative start-ups will come up with now and in the future.

In addition to this network, SPARK offers (learning) programmes, training courses and workshops to increase innovation in sustainability and digitalisation. These programmes are accessible to companies, government organizations and educational institutions who also believe in a green and healthy living environment. Internships for graduates are also offered. In this way, SPARK works on skilling people for the future.

To get started, SPARK Campus has a state-of-the-art innovation lab with access to the most modern techniques. This is where new ideas are built, tested and improved. The SPARK Campus, has two locations Spark Lab in Den Bosch and Dome-X in Oss. They offer a range of programs and activities, such as workshops, lectures, and challenges, to encourage innovative thinking and entrepreneurship.

3.2.4 Finland

The two best practices selected are CE Lab ([Kiertotalouslabra](#)) and Circular Economy Network [Topinpuisto](#). The CE lab is a circular learning community focused on students and student projects. Involved in circular research projects from various clients, students work on improving their circular skills. Topinpuisto on the other hand, is a learning community oriented at businesses while providing research opportunities for students and academics. These initiatives are in line with the objective to establish a learning community that focuses on teaching circular skills. However, the element of creating circular value chains is not yet part of these existing learning communities. This is where the learning community could have an added value in Finland.

1. CE lab

The CE Lab promotes sustainable circular economy business through cooperation. The lab is involved in creating a world where people and nature are doing well. The CE Lab works as a team made up of students, guided by leaders of the learning environment and supported by the responsible student-assistants. The learning community is targeted at students, mainly students of Turku University of Applied Sciences, however exchange students are also becoming part of the learning community. Students are usually recruited to the team for a 4 month period or a longer time, while sometimes students implement shorter individual projects. Each student receives tasks in line with their own skills and professional interests, which are done both independently and in groups. Students also meet regularly in meetings.

Operations are based on problem-oriented project work and innovative pedagogy. The projects are related to the circular economy and their clients are companies, municipalities, developers, research institutes or TUAS RDI projects. In the RDI projects, the students' work is guided by research group experts. The CE lab in numbers:

- 10 research group experts
- 2 part-time leaders of the learning environment
- 1-4 responsible student-assistants
- 30-50 trainees yearly
- 150 credits completed by other students on bachelor and master level yearly.

The goal of the learning environment is to develop circular economy experts. Students work in various projects, where they participate in e.g. making reports, organizing events, communication and networking with companies in the field. The learning environment has been functioning for over

10 years. The working skills and the network the students are developing during their time in the CE Lab, have been noted to increase their employment opportunities.

The CE Lab is an integral part of the research group on circular economy. The research group supports the creation of circular economy businesses together with companies and other actors and develops circular economy teaching in national and international networks. The lab's role in Finland's innovation system is to clearly present research data, pilot and create new know-how, and introduce research results to society. The research group is the practical agent to facilitate network-like activities, business development, projects and studies.

2. Circular Economy Network Topinpuisto

The Topinpuisto circular economy hub is a business hub located in the Southwest Finland. It's formed around the development of new services and the utilization of material, water and energy flows, when more than 80 different materials are received and processed. The network provides opportunities to try new circular economy business models and pilot new technologies. The environmental permits and infrastructure of companies located in the area enable these experiments and also provide advice on how to proceed with authorities. The network is established by Lounais-Suomen Jätehuolto (municipal waste management company), Turku University of Applied Sciences, Business Region Turku and the City of Turku.

Topinpuisto functions as a circular economy learning environment working closely with educational institutions and universities in the area bringing students and companies together by offering research and thesis topics based on the needs of companies. This collaboration helps integrate academic insights with practical applications.

Topinpuisto-day is an event focused on current circular economy topics held twice a year. The most recent event focused on sustainable future and companies needs on multidisciplinary expertise. In addition to Topinpuisto-theme days, they also organize joint training and study tours for partners. The target group of this network are circular economy experts, businesses, startups, universities and the public sector.

Topinpuisto offers help for starting experiments:

- Circular economy raw materials for experiments
- Space and structures for carrying out these experiments
- Knowledge and experience in circular economy business
- Environmental permits for waste treatment
- Cooperation with educational institutions

Topinpuisto brings together a diverse network of businesses, research institutions and the public sector that facilitates the sharing of resources, knowledge and expertise which can significantly enhance the development and implementation of the insights of the BECOME project. BECOME also benefits from Topinpuisto's ability to connect with relevant stakeholders and resources needed to innovate effectively.

3.2.5 Conclusion

Based on the analysis of regional best practices a couple of insights appear. What stands out is that the national agenda in Slovenia puts emphasis on developing circular economy activities, however, the existing learning communities are relatively small and have a promotional objective. The existing

networks are targeted at organisations exploring the green transition, but do not offer practical education or best practices that could be helpful to the industry. In Bulgaria, however, both best practices highlight the importance of competencies. The networks are focused on connecting industry members and sharing knowledge, with a focus on sustainability rather than circular economy. For The Netherlands the development of skills and training materials as well as the exchange of knowledge are central activities of the CE learning communities. Both good practices are in line with the requirements described in chapter 2. The Finnish best practices show that learning communities are not only targeted at businesses or organisations, but also at students. The involvement of industry and education is a clear attempt to bridging the skills gap, a requirement described also in chapter 2.

Based on the benchmark of regional CE learning communities in Slovenia, Bulgaria, The Netherlands and Finland no additional requirements can be identified. The existing CE learning communities are in line or could be developed further with the requirements mentioned in chapter 2.

3.3 Overview of teaching in the BECOME regions

Adding to the regional context of the benchmark, an overview of teaching has been compiled. In total 69 courses have been identified in the field of 'circular economy' spread across the educational institutes (IEDC, UMG, TUAS, RASEKO, ROCMN, HU) in the regions. Finland has the highest availability of CE courses and most courses are on Bachelor's level, see figure 2. Most of the courses have a weight of 5ECTS which means that it is a small course. Integration of the CE topic in degrees or larger modules seems therefore rather limited.

Key words used in the programmes are circular economy, resources, energy, creativity, multi- and interdisciplinary, sustainability, corporate social responsibility (CSR) & business. These key words are in line with the knowledge and skills described in chapter 2 as requirements for CE learning communities. A more in-depth analysis of the teaching programmes will be carried out in Task 3.1 in work package 3 'Development of CE Learning Building Blocks'.

AMOUNT OF PROGRAMMES ON CIRCULAR ECONOMY

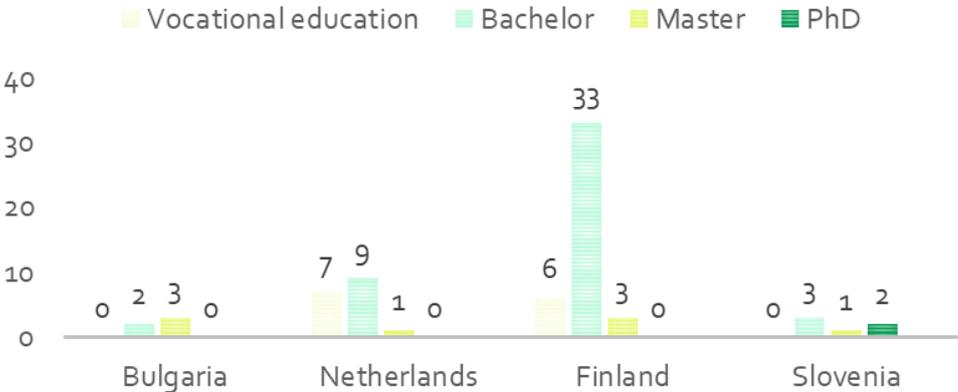


Figure 2: Overview of amount of study programmes in BECOME regions on CE

3.4 Requirements for circular economy learning communities: needs analysis

This paragraph summarises the outcomes of the surveys and interviews with stakeholders on CE learning communities. We specifically focus on the learning communities, skills needs and gaps will be discussed in chapter 4.

3.4.1 Slovenia

Each interviewee perceives significant value in learning communities as a means to advance circular practices through knowledge exchange and collaboration. Across the three interview perspectives, learning communities are regarded as critical in providing practical resources, influencing policy, and fostering industry-specific collaborations that can address regulatory gaps, knowledge shortages, and financial constraints in implementing circular economy practices. All three interviewees value learning communities as resources for practical knowledge exchange, industry insights, and collaboration. However, some differences are perceived: creating a blend of knowledge and industry-specific collaboration, practical experience sharing, and a policy-influencing community that could support strategic decisions through tangible examples and best practices.

All survey respondents confirmed seeing an added benefit from a community of peers in developing circular practices. The 15 respondents highlight a strong preference for communities focused on knowledge sharing within industries (60%) and those that foster collaboration with other organizations (27%). Two respondents also highlighted “other” as further option (13%).

Communities focused on knowledge sharing within industries prioritize industry-specific knowledge sharing, which would allow organizations to stay current on best practices, advancements, and sector-specific challenges. A community focused on sharing within the same industry fosters a deep understanding of common issues and practical solutions that may not be as relevant outside the industry. Despite this strong sectoral preference, 27% has also suggested a focus on cross-organizational collaboration and learning from diverse practices and potentially innovating beyond industry boundaries.

3.4.2 Bulgaria

The added value and benefit from a community of peers in developing circular practices is seen predominantly in setting up multistakeholder governance model a governance structure that comprises institutional ways of involving the different interested parties in the dialogue, decision-making and implementation of solutions to common problems or goals related to protection of environment and green deal of which CE is an integral part. Such a model will foster also the collaboration with different organisations and interpreted parties. The responders belong to the following learning communities: [ESG Academy](#) [Scientix](#) [Cluster Knowledge City Sofia](#) [Industrial Chamber of Commerce](#) [Sustainability Specialist Association](#)

3.4.3 The Netherlands

More than 80% of the organisations see added value in a learning community on circular economy. The community should focus on creating awareness, a better understanding and definition of ‘circular economy’, sharing insights and practical solutions for the entire production chain, provide opportunities to deepen knowledge for branch specific subjects and act as inspiration for organisations. Central to learning community are not only activities supporting collaboration and gaining new knowledge and insights between industry, governments, education and research institutes, but also applying and sharing approaches that have already been developed.

