



LIFE Project Number  
**LIFE20 IPE/DK/000001**

**Interim Report**  
**Covering the project activities from 01/01/2022<sup>1</sup> to 31/12/2024**  
**corresponding to Phase 1**

Reporting Date<sup>2</sup>  
**31/03/2025**

LIFE PROJECT NAME or Acronym  
**LIFE-IP CE Beyond Waste**

**Project Data**

<b>Project location:</b>	Denmark
<b>Project start date:</b>	01/01/2022
<b>Project end date:</b>	31/12/2029 <b>Extension date:</b> <dd/mm/yyyy >
<b>Total budget:</b>	€ 16.898.621
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<b>(%) of eligible costs:</b>	59,46

**Data Beneficiary**

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<sup>1</sup> For the first Interim report and Final report: Project start date; for the second and subsequent Interim reports: Start date of the Phase reported

<sup>2</sup> Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

### Package completeness and correctness check

This table comprises an essential part of the report and should be filled in before submission. The evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing. All elements are expected in electronic version only.

Obligatory elements	✓ or N/A
<b>Technical report</b>	
The correct latest template for the type of project (i.e. integrated project) has been followed and all sections have been filled in, in English.	✓
Index of deliverables with short description annexed, in English.	✓
<u>Interim report</u> : Covers the phase concluded; Deliverables due in the phase being reported on (or due in previous phase(s) and not yet submitted) annexed.	✓
<u>Final report</u> : Covers the entire project duration (see instructions on exceptions to this in next page); Deliverables not already submitted with the Interim reports annexed including the Layman's report and after-LIFE plan.	
Deliverables in language(s) other than English include a summary in English.	
<b>Financial report</b>	
The reporting period in the financial and technical reports is the same; the period corresponds to the duration of the phase being reported on. For the Final report, an additional consolidated financial statement covering the entire project duration is included.	✓
<u>In the case of corrections / changes to costs submitted in a previous period:</u>	
<ul style="list-style-type: none"> <li>• An updated financial statement for the previous period is provided with the changes highlighted in a different colour;</li> <li>• The difference (+ or -) per cost category is included in the financial statement of the new period in the related cost category at the bottom in one single line 'changes to financial statement XX/XX/XX – XX/XX/XX';</li> <li>• The auditor has validated the changes (if needed);</li> <li>• Explanations on the changes are provided in section 9 of the technical report.</li> </ul>	
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated. <i>Preferred: electronic version signed with a Qualified Electronic Signature + full Excel file</i> <i>Alternatively, a pdf of the blue-ink signed* consolidated financial statement + full Excel files (the originally signed document should be kept by beneficiary in case of future audit).</i>	✓
Financial Statement(s) of the Coordinating Beneficiary, of each Associated Beneficiary and of each affiliate (if involved), with all forms duly filled in. The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. <i>Preferred: electronic version signed by each beneficiary with a Qualified Electronic Signature + full Excel files.</i> <i>Alternatively, a pdf of the blue-ink signed* financial statement(s) + full Excel files (the originally signed documents should be kept by beneficiary in case of future audit).</i>	✓
Names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms, and amounts are consistent across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement).	✓
Beneficiary's certificate(s) included for beneficiaries claiming 100% cost for durable goods. <i>Preferred: electronic version signed with a Qualified Electronic Signature</i> <i>Alternatively, a pdf of the blue-ink signed* beneficiary certificate(s) (the originally signed documents should be kept by beneficiary in case of future audit).</i>	N/A
Certificate(s) on financial statement (if required, i.e. for beneficiaries with EU contribution $\geq$ 750,000 €) once the cumulative amount of payment requests reaches 325,000 €. <i>Preferred: electronic version signed with a Qualified Electronic Signature</i> <i>Alternatively, a pdf of the blue-ink signed* certificate(s) on financial statement (the originally signed documents should be kept by beneficiary in case of future audit).</i>	✓

<b>Other checks</b>	
Clarifications and supporting documents requested in previous letters from the Agency.	
This table, page 2 of the Interim / Final report, is completed - each tick box is filled in.	<input checked="" type="checkbox"/>

*\*original signature by a legal or statutory representative of the beneficiary / affiliate concerned*

**Instructions:**

Please refer to the General Conditions annexed to your Grant Agreement for the contractual requirements concerning an Interim/Final Report.

The first Interim Technical Report shall report on progress from the project start-date; the following Interim Technical Reports shall detail progress during the Phase reported although where necessary a consolidated assessment of progress since the start of the project may be required, in particular when discussing the project's contribution to the targeted Plan / Strategy and progress towards the attainment of the project objectives. Final Technical Reports shall report on progress from the project start-date, except for sections 6.3 and 9.4 which may refer only to the final phase (in addition section 8 is not applicable to them).

Interim Reports must be submitted to the Agency as indicated in the Annex II. The Final Report must be submitted to the Agency no later than 3 months after the project end date.

Please follow the reporting instructions concerning your technical report, deliverables and financial report that are described in the document "Guidance on how to report on your LIFE 2014-2020 projects", available in the [Reporting section](#) of the LIFE website. Note the specific guidance given for financial reporting at the Final report stage.

Please download the guidance anew with each report to ensure you have the latest version as it is regularly updated.

Additional guidance concerning deliverables, including the layman's report and after-LIFE plan, are given at the end of this reporting template.

Regarding the length of your report, try to adhere to the suggested number of pages while providing all the required information as described in the guidance per section within this template.

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## 1. Executive Summary

The EU LIFE IP project Circular Economy Beyond Waste (CEBW) aims for the full implementation of the Action Plan for Circular Economy 2020-2032 (APCE) in a manner that reinforces and accelerates the transition to a circular economy, thereby ensuring resources remain at the highest possible level of the waste hierarchy for as long as possible and a reduction of CO<sub>2</sub> emissions. The main categories in the waste hierarchy are prevention, reuse, and recycling. The majority of the projects' actions fall within one of these three categories. In addition to them, there are actions that support implementation. These are the supportive actions (A2, C1, C2, C3, C4 and C5), and also the obligatory actions (D, E and F).

This Phase 1 Interim report summarizes the project progress for the first three years, 2021-2024. The project spans eight years and comprises three distinct phases. CEBW involves 33 partners collaborating on 26 concrete implementation actions.

The overall project management of CEBW is conducted by Central Denmark Region (CDR). Project management encompasses comprehensive project administration, financial reporting, monitoring, and communication, which are integrated into the D-E-F actions along with the management of A2, C1, and C3. The C1 action, which focuses on capacity building, has played a significant role in the project's development.

### Overall progress across all C-actions

The project is progressing as planned. All action leads have successfully established strong project teams, integrated into professional networks through C1, and achieved, or are on track to achieve, innovative results that significantly contribute to the practical implementation of the APCE.

The largest anticipated or achieved gains in relation to direct or qualitative benefits have been observed in Action C6.3, which focuses on the transition from single-use to multiple-use in the healthcare sector, and in Action C7, which has worked on methods for increased reuse and extended lifespan across five sub-actions. The construction sector is particularly burdensome concerning CO<sub>2</sub> emissions and resource consumption, and Action C10.1 has made progress by increasing the reuse of bricks and developing methods for creating new housing within existing buildings.

In relation to qualitative environmental benefits, all C-Actions are engaged in this area, and the specific outcomes are reviewed in Section 4.1.2.

Regarding economic and social benefits, Section 4.2, several C-Actions are already reporting the establishment of permanent positions—amounting to a total of 8 jobs, (some of which are part-time), by the end of Phase 1. In addition to this, opportunities for volunteering and education for young people have also been created. The social benefits, particularly from the five sub-actions under C7, are very evident, ranging from increased social interaction in repair cafés, to the establishment of brushwood fences, and to courses that promote engagement across gender, age, and ethnicity.

In relation to Section 4.3.1, several actions have established cross-sectoral collaboration and new types of interaction between citizens and public authorities, resulting in tangible outcomes.

Likewise, several C-Actions have developed methods and approaches that are suitable for replication. A replication that is already taken place (Section 4.3.2.)

Several transboundary outcomes and impacts have been established (Section 4.3.3.)

It is central to the continuation of project results and to the efforts to overcome barrier implications that there is contact with the political level. Section 4.4 describes how this work has been facilitated, for example, through the Regional Political Forum in the Central Denmark Region, the political committee of CEBW, and by developing a promising tool aimed at making political decisions more focused on achieving circular objectives. The work on barriers has been conducted systematically through data collection across all actions, which has been thematized in the next phase and will be communicated with the aim of achieving impact both locally, nationally, and internationally, as outlined in Section 4.4.