Many of the organisations that have participated in this research are already part of existing learning communities on circular economy. The most frequently mentioned learning communities are:

- DGBC (Dutch Green Building Council > Whole Life Carbon project)
- Cirkelsteden (innovation in building)
- Groene Brein (one of the good practices)
- Lenteakkoord 2.0 by branche organisations (practices for circular building)

About 20 other networks have been shared. This shows the great variety and diversity of learning communities on circular economy in Utrecht. The requirement for this learning community is to keep track of the existing learning communities, connect them to each other and make sure they are linked

3.4.4 Finland

According to respondents, collaboration and shared knowledge are essential for advancing a circular economy. Shared knowledge, experience, development ideas and benchmarking were the type of effect some expect to have from learning communities. All of the respondents see an added benefit from a community when developing circular practices. Some of the respondents stated that developing and implementing circular economy wouldn't even be possible without effortless collaboration. Sharing best practices and having meetings without agendas, give room for more open discussion where people can share their feelings and difficulties and also find solutions. One of the respondents thought that peer pressure from the community is also beneficial when developing circular practices.

"Knowledge is power and we cannot do circular economy alone."

Even though a few respondents stated working in peer-learning networks and promoting working in multisectoral groups, none of the respondents were able to mention a learning community they already were a part of or why they would be important for their organizations. Half of the respondents agreed that "Community fostering collaborations with other organizations" and the other half thought that "Joint community focused on knowledge sharing with industry" would be the type of form for a learning community to get their organizations interested.

3.4.5 Conclusion

Stakeholders describe learning communities as important networks to develop skills. The learning communities should facilitate exchange and collaboration between stakeholders. Practical knowledge and/or industry specific knowledge should be the main topic discussed. This will allow for a better understanding of CE practices and allow to deepen knowledge on industry specific themes. Furthermore, a learning community will allow for 'peer pressure' thereby allowing for other stakeholders to follow along in the transition to CE. Major emphasis is placed on collaboration and connecting the entire production chain with a similar goal. In The Netherlands and Bulgaria stakeholders are already part of existing learning communities.

3.5 Insights

This chapter has carried out an ecosystems analysis of the four regions. Despite regional variations, a common denominator is the emphasis each of the regions place on learning communities as networks for developing skills, sharing knowledge, and fostering collaboration.

Across regions, CE is understood as a transformative economic model prioritizing waste reduction, resource efficiency, and sustainability through cross-sectoral collaboration, with an emphasis on versatile skills, knowledge exchange, and practical implementation. Main theme for CE is materials, with Slovenia, Finland, and The Netherlands also incorporating values and circular business models.

Existing communities differ in structure and focus, but connecting and expanding these networks is a shared priority. While Slovenia's CE agenda is ambitious, its learning communities are small and primarily promotional. Bulgaria emphasizes material reuse and societal awareness but lacks advanced knowledge in construction waste management, a potential area for collaboration with more experienced regions like The Netherlands. The Dutch and Finnish communities focus on technical skills, innovative approaches, and value chain integration, addressing both industry and education.

Requirements for CE learning communities are linked to knowledge exchange between different stakeholders such as research/educational institutes and companies, industry-specific collaboration, policy influence/governance, sharing and applying practical solutions. Despite the industry-specific collaboration, also cross-organizational collaboration and practical resource-sharing should be facilitated. Showcasing best practices are essential to create awareness and foster multisectoral collaboration aligning stakeholders toward shared sustainability goals. There is a disparity between fostering inter-organizational collaborations and sector-specific knowledge sharing.

CE learning communities across regions align with benchmarks set for fostering skills, collaboration, and knowledge sharing. They should focus on fostering practical, industry-specific knowledge, enhancing collaboration among stakeholders, and supporting the exchange of best practices. While existing networks meet foundational requirements, further development can strengthen their role in facilitating systemic change and advancing CE practices regionally.

Chapter 4: Circular skills needs and gaps

Following the analysis on requirements for CE learning communities, this chapter will outline the skills needs of stakeholders in the four regions. All regions have carried out desk research and verified the outcomes with stakeholders by means of surveys and interviews. This chapter will outline the skills models used for the analysis (paragraph 4.1) and then present the outcomes of the skills analysis for Slovenia (paragraph 4.2), Bulgaria (paragraph 4.3), The Netherlands (paragraph 4.4) and Finland (paragraph 4.5). Skills needs, gaps and potential ways to bridge these gaps will be discussed for each of the regions.

4.1 Introduction of skills models

When evaluating regional skill needs and crafting solutions to meet them, it is crucial to clearly define the skills being assessed and developed. To enhance clarity and efficiency in skills assessments, a streamlined approach has been adopted, dividing skills into two categories: transversal skills and circular (or technical) skills. Transversal skills refer to transversal abilities that are independent of specific countries, markets, employers, or job functions. These skills, often referred to as soft and digital skills, are transferable across workplaces and can be taught uniformly. In contrast, circular skills are specific and are less transferable. Two models have been selected to be able to differentiate between transversal and circular skills. For the transversal skills, the ESCO framework developed by the European Commission has been selected. For the circular skills the Circular Economy Competence (CEC) framework developed by Association of Nordic Engineers will be used. This streamlined approach allows for a comparison between regions minimizing fragmentation and facilitating efficient collaboration on skills development initiatives such as the development of CE building blocks in work package 3. Both skills models will be explained in greater detail.

ESCO framework

ESCO (European Skills, Competences, Qualifications, and Occupations) is a multilingual framework used across Europe to classify skills, competencies, and professions. Acting as a comprehensive dictionary, ESCO identifies and categorizes professional occupations and skills that are relevant to the EU labour market as well as education and training. By structuring these concepts and their interrelationships in a way that can be understood by digital systems, ESCO enables various online platforms to offer services such as matching job seekers with suitable roles based on their skills, and recommending training opportunities for those seeking to reskill or upskill (Directorate General Employment, Social Affairs and Inclusion (DG EMPL), 2024).

Transversal knowledge, skills, and competences are essential across a wide variety of jobs and industries. Often called core skills, basic skills, or soft skills, they serve as the foundation for personal growth. These transversal abilities are key to developing the "hard" skills and competences necessary for success in the job market (Directorate-General for Employment, Social Affairs and Inclusion, 2024) & (Hart et al., 2021). The transversal skills have been included in table 3.

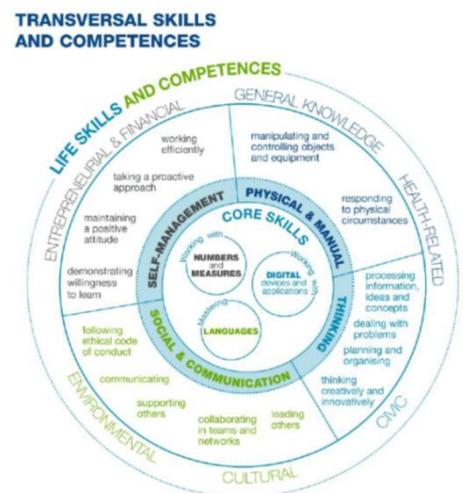


Figure 3: Transversal skills and competences (John Hart, Martin Noack, Claudia Plaimauer Jens Bjørnåvold, 2021)

Table 3: Transversal skills

Transversal skill	T1 - core skills and competences	T2 - thinking skills and competences	T3 - self-management skills and competences	T4 - social and communication skills and competences	T5 - physical and manual skills and competences	T6 - life skills and competences
Subskill	T1.1 mastering languages	T2.1 processing information, ideas and concepts	T3.1 working efficiently	T4.1 communicating	T5.1 manipulating and controlling objects and equipment	T6.1 applying health-related skills and competences
	T1.2 working with numbers and measures	T2.2 planning and organising	T3.2 taking a proactive approach	T4.2 supporting others	T5.2 responding to physical circumstances	T6.2 applying environmental skills and competences
	T1.3 working with digital devices and applications	T2.3 dealing with problems	T3.3 maintaining a positive attitude	T4.3 collaborating in teams and networks		T6.3 applying civic skills and competences
		T2.4 thinking creatively and innovatively	T3.4 demonstrating willingness to learn	T4.4 leading others		T6.4 applying cultural skills and competences
				T4.5 following ethical code of conduct		T6.5 applying entrepreneurial and financial skills and competences
						T6.6 applying general knowledge

Circular Economy Competence (CEC) framework

As already mentioned in chapter 2, there is a strong need for skills to facilitate circular economy practices. However, there is no clear mention of what these circular skills are. There is no abundance of circular skills models that categorises competencies and skills. The Circular Economy Competence framework, therefore, fills a void. To streamline the research on circular skills, this model has been chosen (Sine Beuse Fauerby, Jussi-Pekka Teini, Robert Nyheim-Jomisko, & Kristoffer Boesen, 2021).

The model draws on input from STEM professionals (science, technology, engineering and math), who are a crucial stakeholder group in the circular economy (CE) due to their pivotal role in design and technology development. To fully realize the potential of a circular economy in Nordic societies and beyond, skills and competences must be developed across STEM fields. This study introduces a Circular Economy Competence Framework (CEC) to outline the future skill needs related to CE.

The framework is based on the idea that circular economy principles should shape how STEM professionals and engineers' approach, analyze, and solve problems. These principles contrast with those that have traditionally driven the linear economy. A shift in problem-solving and design practices is necessary. Understanding planetary boundaries and the core principles of circular economy is essential for implementing technical and analytical tools for circular problem-solving.

Circular thinking must be integrated into mainstream design and engineering practices. All STEM professionals should possess at least a foundational understanding of key technical and analytical frameworks related to circular design, business models, systems management, and digitalization, all of which support the development of circular solutions. Interdisciplinary and cross-disciplinary collaboration is crucial for advancing the circular transition. The competencies and skills outlined in the model are displayed in table 4:

Table 4: Circular skills and competencies

CEC competence	Circular product design strategies	Circular business models	Systems management and digitalisation
Subskill	1.1 Understanding the concept of multiple lifecycles thinking	2.1 Knowledge of circular business models and alternative ways of value creations	3.1 Understanding the interconnectedness of economy, environment and society
	1.2 Knowledge of circular materials	2.2 Service business and products service systems	3.2 Ability to perform systems-level analyses on impacts and trade-offs
	1.3 Understanding the lifecycle impact of products and services		3.3 Ability to frame problems from a systems perspective
			3.4 Knowledge of digital solutions as an enabler for a circular economy
			3.5 Analysing and optimising efficiency at the systems level

4.2 Slovenia: overview of skills need and gaps

4.2.1 Desk research

Desk research carried out in Slovenia covered 5 government and industry strategy documents on circular economy (Srip (Strategic Research & Innovation Partnership - Networks for the transition into circular economy), 2023) (FTPO, 2020)(Slovenian Government, 2017) (Republic of Slovenia bsp, 2018) (POGLEDOM LJUBLJANA, 2021)Based on the findings in these strategy documents, the outputs were matched with the skills frameworks on transversal or circular skills. As

becomes clear from the results in table 5, the skills needs identified were mostly related to technical or circular skills. Specifically, emphasis is placed on circular business models and design strategies.

Table 5: Skills need Slovenia (based on desk research)

Skill/competence need, in own words	ESCO transversal skill Level 1	ESCO transversal skill Level 2	CEC competence Level 1	CEC skill Level 2
CE Intersectoral Collaboration	T2 - thinking skills and competences	T2.1 - processing information, ideas and concepts		
Alternative Economic Models			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
Capital CE Strategy			2 Circular business models	
CE Regional Network			1 Circular product design strategies	1.2 Knowledge of circular materials
CE Business Models			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
CE Market Potential			1 Circular product design strategies	1.3 Understanding the lifecycle impact of products and services
Partnership for Innovation			1 Circular product design strategies	1.1 Understanding the concept of multiple lifecycles thinking

4.2.2 Stakeholder needs analysis

Across respondents, there is a strong emphasis on systemic understanding and lifecycle analysis, as well as knowledge of circular materials and business models. These skills reflect the need to understand circular economy principles at both the operational and strategic levels, integrating practical material knowledge with broader economic and environmental insights.

The focus on skills varies by industry, specialized expertise tailored to each sector is necessary varying from design and client-centered knowledge, consultancy-oriented strategic skills, and assessing lifecycle impacts for practical applications in infrastructure. Consequently, respondents diverge in the level of focus on specific areas—some prioritize a deep understanding of lifecycle impacts and material choices, while others emphasize a broader systems perspective or the knowledge of circular business models. Additionally, certain skills like system-level efficiency analysis and alternative economic models are mentioned by fewer respondents, suggesting they may be valued differently depending on organizational context. Among the importance of certain ranked skills, the following aspects have been mentioned:

1. Understanding the lifecycle impact of products:

This skill is emphasized by at least 4 respondents. It reflects an understanding of the entire lifecycle of products, from design to disposal, as crucial for minimizing environmental impacts. Lifecycle impact analysis enables organizations to identify and mitigate potential negative effects of products and services, supporting long-term sustainability goals.

2. Knowledge of circular materials:

5 respondents prioritize knowledge of circular materials. This skill is essential for organizations aiming to incorporate sustainable materials that can be reused, recycled, or safely degraded. Knowledge in this area supports responsible sourcing and material selection, fundamental aspects of circular design and production.

3. Understanding the interconnectedness of economic, environmental, and social systems:

3 respondents emphasize the importance of understanding how these systems are interlinked, recognizing that circular economy practices affect not just the environment but also social and economic outcomes. This broader, systems-thinking approach is essential for making informed decisions that consider multiple impacts and dependencies within a circular economy framework.

4. Knowledge of Circular Business Models and Alternative Economic Models:

3 respondents focus on understanding circular business models, which is critical for rethinking traditional, linear approaches in favor of sustainable, circular ones. This skill is particularly relevant for organizations exploring new ways to create and capture value through methods such as product-as-a-service, extended producer responsibility, and closed-loop supply chains.

5. Analysing and Optimising Efficiency at the System Level:

One respondent identifies system-level efficiency analysis as a key skill, which supports organizations in optimizing resource usage and reducing waste through comprehensive, cross-functional evaluation of processes.

Key skills for CE identified by the interviewees reflect a common need for systemic understanding, lifecycle knowledge, and specialized expertise tailored to each sector. **Interviewee 1** identifies systemic understanding of economic, environmental, and social impacts as essential, alongside knowledge of circular materials and business models to support their consultancy in sustainable packaging. **Interviewee 2** stresses the need for a broad understanding of sustainability, including ESG frameworks, to guide clients in integrating CE principles within their operations. **Interviewee 3** highlights the lifecycle assessment of products and services as vital for making responsible decisions around materials, procurement, and infrastructure. Despite this alignment on systemic and lifecycle understanding,

Commonly identified skill gaps

- **Systems Thinking and Resource Efficiency:** Several respondents mention the importance of systems thinking and resource efficiency. These skills are foundational to understanding how individual processes impact the larger circular economy and enable efficient resource use, highlighting a need for employees who can view the organization holistically.
- **Knowledge of Circular Business Models and Production Processes:** Respondents express a need for deeper knowledge of circular business models, strategies, and production

processes, indicating that operationalizing circular practices requires specific frameworks and methodologies that may currently be lacking in their organizations.

- **Sustainability and Circular Economy Knowledge:** Respondents mention general sustainability knowledge as essential. This reflects a need for a foundational understanding of circular economy principles, especially in the context of design and broader sustainability principles.
- **Interdisciplinary Knowledge and Impact Analysis:** Respondents underscore the value of interdisciplinary knowledge and specific skills like environmental impact analysis and economic impact analysis. These insights highlight a gap in assessing circular practices' tangible impacts, which may hinder informed decision-making.

Many respondents identify a need for systems thinking, resource efficiency, and sustainability knowledge as critical for implementing CE practices. There is also a general consensus on the importance of circular business knowledge and the ability to conduct impact analyses. However, interviewees as well as survey participants reflect on the importance of their specific industry-related knowledge and application since some skill gaps are industry-specific, like health impact knowledge or economic implications, reflecting unique sector requirements. Additionally, the responses suggest a variation in the level of specificity required—from broad sustainability principles to specialized knowledge in production and process design.

4.3 Bulgaria: overview of skills need and gaps

4.3.1 Desk research

Desk research carried out in Bulgaria covered 7 government and industry strategy documents on circular economy¹. Based on the findings in these strategy documents, the outputs were matched with the skills frameworks on transversal or circular skills. As becomes clear from the results in table 6, some skills identified have a transversal and circular aspect to them. For the skills related to circular products, management skills and knowledge the transversal skill to creatively think and innovate is mentioned. Circular business models have been mentioned quite frequently as important skill.

¹ The reports studied for Bulgaria, have been included in the reference list in Cyrillic writing. We have translated the titles of the documents here to provide insights in the policy documents: circular economy and sustainable finance - modern perspectives; The circular economy in the construction sector: Innovation process, legislative initiatives and good practices; Educational materials on sustainability, circular economy, bioeconomy for schools, colleges and universities; BE-Rural: strategies and plans for the transition to the bioeconomy for improvement; Waste Free Economy. Transformation for SMEs, University of National and World Economy; Regional circular economy status quo; Strategy for the transition to a circular economy 2022 – 2027; Strategy for the transition to a circular economy 2022 – 2027

Table 6: Skills need Bulgaria (based on desk research)

Skill/competence need, in own words	ESCO transversal skill Level 1	ESCO transversal skill Level 2	CEC competence Level 1	CEC skill Level 2
circular products and services	T2 - thinking skills and competences	T2.4 - thinking creatively and innovatively	2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
communication	T4 - social and communication skills and competences	T4.3 - collaborating in teams and networks		
management skills to innovate	T2 - thinking skills and competences	T2.4 - thinking creatively and innovatively	3 Systems management and digitalisation	3.5 Analysing and optimising efficiency at the systems level
technical skills			1 Circular product design strategies	1.2 Knowledge of circular materials
circular knowledge	T2 - thinking skills and competences	T2.4 - thinking creatively and innovatively	2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
circular business models			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
regulatory frameworks	T6 - life skills and competences	T6.6 - applying general knowledge		
professional skills in CE			1 Circular product design strategies	1.3 Understanding the lifecycle impact of products and services
collaboration	T4 - social and communication skills and competences	T4.3 - collaborating in teams and networks		

4.3.2 Stakeholder needs analysis

Based on the desk research, the responders ranked the following skills:

- Understanding the interconnectedness of economy, environment and society;

- Analysing and optimising efficiency at the systems level;
- Understanding the lifecycle impact of products and services;
- Knowledge of circular materials;
- Knowledge of circular business models and alternative ways of value creations;

For 10 of the responders *Understanding the interconnectedness of economy, environment and society* is the most important skill and for 4 of them this is *Knowledge of circular materials*. Furthermore, it was mentioned that increased knowledge on innovative and feasible best practice circular economy business models are instrumental to transforming production value chains towards environmental sustainability. To be able to do so, entrepreneurs have to increase their managerial skills. Consequently, to succeed in the circular economy transition, professionals in the mining and geology sectors need a diverse set of skills and competencies that blend technical expertise with strategic thinking, innovation, and collaboration. The skills need is therefore versatile.

The critical skills needs include items such as:

- Learning how to save and see opportunities to limit the use of resources and reuse of materials;
- Understanding life cycle impact and knowledge of circular materials;
- Knowledge of circularity principles, lifecycle assessment (LCA) and circular design, circular materials
- System & holistic thinking, creative thinking, empathy and social responsibility
- Digital skills
- Acknowledgement and engagement of all parties involved – public, private, individuals, etc.