Overall, there is good progress in all C-Actions, although some actions have faced delays and adjustments due to factors such as new legislation, staff turnover and maternity leave. The PM Unit has proactively addressed these challenges, taking on additional responsibilities to ensure continued progress across all actions.

#### Project Management by CDR (F)

This includes the Project Management Unit's (PM Unit) efforts in communication, monitoring, capacity building, and overall project management.

CDR established a robust organizational structure within the first year to secure the implementation of project. This structure comprises of the PM Unit, a steering group, political committee, coordinating body, and a communications platform.

The project management has maintained a close and intensive dialogue with the partners regarding technical, administrative, and financial challenges and opportunities, which have contributed to ensuring progress throughout the project.

The PM Unit has processed two amendments, of which Amendment 1 in 2023 resulted in major adjustments of the project. Amendment 1 mainly occurred due to new Danish legislation. The political agreement "Climate Plan for a Green Waste Sector and Circular Economy"<sup>3</sup> led to new legislation on waste treatment, with a new division of labour between the public and the private sector when it comes to material recovery of waste<sup>4</sup>. Because of this several partners chose to withdraw from action C9 and overall project, and a new action C9 was created with Randers Kommune (RK) as new lead partner.

#### Communication and Outreach Platforms (E)

The organization's communications platform has been established and has served as a foundation throughout the first phase of the project. The platform includes a visual identity, logo, website, LinkedIn profile, story map, newsletter, production of articles, and a podcast series. The PM Unit will continue to develop each aspect and emphasize the part of dissemination and replication even more. The aim is both to create communication inside the project and create an outreach to other actors on the Circular Economy Scene.

#### Capacity Building Initiatives (C1)

The PM Unit has prioritized ensuring professional capacity building across partners and within their respective networks. An annual wheel has been developed to schedule 5-7 technical webinars, each

<sup>3</sup> Klimaplan for en grøn affaldssektor og cirkulær økonomi, Juni 2020

<sup>4</sup> Introduced in law L898/2022, a revised waste announcement (affaldsbekendtgørelsen, BEK 2512, 10-12-2021) and the waste operator announcement (affaldsaktørbekendtgørelsen, BEK 938, 20-06-22).

featuring three presentations, as well as two seminars, networking meetings, and professional guidance at the project level. Additionally, field trips to Amsterdam and Rotterdam, along with two major conferences, have been held. These initiatives have led to the following outcomes: Enhanced innovation levels; Improved ability to think in terms of value chains; Strengthened capability to seek solutions higher up in the waste hierarchy; Greater understanding and application of principles from the circular economy ; Improved facilitation of meetings involving stakeholders with differing perspectives, Reduced sub-optimization of local solutions; Established common understandings at a national level and influence the upcoming new APCE; Strong interest in collaborative learning and working across boundaries; Communication and strategic development occurring at both local and national levels. These achievements reflect the commitment to cultivating a robust circular economy framework, embracing collaborative efforts, and aligning stakeholders towards a sustainable future.

#### Monitoring of impact (D)

Monitoring is essential for progressing through project phases. The PM Unit has established structures and tools (incl. a monitoring plan) to monitor the progress and the impacts of the project. The PM Unit conducted 17 visits involving all partners during autumn 2024 to gain a detailed understanding of action progress. These insights provided a comprehensive understanding for the PM Unit of the project's overall progress, the Action D deliverables and Phase 2 planning in every action. Partner visits also revealed which action results were ready for or already were being disseminated and replicated. Environmental and socio-economic baseline data has successfully been provided and inserted into the KPI webtool by the PM Unit. Projections and goals from APCE have been taken into account while providing the data.

#### Status of complementary projects

33 complementary projects with a total amount of 65.008.959 euros were either granted or initiated during Phase 1. Results from the individual actions have begun to emerge, and this means that the partners are increasingly looking at new project opportunities. During phase 2 and 3 the PM Unit will work strategically with complementary actions – both in terms of cooperation with existing projects and development of new ones - by supporting project development and fundraising efforts.

#### Policy implications and the sustainability of the results of CEBW

It is the assessment of the PM Unit that most tools and results developed in CEBW can potentially be up-scaled nationally and internationally. Some results have already been replicated to several municipalities and others are ripe to enter this process through network and dialogue with relevant stakeholders. This specific theme is addressed in chapter 4, section 4.3.2 with examples of replication activities.

After the project's second phase, the PM Unit expects to have created a better understanding of how transition to a more circular resource management works. This is expected to strengthen the PM Unit's ability to influence both practical and political levels supporting a more powerful transition to a circular economy.