Bridging skill gap

To bridge the gap in skills, 3 responders see *Development of new curricula* as a good solution and the rest emphasise on *In company training* and 1 respondent pointed out *Flexible education such as micro credentials*. Furthermore, there are challenges to introducing in CE due to lack of external support and demand (for example customer demand, public procurement), lack of resources, infrastructure or competence, limited access to emerging business models and lack of regulations and guidelines. This means that for the mining industry economic feasibility, regulatory barriers, and the need for new infrastructure must be addressed for circularity to become the standard approach across the industry. By overcoming these obstacles, the mining sector can contribute significantly to global sustainability goals, making resource extraction and management more environmentally responsible and economically viable in the long term. So to bridge the skills gap, CE has to become a bigger priority.

The shift also creates new jobs and requires „reskilling“ the workforce to meet the demands of sustainable practices.

„**Design for circularity**“ is another key factor—products and processes must be designed for reuse and easy recycling, essential for achieving long-term sustainability.

„Consumer behaviour changes“ also play a significant role. Success depends on consumers opting for sustainable products and services, such as product-as-a-service models instead of traditional ownership.

The circular economy also involves better „supply chain management“, requiring material traceability and collaboration among stakeholders. Technologies like blockchain can help track resources and ensure sustainability throughout the supply chain.

4.4 The Netherlands: overview of skills needed and gaps

4.4.1 Desk research

Desk research carried out in The Netherlands covered 5 government and industry strategy documents on circular economy (Deborah Sumter*, Jotte de Koning, Conny Bakker and Ruud Balkenende, 2020), (Het groene brein & Leren voor morgen, 2021), (Circle-economy.com, 2021), (Guido Bastiaans, 2023), (Circle Economy, n.d.), (Deborah Sumter*, Jotte de Koning, Conny Bakker and Ruud Balkenende, 2020), (Het groene brein & Leren voor morgen, 2021), (Het groene brein & Leren voor morgen, 2021), (Circle-economy.com, 2021), (Circle-economy.com, 2021). Based on the findings in these strategy documents, the outputs were matched with the skills frameworks on transversal or circular skills. As becomes clear from the results in table 7, some skills identified have a transversal and circular aspect to them. This is due to the fact that certain circular skills also have a transversal element such as creative and innovative thinking and the ability to interact with stakeholders. Product design strategies are considered as the most important skill.

Table 7: Skills need The Netherlands (based on desk research)

Skill/competence, in own words	ESCO transversal skill Level 1	ESCO transversal skill Level 2	CEC competence Level 1	CEC skill Level 2
Communication	T4 - social and communication skills and competences	T4.3 - collaborating in teams and networks		
Design for Multiple Use Cycles			1 Circular product design strategies	1.1 Understanding the concept of multiple lifecycles thinking
Design for Recovery			1 Circular product design strategies	1.2 Knowledge of circular materials
Circular Impact Assessment			3 Systems management and digitalisation	3.2 Ability to perform systems-level analysis on impacts and trade-offs
Circular Business models	T2 - thinking skills and competences	T2.4 - thinking creatively and innovatively	2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
Circular User Engagement	T4 - social and communication	T4.2 - supporting others	1 Circular product design strategies	1.1 Understanding the concept of

	skills and competences			multiple lifecycles thinking
Circular Economy Collaboration	T4 - social and communication skills and competences	T4.3 - collaborating in teams and networks		
Knowledge circularity and materials			1 Circular product design strategies	1.2 Knowledge of circular materials
Knowledge funding and value			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
Knowledge and use of digital tools			3 Systems management and digitalisation	3.4 Knowledge of digital solutions as an enabler for a circular economy

4.4.2 Stakeholder needs analysis

- Following the results of the survey and interviews, the respondents determined the following order of importance to the skills and competencies: Creative thinking (29% of the respondents mentioned this as the most important skill)
- Circular product design strategies (35% of the respondents mentioned this as the second 3. most important skill)
- Circular business models (29% of the respondents mentioned this as the third most important skill)
- Systems management and digitalization (29% of the respondents mentioned this as the fourth most important skill)
- Communication skills and competencies (35% of the respondents mentioned this as the fifth most important skill)

What becomes clear is that the technical skills, or circular skills, are considered more important than the so-called 'soft skills' such as communication. Respondents argue that creative thinking is the most important skill in circular economy, as organisations are forced to look for alternative materials and models due to scarcity of traditional materials. This requires a need for creative approaches and out of the box thinking, something that comes more naturally to some organisations than others.

Critical skills need and gap

Organisations argue that knowledge about circular economy, circular building practices, circular materials and circular product design is lacking. Even though organisations have employed specialists to increase awareness of circular practices, detailed technical knowledge is often lacking or available in small numbers. This makes for a slow transition to circular economy.

Most organisations however, add that leadership is important to stimulate the transition to more circular practices. Business leaders should be able to inspire and kickstart circular economy and they should be equipped to lead this transition. Furthermore, organisations argue that not all of their clients are asking for circular products or materials. Therefore, they are not stimulated to think

creative or work on innovative circular solutions. Organisations argue that business leaders should act as ambassadors of change, not only to make sure that their own organization is more circular, but the entire production chain. In other words, business leaders should take a responsibility to inform their clients and partners as well as their own organisations to enable change. System management is mentioned by organisations working on procurement and governance to enable circular practices.

In conclusion, the skills needs include:

- Knowledge about circular economy, building materials, product design, materials
- Transitional leadership
- Creative and innovative thinking
- Systems management for governance organisations

Bridging skills gap

To bridge the skills gap most organisations argue there should be in company training programmes to increase knowledge. 20% of the respondents also highlight the need for new educational programmes on circular economy and the integration of the subject in existing curricula. Furthermore, learning communities are also mentioned as important ways to connect, collaborate and learn from other organisations. Lastly, the role of the government is mentioned as an important coordinator for regulating circular economy.

4.4 Finland, overview of skills needed

4.4.1 Desk research

Desk research carried out in Finland covered 6 government and industry strategy documents on circular economy (Rosa Degerman et al., 2022), . (Kuusela et al., 2023)(Milja & Räsänen, Annukka Berg, Paula Eskola, Sari Piippo ja Hanna Savolahti, 2023), (Opetushallitus , 2023), (Afry & Tieke, 2024), (Tiia & Tuomisto, 2023). Based on the findings in these strategy documents, the outputs were matched with the skills frameworks on transversal or circular skills. As becomes clear from the results in table 8, the main focus is on technical or circular skills. In this regard systems management and digitalisation is considered the most important skill, followed by circular design strategies.

Table 8: Skills need Finland (based on desk research)

Skill/competence, in own words	ESCO transversal skill Level 1	ESCO transversal skill Level 2	CEC competence Level 1	CEC skill Level 2
collaboration	T4 - social and communication skills and competences	T4.3 - collaborating in teams and networks		
systemic thinking			3 Systems management and digitalisation	3.1 Understanding the interconnectedness of economy, environment and society

regulation	T6 - life skills and competences	T6.6 - applying general knowledge		
future thinking			3 Systems management and digitalisation	3.5 Analysing and optimising efficiency at the systems level
interdisciplinary thinking			3 Systems management and digitalisation	3.1 Understanding the interconnectedness of economy, environment and society
digitalisation			3 Systems management and digitalisation	3.4 Knowledge of digital solutions as an enabler for a circular economy
lifecycle thinking			1 Circular product design strategies	1.1 Understanding the concept of multiple lifecycles thinking
circular products			1 Circular product design strategies	1.2 Knowledge of circular materials
critical thinking			3 Systems management and digitalisation	3.1 Understanding the interconnectedness of economy, environment and society
problem solving			3 Systems management and digitalisation	3.2 Ability to perform systems-level analyses on impacts and trade-offs
sustainable value creation			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations
managing material flows			3 Systems management and digitalisation	3.4 Knowledge of digital solutions as an enabler for a circular economy
understanding novel business models			2 Circular business models	2.1 Knowledge of circular business models and alternative ways of value creations

recyclable materials			1 Circular product design strategies	1.2 Knowledge of circular materials
reverse supply chains			3 Systems management and digitalisation	3.5 Analysing and optimising efficiency at the systems level

4.3.2 Stakeholder needs analysis

Following the results of the survey and interviews, the respondents named the following skills and competencies as most important:

1. Understanding the lifecycle impact of products and services
2. Knowledge of circular materials
3. Knowledge of circular business models and alternative ways of value creations
4. Understanding the interconnectedness of economy, environment and society
5. Analysing and optimizing efficiency at the systems level

64 percent of the respondents selected "Understanding the interconnectedness of economy" as a most important skill for circular development in organization. The second most important skill according to the respondents was "Knowledge of circular materials". This was selected as most important skill as well. The least important skill out of 5 was "Analysing and optimizing efficiency at the systems level", as 45 % of the respondents had chosen this as the least important skill. 72 % of respondents have selected this skill as one of the two least important skills. Looking again at all responses, almost 60% of all respondents have selected this skill as one of the two least important skills. According to respondents critical circular skills that are missing was holistic knowledge.

Bridging the gap

To bridge the skills gap more support should be given to students to express their interest in the subject was identified. One of the remarks in the surveys was:

"Circular economy should be part of our day-to-day work at every sector. Unfortunately, it is so at strategic level, while operational level lacks skills on how to integrate circular economy in their daily work. It requires more training and more time resourced to employees."

During the interviews, the important skills mentioned were system-level competence and practical skills and professional competence.

4.5 Insights

Based on the regional skills needs it becomes clear that stakeholders identify systems management (Finland and Bulgaria) as most important skill. Knowledge about circular practices/materials is commonly identified as important (circular product design), ranking first in Slovenia and second in all other countries. The Netherlands is the only country that has ranked a transversal skill as most important, highlighting the importance of creative and innovative thinking. Even though knowledge about circular business models appears quite frequently in the policy documents, it is ranked less highly by the stakeholders surveyed. A conclusion also shared by (Kirchherr et al., 2017). In terms of

skills gaps, systems management is highlighted once more, and also the absence of detailed technical knowledge not only on materials, but also on entire production chains and business models is stressed.

A new skill gap mentioned by the stakeholders is leadership, meaning that leaders of industry should aspire to kickstart the CE transition. To do so they need skills to involve production chains that cover more than only their own company (holistic thinking), conveying their message to a broader network and ecosystem. Respondents in all regions mention that this could impact consumers, creating a customer demand for CE that is currently not experienced by organisations.

Similar to requirements described in chapter 2 and 3 the importance of interdisciplinary knowledge/collaboration is stressed. Life cycle analysis is also considered an significant skill. One aspect of the circular economy that has been highlighted during the interviews is the „**social dimension**“. It's crucial to ensure that the transition to a circular economy is inclusive and benefits local communities, especially those reliant on the mining industry. The shift also creates new jobs and requires „reskilling“ the workforce to meet the demands of sustainable practices.

As the regions mention the importance of knowledge on circular practices and materials, respondents suggest a variation in the level of specificity required—from broad sustainability principles to specialized knowledge in production and process design. This is highly linked to unique sector requirements such as health impact knowledge or economic implications. The lack of detailed CE knowledge in the industry, is linked by respondents to explain their lack of organisational focus on CE . There is therefore, an important gap to bridge.

Other barriers respondents have mentioned throughout the regions, is that even though sustainability is a key focus for many, CE is not necessarily. Lack of regulation and need for a behavioural shift allowing for resources such as time and money, makes that circular economy is not a main priority for all respondents. Other challenges discussed are that organisations struggle with who will take ownership, there is a certain amount of unclarity about who will be responsible and takes the risks when circular products have been developed. This does not help in developing CE practices.

All in all, a clear set of skills and competencies have been defined by the stakeholders. This should help to bridge the skills gap and to take away barriers that organisations are currently facing.

Conclusion

Based on the analysis of Regional CE Ecosystems and Learning Communities in this report, the primary skills identified for CE learning communities include technical knowledge (such as resource efficiency, life cycle analysis, and circular business models) and more general skills like creativity, innovation, and critical thinking. These skills should be taught in a learning community focusing on challenge-based learning, connecting theory to practice through interdisciplinary approaches, aiming to foster systemic change. The learning communities reviewed target a diverse range of audiences—from unemployed individuals and low-skilled workers to professionals and trainers—and emphasize the importance of practical, accessible resources for non-experts, while offering in-depth materials for advanced learners. This highlights the importance of focusing a learning community on a specific target group or groups, without trying to cover all stakeholders at once.

The learning communities should serve as knowledge hubs, offering training materials such as for example MOOCs, online platforms, and specialized handbooks to share best practices and foster cross-sectoral collaboration. Partnerships between education, industry, policy, and non-profits are crucial for closing the skills gap and driving the CE transition at both local and global levels. Lifelong learning, interdisciplinary collaboration, and practical application are identified as key priorities to equip individuals and businesses with the necessary competencies to scale CE initiatives globally.

An ecosystem analysis across four regions reveals that despite regional differences, learning communities consistently emphasize the development of skills, knowledge exchange, and collaboration. CE is viewed as a transformative model focused on sustainability, resource efficiency, and waste reduction. Regions like Slovenia, Finland, and the Netherlands integrate circular business models and values, while Bulgaria has a strong focus on material reuse. Technical skills, innovative approaches, and value chain integration are key strengths in the Dutch and Finnish communities.

Stakeholders across the regions agree on several skills gaps, including systems management, knowledge of circular practices and materials, and leadership in driving the CE transition. Leadership is highlighted as a critical skill for industry leaders to drive change and involve wider production chains. The transition also requires reskilling the workforce, particularly for jobs created by sustainable practices. Interdisciplinary collaboration and life cycle analysis are identified as crucial skills, with a focus on ensuring the social dimension of CE benefits local communities.

A common challenge faced across regions is the lack of detailed technical knowledge in CE, particularly in production chains and business models. This knowledge gap, along with the absence of strong regulations and unclear ownership responsibilities, hinders progress toward adopting circular practices. Despite sustainability being a focus for many organizations, CE often takes a back seat due to these barriers.

In conclusion, this ecosystem analysis has identified skills that should be developed in building blocks in work package 3. The insights from industry stakeholders have highlighted not only the skills needs and gaps, but also existing barriers to adopting CE. Requirements for the CE learning communities shows that they should act as hubs for knowledge, where the mentioned skills should be developed.

Useful links and documents

The Butterfly Model

Ellen Macarthur Foundation (2019) Circular Economy System Diagram

To be retrieved from <https://www.ellenmacarthurfoundation.org/circular-economy-diagram>

The Doughnut Economy

Kate Raworth (2012). Oxfam Discussion Papers: [A Safe and Just Space for Humanity: Can we live within the doughnut?](#)

To be retrieved from https://www-cdn.oxfam.org/s3fs-public/file_attachments/dp-a-safe-and-just-space-for-humanity-130212-en_5.pdf

R-Strategies

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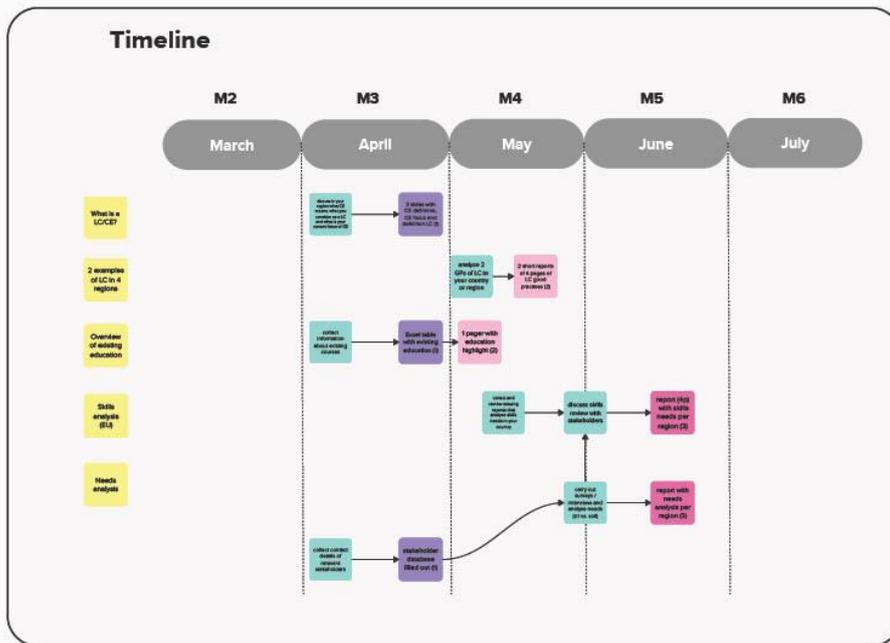
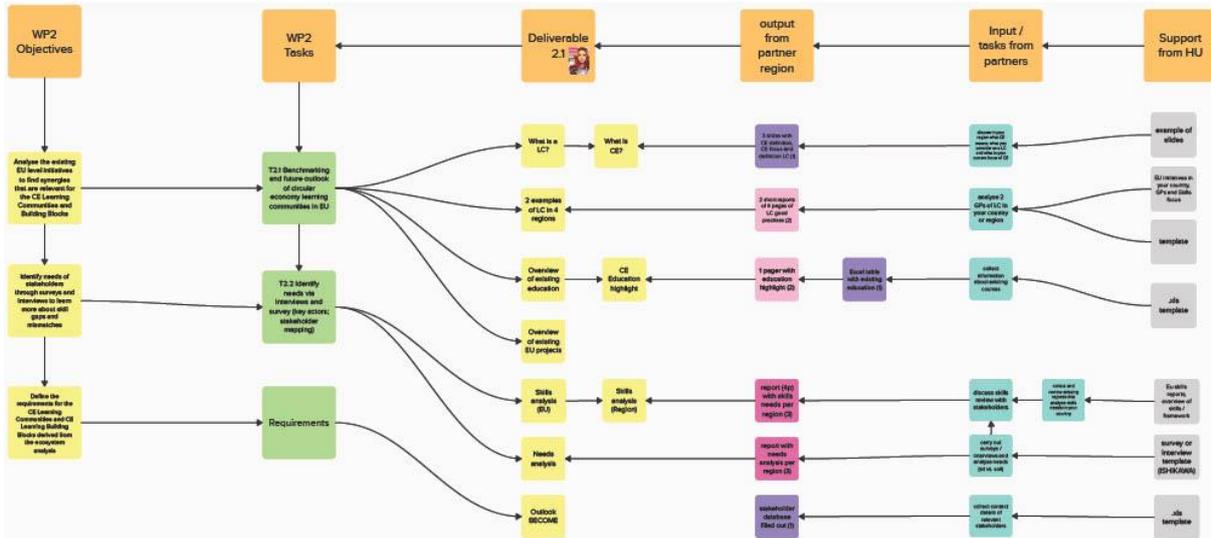
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Annex 1: Miro board timeline of activities for work package 2



Annex 2: Template for definition and focus CE Learning communities

Pilar of CE	Reason/ motivation:

Focus in the learning community on:	Which stakeholders:	Events to be organised:

Annex 3: Template regional good practices CE learning communities

Template

Good practice learning communities Circular Economy in your region

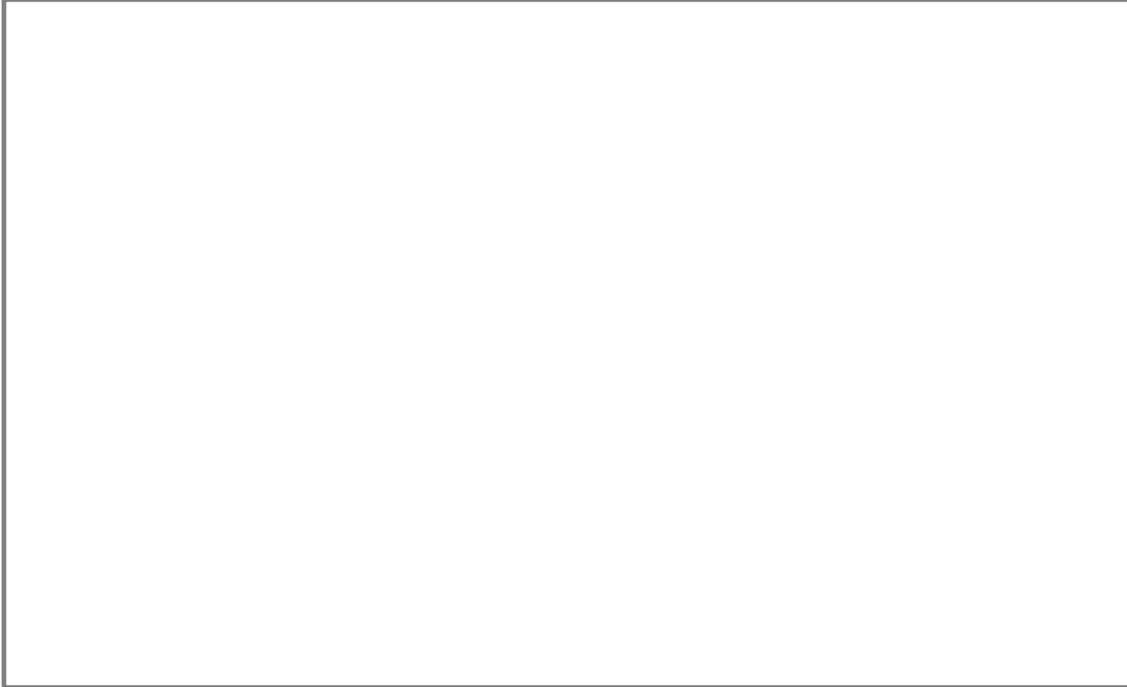
Region:

Authors:

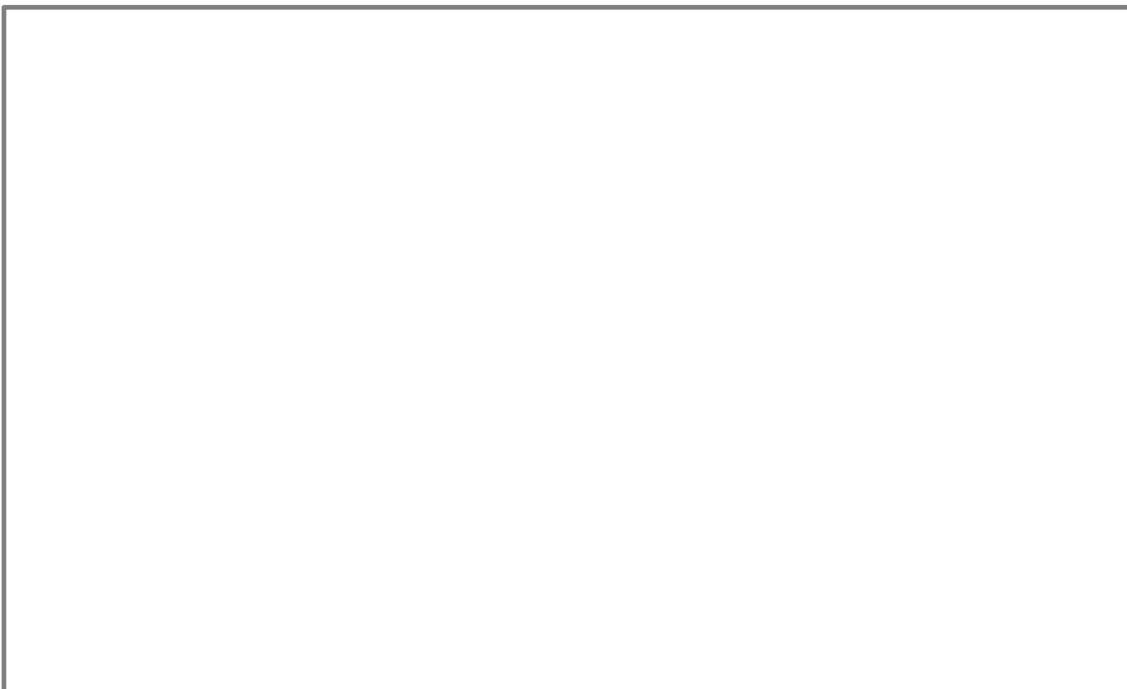
1. Name of the learning community, including web address

2. Content (explain the focus of the learning community, what is been done, what type of events are organised etc.)

3. Objective of the learning community (for example sharing knowledge or building up skills)



4. What is the added value of this learning community for BECOME?



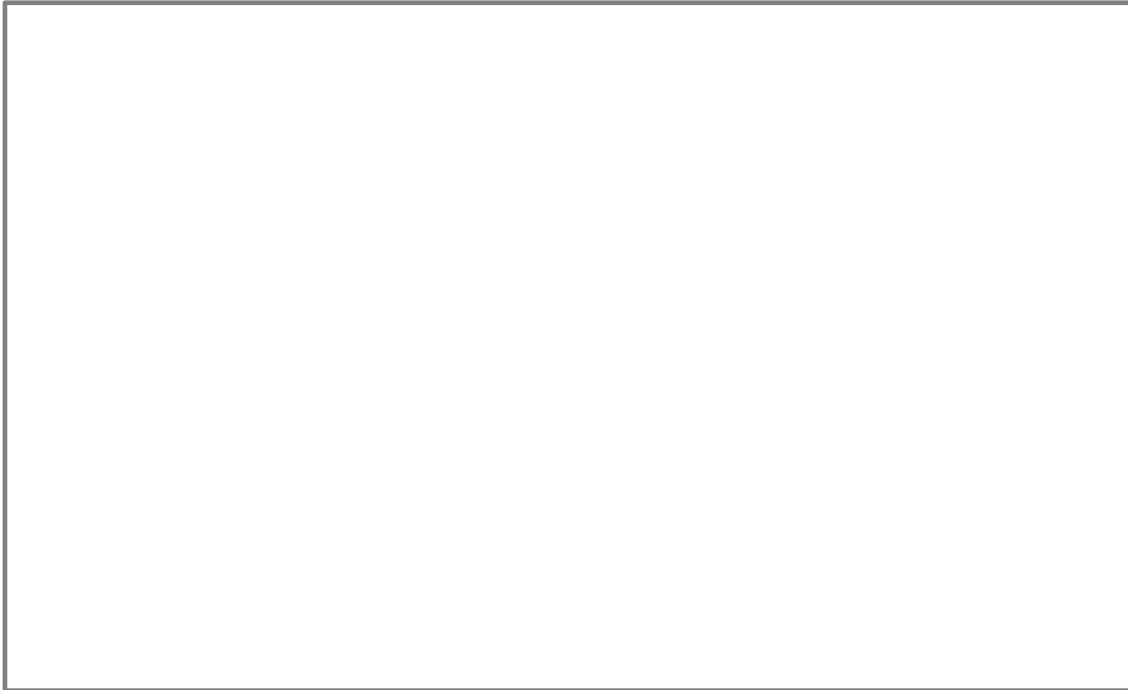
5. Who is the target group of this learning community?



6. Which stakeholders are involved in this learning community (in terms of organization)?



7. What is the timeline of this learning community? (e.g. when was it established, how frequently events are being organised)



Please upload pictures of your good practice learning community [here](#).