#### Major amendment

A major amendment will be necessary to implement in 2025. This is due to new legislation in Denmark concerning the responsibilities of the Danish regions, which will revoke the regions' right to work with climate-related matters, among other areas, by the end of 2025.

The legislation covers the area of “Regional Development” within the regions, where climate-related activities are carried out in the geographical territory. Regional Development serves as the coordinating beneficiary in the Central Denmark Region (CDR), where the Project Management Unit is located. As a consequence, the Central Denmark Region (CDR) will no longer be able to act as the coordinating beneficiary in CE Beyond Waste. However, the legislation does not cover climate-related work and projects within the region's own organization, which are managed by the Healthcare Administration. This means that there is still a possibility for CDR to continue as a beneficiary with Action C6.3, which is currently led by the CDR Healthcare Administration.

Two other beneficiaries, the Capital Region of Denmark (CR) and the Region of Southern Denmark (RSD), are covered by the same legislation. Both regions are expected to withdraw from their commitments in CE Beyond Waste. This means that RSD is expected to withdraw from CE Beyond Waste entirely. Similar to CDR, however, there is a possibility that CR may continue some of its activities — specifically, Action C8, in which CR participates through its Healthcare Administration.

In addition, Fredensborg Kommune (FK) wishes to withdraw from the partnership.

Regarding the role of Coordinating Beneficiary, in spring 2025 CDR conducted a process to identify an actor willing and able to take over the role. On that basis, Silkeborg Municipality (SIK) expressed interest in assuming the role. On 24 June 2025, the City Council of SIK made the final political decision to take over the role of Coordinating Beneficiary and has allocated the necessary co-financing.

CDR and CINEA have already initiated dialogue concerning the amendment process.

## 2. Project relation to the Plan

The purpose of this chapter is to describe the relationship between the project activities, the objectives and the national plan for prevention and management of waste.

Circular Economy Beyond Waste (acronym LIFE-IP CE Beyond Waste and abbreviated "CEBW") aims at the full implementation of the Action Plan for Circular Economy (APCE). APCE is the national plan for the prevention and management of waste 2020-2032. It aims to reinforce and accelerate the shift to a circular economy to keep resources at the highest possible level. APCE describes Danish policy, and the specific initiatives based on the circular value chain, which spans from design and consumption to waste management, from which natural resources are fed back into new products and materials.

The APCE includes a total of 129 initiatives, many of which are part of the Climate Plan for a Green Waste Sector and Circular Economy (2020), the Strategy for Green Public Procurement (2020), the National Strategy for Sustainable Construction (2021), the Strategy for Circular Economy (2018), and the Plastics Action Plan (2018).

The strategy of the IP is to support the implementation of the APCE by laying a foundation of circular capacities and concrete circular solutions and best practices which are necessary in order to reach the overall vision and goals described in APCE. To reach the goals of APCE the IP is composed of actions that address both prevention, reuse and recycling of waste as well as cross-cutting actions which facilitate and support these efforts.

The three main objectives in the IP are:

O1. Waste prevention: *To prevent waste generation and reduce consumption of primary resources by introducing and integrating circular approaches in the actions and behaviour of public authorities, private enterprises as well as among citizens.*

O2. Circular waste management: *To turn waste to resources by implementing circular economy practices in the treatment of waste; realise markets for reuse and secondary raw materials and innovate waste monitoring to include effects of circularity and thus incentivise circular economy.*

O3. Regulation: *To improve the regulatory framework, governance, and incentives for circular economy, waste prevention and circular waste management by identifying regulatory barriers to circularity and providing feedback and guidance to political and administrative decision makers.*

Actions and means are designed to meet the three objectives.

CEBW encompasses a wide range of both A and C-Actions within the areas of prevention, reuse, and recycling, as well as several supporting functions. These supportive functions are designed both to ensure the implementation of the C- actions and to ensure that barriers and lack of incentives do not become bottlenecks for implementation.

More specifically the actions A2 and C1-C5 catalyze, facilitate and support the development within and replication of the actions C6-C15, which are dealing with public procurement, reuse, recycling, specific waste fractions, business waste and citizen empowerment. Beneficiaries and other stakeholders (e.g. follower municipalities, waste companies, businesses, universities and interest organizations), have actively designed the actions together with the three main beneficiaries – CR, EPA and CDR – and planned them to make maximum use of the adaptive approach and ensure replicability.