Appendix 4: Overview of education

Region	Partner	Course name	Part of degree programme	Amount of credits	Keywords
Netherlands	HU	Circular stad (Circular City)	Yes & No, minor programme	30 ECTS	Circular economy, resources, energy, creativity, multidisciplinary
Bulgaria	UMG	Circular economy	Part of Master degree programme	5 ECTS	Circular economy, circular business models
Bulgaria	UMG	Sustainable development	Part of Bachelor degree programme	4 ECTS	Sustainability
Bulgaria	UMG	Corporate social responsibility	Part of Bachelor degree programme	6 ECTS	CSR
Bulgaria	UMG	Emission inventory	Part of Master degree programme	5 ECTS	
Bulgaria	UMG	Environmental, social and corporate g	Part of Master degree programme	5 ECTS	Ecological pillar, social pillar, sustainable governance
Slovenia	IEDC	Circular economy (elective)	Elective at BA (1st cycle) level	6 ECTS	
Slovenia	IEDC	Environment, School of Environmenta BA, MA Study Programme			Environmental pollution, protection, policy and management
Slovenia	IEDC	Environmental and Regional Studies; I PhD Programme			Interdisciplinarity; urbanization, climate change, decreasing biodiversity, increasing the incidence of natural disasters
Slovenia	IEDC	Environmental and Spatial Studies; U PhD Programme		240 ECTS	Environment, nature and space; social construction of nature space, natural environment and space as a restricting or developmental factor
Slovenia	IEDC	Sustainability: From Standards to CSFD Expert Program	CSFD Expert Program		CSFD and related EU regulations
Finland	RASEKO	Creating a circular economy product	Yes	15 ECTS	Circular economy, production of a circular economy product
Finland	RASEKO	Promotion of sustainable development	Yes	1 ECTS	Sustainable development
Finland	RASEKO	Promoting sustainable development in	Yes	3 ECTS	Sustainable development
Finland	RASEKO	Working in textile sorting (Tekstiliilait)	Yes	15 ECTS	Circular economy, sustainable development
Finland	RASEKO	Circular economy functions (Kiertotalo)	Yes	15 ECTS	Circular economy, sustainable development
Finland	RASEKO	Vocational Qualification in Business, c	No, graduate programme	80 ECTS	Circular economy, sustainable development, business
Finland	TUAS	Sustainable Development and Corpor	Business Administration		5 sustainable development, corporate social responsibility, CRS strategy
Finland	TUAS	SUSTIS project of sustainable develop	Energy and Environmental Engineer	3	not available
Finland	TUAS	Entrepreneurship and Sustainable Bu	Energy and Environmental Engineer	5	Entrepreneurship, Sustainable Business, Resource efficiency, material efficiency, and energy efficiency
Finland	TUAS	Renewable energy production	Energy and Environmental Engineer	7	solar power, wind power, hydro power
Finland	TUAS	Sustainable Development and Busines	Industrial Management and Engineer	5	sustainable development, LCA, business
Finland	TUAS	Entrepreneurship and Sustainable Bu	Mechanical Engineering	5	Entrepreneurship, Sustainable Business, Resource efficiency, material efficiency, and energy efficiency
Finland	TUAS	Introduction to Life Cycle Assessment	Mechanical Engineering	2	Life Cycle Assessment, analysis, process
Finland	TUAS	SUSTIS project of sustainable develop	Information and Communications Tec	3	not available
Finland	TUAS	SUSTIS project of sustainable develop	Business logistics	3	not available
Finland	TUAS	SUSTIS project of sustainable develop	Sales work, financial services	3	not available
Finland	TUAS	Occupational Safety and Sustainable	Visual Arts	5	safety environment, sustainability, health
Finland	TUAS	SUSTIS project of sustainable develop	Mechanical Engineering	3	not available
Finland	TUAS	Green Logistics	Vehicle and transportation engineering	5	eco balance of logistics, responsible logistic, recycling, waste disposal logistics
Finland	TUAS	Environmental issues and habitat cont	Energy and Environmental Engineer	4	environmental issues, habitat
Finland	TUAS	Environmental legislation and econom	Energy and Environmental Engineer	4	environmental politics, environmental law, environmental taxes
Finland	TUAS	Climate now basics	Energy and Environmental Engineer	4	climate change
Finland	TUAS	The methods of Circular Economy	Energy and Environmental Engineer	5	Circular economy, possibilities of circular economy
Finland	TUAS	Climate change guest lecture series	Energy and Environmental Engineer	5	climate change, circular economy, non-government organizations
Finland	TUAS	Solutions.now	Energy and Environmental Engineer	5	Climate change, depleting natural resources, pollution and urbanization
Finland	TUAS	Circular Economy	Energy and Environmental Engineer	5	circular economy, limited resources
Finland	TUAS	Practical Business in Circular Econo	Energy and Environmental Engineer	5	start-up, entrepreneurships, circular economy
Finland	TUAS	Life cycle assessment	Energy and Environmental Engineer	5	LCA, analysis
Finland	TUAS	Competence Needs and Missing Skill	Energy and Environmental Engineer	5	circular economy, transition to circular economy
Finland	TUAS	Specialization Studies in Circular Ec	Energy and Environmental Engineer	10	project work, circular economy
Finland	TUAS	Emission Control and Purification Te	Mechanical Engineering	5	emission control, emission calculation, flue gas emissions
Finland	TUAS	SUSTIS project of sustainable develo	Bio and Chemical Engineering	3	not available
Finland	TUAS	sustainable building	civil engineering	2	Low-carbon construction, responsibility in the construction industry, Sustainable development
Finland	TUAS	SUSTIS project of sustainable develo	Building architect	3	not available
Finland	TUAS	Low-carbon construction	Building architect	5	Carbon neutrality, Low-carbon construction, Carbon footprint, Sustainable development
Finland	TUAS	SUSTIS project of sustainable develo	Electrical and Automation Engineer	3	not available
Finland	TUAS	SUSTIS project of sustainable develo	Industrial Engineering	3	not available
Finland	TUAS	Sustainable and Client-Oriented Soc	Nursing education	5	ecologically, socially, culturally and economically sustainable development
Finland	TUAS	The Basics of Circular Economy Bus	Master of business administration	5	circular economy, limited resources
Finland	TUAS	The development of circular econom	Master of business administration	5	circular economy, circular economy development activities
Finland	TUAS	Assessment and Measurement of Er	Master of Engineering, energy and e	5	measuring environmental and social impacts in sustainable circular economy
Netherlands	RDCMN	Duurzaamheid B	No, minor programme		Circular economy, footprint, corporate social responsibility
Netherlands	RDCMN	Duurzaamheid C	No, minor programme		Circular economy, footprint, corporate social responsibility
Netherlands	RDCMN	Duurzaamheid D	No, minor programme		Circular economy, footprint, corporate social responsibility
Netherlands	RDCMN	Technicus in smart building			Smart Building
Netherlands	HU	Bachelor Built Environment; first two	yes	120 ECTS	studies: mechanical engineering, electrical engineering, technical business administration, built environment
Netherlands	HU	Institute for Design & Engineering; C	yes	30 ECTS	studies: mechanical engineering, electrical engineering, technical business administration, built environment
Netherlands	HU	Institute for Design & Engineering; graduation programme	yes	30 ECTS	studies: mechanical engineering, electrical engineering, technical business administration, built environment
Netherlands	HU	Master of Urban & Area		30 ECTS	Future-proof Development and Management
Netherlands	HU	Technical Business Administration; first year about circular models. Second year design engineer about sustainable design, circularity as	yes	120 ECTS	sustainable & circular design
Netherlands	HU	Electrical Engineer; Life-cycle engineering, aspects of circularity	yes	5 ECTS	
Netherlands	HU	Logistics Management; making the circular performance of companies measurable	yes		
Netherlands	HU	Chemical Studies; circular	yes		
Netherlands	HU	Communication and Multimedia Design; circular assignments per semester for students	yes	30 ECTS	
Netherlands		Technicus engineering - BOL			Circular technologies, smart technologies
Netherlands		Civiele techniek Infra-BOL			Sustainability and landscaping
Netherlands		Rnwkw uncle			

Annex 7: Survey and Interview guide

Introduction

According to the World Overshoot Day statistics, we consume planetary resources 1.75 times faster than they can regenerate. Additionally, our current “take-make-waste” model of production and consumption predominantly relies on the extraction of virgin materials. Currently, the global economy is only 7.2% circular. Our aim is to educate future leaders in the fields of business and education on how to use less, longer and reuse (regenerative) materials. To accomplish this we link the corporate sector and educational institutions (VET, HEIs) to work together to foster skills of future experts in circular economy, so they will be able to develop viable solutions for circular economy and its respective business models. That is why the BECOME project, Boosting Circular Economy Expertise through Learning Communities, was started in Spring 2024.

This project is a European project, sponsored by the European Commission and carried out in four different regions: Utrecht (The Netherlands), Turku (Finland), Bulgaria and Slovenia.

The goal of this interview is to understand your perspective on circular economy. We would like to know whether this topic is important for your organization, what type of education we associate with it and how we could work together more effectively on this topic.

1. Name
2. Organisation/company
3. Job description
4. Email

Concepts & terms

5. How do you define Circular Economy?

Definition BECOME

“In a circular economy, all activities take place within the **boundaries** of the **earth**, while at the same time ensuring that certain minimum social conditions are met (Raworth, 2013). These conditions relate to health and **well-being, added value that goes beyond money alone**, support of culture and society and the maintenance of the living environment. The circular economy simultaneously ensures that **materials and raw materials are continuously recycled** at a high level and a resilient region that adapts to changes and external shocks.” (Circular indicators, Metabolic, 2016)

The role of Circularity

6. Is circularity a priority for your organization?
No/yes/other
7. If no, why not?
8. If yes, why is circular economy incorporated in your organization?
9. If yes, how is circular economy incorporated in your organization?
10. If other, please explain the position on circularity and the reason for this?

Developments

11. What are the key developments within your organization on circular economy?
12. What are the biggest challenges when implementing circular practices (for example circular business models)?

13. If you answered 'other', can you explain what the biggest challenge is for you to implement circular practices in your organisation?

Skills & competencies

14. Rank your top 5 skills from the list below in terms of importance for circular development in your organization. [list of skills, different for each region, based on literature search]
15. Out of your top 5, do any skills jump out as being more important for your organization?
16. What critical (circular) skills are missing from you employees/students?
17. How do you think you can bridge this gap?
18. Do you feel like any resources (for example time), materials or education is missing on circular economy in your organisation? Please elaborate.

Learning communities

19. Do you see an added benefit from a community of peers in developing circular practices in you organization?
20. If YES what type of effect do you expect this to have?
21. If NO, can you elaborate?
22. What form would such a community need to have in order to be attractive for your organization? Think about communication channels, knowledge shared within industry, collaboration forms and type of activities organized
23. If you answered 'other' can you please explain what other elements make such a community attractive for your organization?
24. Which learning communities or networks are you already part of?

Conclusion

Are there any aspects of circular economy you would like to share, but we have not discussed today?

Thank you for your time.

Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-PP	Towards E The Todd New Innov	HRK/HR	OP-PTLV FR	FR_BE_IT_ES	132,875.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-EE	Circular E For Youth New Innov	IRK/IR	COMPRED ES	ES_LV_PT_EL_RO	162,386.08	No	FALSE	FALSE	FALSE	FALSE	TRUE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2015	2015-1-NE	Peer-Vieles Connected Interactio	IRK/IR	DRING NL	NL_BE_SE	308,064.00	No	TRUE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-JH	CHinnot Connected New Innov	HRK/HR	COVENTI UK	UK_PL_IT_EL_DE	318,813.25	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for adult education	2018	2018-1-CC	Creating a The great Open and	HRK/HR	MUTU CZ	CZ_NL_B	118,462.48	No	TRUE	TRUE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for higher education	2016	2016-1-AC	Substrate! The pink Enterprise	IRK/IR	NORBER NO	NO_ES_DK	178,083.20	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for Schools Only	2017	2017-1-TI	BE GREEN The Big an Enterprise	HRK/HR	RES ES/AT	IT_NO	183,523.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation European Universities	2020	2017-1-PP	How many Floors the Interactio	IRK/IR	Lydia Pro FR	FR_PL_DE_RO_IT	102,597.17	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation European Universities	2020	10100400	UNIFA - U1 UNITALIA	IRK/IR	UNIVERS IT	IT_PT_PL_RO_ES	6,001,000.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation European Universities	2020	10100404	EURECA- University	IRK/IR	MONTANI AT	AT_ES_JC_DE_ES_PL	4,983,340.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation European Universities	2020	10100402	ENLIGHTEN - ENLIGHT	IRK/IR	UNIVERS SE	SE_PL_SK_DE_ES_BE_IT	4,939,990.00	No	TRUE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for adult education	2017	2017-1-EE	Circular E - Connected Enterprise	IRK/IR	UNIVERS ES	ES_EL_PT_IT	180,448.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for adult education	2017	2017-1-TI	Promoting Turkish in New Innov	IRK/IR	ANKARA TR	TR_DE_NL_SE	184,475.00	No	TRUE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2016	2016-1-RC	Circular E The win o New Innov	IRK/IR	CAMERA RO	RO_UK_ES_BE_BO_MT	184,581.38	No	FALSE	FALSE	FALSE	TRUE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-EE	Towards a For a King Enterprise	IRK/IR	ADCCAC ES	ES_ES_PT_SE	185,862.00	No	FALSE	TRUE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-TI	AgriFood e APPETIT Interactio	IRK/IR	TRENCH	TR_IT_FR_DE_ES	235,066.59	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-EE	Circular E An online Enterprise	IRK/IR	TRENCH	ES_AT_IT_UK_BE_PL	118,877.00	No	FALSE	FALSE	FALSE	FALSE	TRUE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2016	2016-1-EE	BIOPLANT BIOPLANT Research	IRK/IR	PONDICH ES	ES_BE_IT_DE	20,292.00	No	FALSE	TRUE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2017	2017-1-DP	Enhance 1 The EU is Enterprise	IRK/IR	DEI DEMAR DK	DK_EL_IT_BE_ES	193,465.00	No	FALSE	FALSE	FALSE	FALSE	TRUE
Erasmus+ Cooperation Strategic Partnerships for Schools Only	2016	2016-1-LL	Let's talk with me on EU Cities	IRK/IR	ESPA PL UJ	LU_IT_EL_DE	83,825.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for higher education	2015	2015-1-PL	Advanced The object Interactio	IRK/IR	UNIVERS PL	PL_PT_ES	272,460.25	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for youth	2016	2016-1-YB	You HOOCCOFTED Enterprise	IRK/IR	TRAVIA IT	TR_PT_IT_ES	38,705.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Capacity Building for youth in ACP countries, Latin America and Asia	2015	589515-B	Young Co-YOUNCOON Enterprise	IRK/IR	ASSOCIA IT	IT	149,928.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for higher education	2015	2015-1-RC	Legal Info The progme New Innov	IRK/IR	UNIVERS RO	RO_BE_IT	183,123.00	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for higher education	2014	2014-1-RC	The Innov The Europ Energy an	IRK/IR	INSTITUT RO	RO_PL_UK_BE_CZ	168,847.50	No	FALSE	FALSE	TRUE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships for vocational education and training	2014	2014-1-PP	Centre For Commerce Economic	IRK/IR	ATMERS FR	FR_IT_ES_BE	277,580.47	No	FALSE	FALSE	FALSE	FALSE	FALSE
Erasmus+ Cooperation Strategic Partnerships addressing more than one field	2014	2014-1-CC	Creating a The progme Enterprise	IRK/IR	LANDREDE	DE_ES_PL_BE_ES_PT_NL	270,213.00	No	TRUE	FALSE	TRUE	FALSE	FALSE

Annex 9: Additional regional good practices

Slovenia

[Ekologi brez meja](#)

Ecologists Without Borders advocate for a world without waste, which they strive to achieve through awareness, activation, and especially by connecting individuals, decision-makers, and organizations. Their mission is to discover new topics and provide data that can influence changes in policies and habits. They are leaders in the field of waste management, focusing their efforts primarily on waste prevention. They organise educational workshops and monthly activities. Established in 2009.

[Eko krog](#)

Their goal is to establish an important national and international center for environmental activism. They collaborate on environmental legislation, organize educational programs for activists as well as children and youth, address and solve specific environmental issues, connect knowledge and experience within and outside the Eko krog, and establish connections with experts and other organizations on a national and international level. Established in 2005, they organise few activities yearly.

[Fit media](#)

Fit medias Green Slovenia has a vision of co-creating a green Slovenia – a low-carbon society focused on sustainable development. It connects a wide range of communication, development, and research projects in the field of sustainable development. Through various programs, it engages and connects businesses, professional and governmental institutions, and young professionals to drive sustainable changes and develop sustainable competencies that create added value. They publish a monthly magazine.

The Netherlands

Cirkelstad, [Cirkelstad, hét platform voor koplopers in de bouw - Cirkelstad](#)

2. Content (explain the focus of the learning community, what is been done, what type of events are organised etc.)

Cirkelstad is a national platform that connects private entrepreneurs and policymakers who are working towards the transition to a circular economy in pioneering Dutch cities³. **The focus** of the initiative is on the circular and inclusive construction sector³. It aims to return waste streams back into the chain and utilize all talents in the district².

Cirkelstad facilitates public and private pioneers in the region by connecting a managerial and operational network, sharing 10 years of experiences via the Cirkelstad Academy, and jointly advancing in the respective region with periodic coordination to generate impact³.

what is being done, Cirkelstad is actively involved in various projects and programs³. For example, the 'Zero Waste' project was set up by Heijmans Bouw & Techniek, Jan Zevenhuizen, and Cirkelstad Apeldoorn³. This project fits within Heijmans' strategy to build and maintain fully circular by 2023³.

events organized, Cirkelstad hosts a mix of events, both online and physical, local/regional, and provincial⁶. Some of the upcoming events include 'Cirkelstad Zuid-Holland: Biobased insulating. How?' and 'Cirkelstad Partner Day'⁵. They also provide a platform for partners to submit their events to be included in the Cirkelstad agenda⁴.

Sources:

1. [Cirkelstad | European Circular Economy Stakeholder Platform](#)
2. [Cirkelstad. hét platform voor koplopers in de bouw - Cirkelstad](#)
3. [Over ons - Cirkelstad](#)

3. Objective of the learning community (for example sharing knowledge or building up skills)

The objective of Cirkelstad is to serve as a platform for pioneers in the circular and inclusive construction sector who want to do, learn, and meet each other³. It aims to address two significant societal issues: how to return waste streams back into the chain and how to utilize all talents in the district².

Cirkelstad facilitates public and private pioneers in the region by connecting a managerial and operational network, sharing 10 years of experiences via the Cirkelstad Academy, and jointly advancing in the respective region with periodic coordination to generate impact³. The focus is on creating a fertile ground for lasting cooperation between the partners².

In essence, the objective of Cirkelstad is to create "Cities without waste and without exclusion" by promoting circular and inclusive building practices².

(1) Cirkelstad, hét platform voor koplopers in de bouw - Cirkelstad. <https://www.cirkelstad.nl/>.

(2) Over ons - Cirkelstad. <https://www.cirkelstad.nl/over-ons/>.

(3) Home | Cirkelstad. <https://academie.cirkelstad.nl/home>.

4. What is the added value of this learning community for BECOME?

Cirkelstad offers significant added value for education programs that are seeking to develop circular skills. Here's how:

1. **Knowledge Sharing**: Cirkelstad serves as a platform for pioneers in the circular and inclusive construction sector to share their knowledge and experiences¹. This can be incredibly valuable for educational programs as it provides access to practical insights and learnings from the field.
2. **Networking Opportunities**: The platform facilitates networking between public and private pioneers in the region². This can help educational programs connect with industry professionals and potential employers.
3. **Practical Tools**: Cirkelstad offers a toolbox with concrete tools to perform on the set performances in the New Normal³. These tools can be used by educational programs to provide students with practical skills and understanding of circular building practices.
4. **Cirkelstad Academy**: The renewed Cirkelstad Academy provides a first foothold for parties who want to work with concrete circular building in projects³. This is not only worked out for clients but is also certainly relevant for contractors, to come to a uniform language and understanding³.

In summary, Cirkelstad can provide education programs with the knowledge, network, and tools necessary to effectively teach and implement circular skills.

(1) Cirkelstad, hét platform voor koplopers in de bouw - Cirkelstad. <https://www.cirkelstad.nl/>.

(2) Home | Cirkelstad. <https://academie.cirkelstad.nl/home>.

(3) Over ons | Cirkelstad. <https://academie.cirkelstad.nl/over-ons>.

5. Who is the target group of this learning community?

The target group of the learning community mentioned on the current page is **koplopers in de circulaire en inclusieve bouwsector**. This includes pioneers in the circular and inclusive construction sector who are interested in doing, learning, and meeting others within the platform of Cirkelstad. They aim to work towards cities without waste and exclusion.

6. Which stakeholders are involved in this learning community (in terms of organization)?

Cirkelstad is a national platform that connects various stakeholders who are delivering the transition to a circular economy in pioneering Dutch cities¹. The stakeholders involved in this learning community include:

1. **Private Entrepreneurs:** These are individuals or businesses that are actively involved in the circular and inclusive construction sector².
2. **Policy-Makers:** These are individuals or organizations that have the power to affect decisions within the circular and inclusive construction sector².
3. **Educational Institutions:** These are schools, colleges, and universities that are interested in teaching and implementing circular skills².
4. **Non-Profit Organizations:** These are organizations that are dedicated to furthering a particular social cause related to the circular and inclusive construction sector².
5. **Government Agencies:** These are government entities that are interested in promoting and implementing circular and inclusive building practices².

These stakeholders come together to share knowledge, network, and collaborate on projects and programs aimed at promoting circular and inclusive building practices². They explore the current (and future) stakeholders, their ground positions, and their ambitions and interests that play a role in the area development³.

1

7. What is the timeline of this learning community? (e.g. when was it established, how frequently events are being organised)

Cirkelstad was established when public and private entrepreneurs were struggling with issues in the area of the circular economy³. Unfortunately, the exact establishment date is not mentioned in the sources I found.

As for the frequency of events, Cirkelstad organizes Communities of Practices 4 times yearly in various Circle-cities³. In addition to these, there are several overall activities undertaken, including the publication of a biweekly City newspaper and offerings from the Cirkelstad Academy³. You can find more details about their upcoming events on the Cirkelstad agenda⁴.

(1) About Cirkelstad - Cirkelstad. <https://www.cirkelstad.nl/english/>.

(2) Agenda Cirkelstad - Cirkelstad. <https://www.cirkelstad.nl/agenda-cirkelstad/>.

(3) Event inzending - Cirkelstad. <https://www.cirkelstad.nl/event-inzending/>.

(4) Cirkelstad, hét platform voor koplopers in de bouw - Cirkelstad. <https://www.cirkelstad.nl/>.

(5) Over ons - Cirkelstad. <https://www.cirkelstad.nl/over-ons/>.



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