The cross-cutting issues addressed in C1 have been identified by the consortium members as important topics for the design and implementation of the local WMPs. C1 will support consortium members in obtaining the competences needed to design, implement and replicate A1, and C6-C15 activities in accordance with local needs.

CE Beyond Waste has combined IP actions with complementary actions to bring about the full implementation of the APCE and the circular transition in several ways:

- Firstly, the IP will build CE capacities among the partnerships, relevant to the implementation of the APCE, e.g., municipalities, regions, waste management companies, businesses, universities and educational institutions, interest organisations, civil society organisations and citizens. It will do so through a great number of capacity building activities focusing on both general CE understanding and particular themes such as procurement, reuse and recycling. It will also facilitate networking and coordination between key stakeholders to ensure optimal dissemination of circular best practices as well as an effective implementation of the APCE.
- Secondly, the IP intends to strengthen institutional and technical capacities along the entire value chain among its stakeholders in a circular transition by facilitating formalised public-private partnerships and value chain collaborations, which will lead to development and demonstration of new business models and new circular solutions. Those new partnerships and value chain collaborations are expected to contribute to improved market conditions for reuse, recycling and secondary raw materials, as the stakeholders find ways to climb the waste hierarchy and discover new ways of creating value through circular solutions (e.g., through job creation and other socio-economic and environmental benefits).
- Thirdly, the IP intends to contribute to improved framework conditions for the circular transition, e.g., by designing and implementing the new extended producer responsibility and by mapping regulatory and governance barriers for the circular transition and feeding those insights into the revision of the APCE in 2027 and the revision of local waste plans. Those measures will support the dissemination and replication of the circular best practices developed and demonstrated in the IP, by promoting systemic changes that provide the best possible conditions for circular solutions and practices to be broadly adopted and implemented across all relevant stakeholders in the full geography of Denmark.

The Danish government is responsible for the implementation, application and enforcement of the Waste Framework Directive (2008/98/EC), but the actual waste management plans (WMPs) are decided at local level. Thus, there is not one (national) WMP, but an overall national strategy and a waste decree (Affaldsbekendtgørelsen) as well as up to 98 municipal WMPs (some municipalities have made joint WMPs). To ensure that the IP activities are adapted to reflect local needs and thus support the implementation of the local WMPs, several mechanisms are put in place.

The IP activities will be adapted to local circumstances by prioritizing the involvement of key local stakeholders during all phases of the IP, ensuring that specific local aspects are kept in mind during the design, implementation and replication of the IP activities. To tackle any local legislative, political and administrative constraints, thorough and timely dialogue with the stakeholders affected by potential limitations in the local regulatory framework to implement projects will be ensured.

The IP enhances the circular transition in Denmark by implementing the APCE in synergy with complementary projects, which also aim individually to implement certain circular measures.

#### Tabular summary of Project relation to Plan

The attached Annex 4 (which was Annex VI of the CE Beyond Waste Full Proposal, "Implementation overview of the targeted plans/strategies") illustrates how each component or objective of the APCE is supported by the LIFE IP and by the supportive complementary actions.

### 3. Administrative part

The purpose of this chapter is to present the mechanisms and working methods put in place by the CDR to manage the project, ensure progress and achievement of the IP objectives and ensure collaboration with stakeholders and other relevant actors.

#### 3.1 The project management process

The establishment of the Project Management Unit (PM Unit) within Central Denmark Region benefited from a strong foundation. Two existing employees of the region, who were instrumental in developing the LIFE Integrated Project (LIFE IP) application, provided a wealth of relevant knowledge and expertise at the project's inception in 2022. Since then, the team has expanded to include five staff members (incl. a newly hired staff member in autumn 2024). During Phase 1, the PM Unit was challenged in securing qualified financial staff to replace a departing financial officer but eventually succeeded.

Each of the members of the PM Unit brings unique skills and experiences to the team, fostering a collaborative environment that promotes knowledge sharing and development of new activities.

The PM Unit is responsible for the overall coordination and administration of the project. This includes establishing governance structures (coordinating group, political committee and Steering group), communication channels, and monitoring systems.

A primary focus of the PM Unit has been to build the capacity of project partners to ensure motivation and progress. Many partners lacked the necessary administrative or technical expertise to participate in a complex EU-funded project. Many have had to familiarize themselves with rules, requirements, and terminology that were new to them, and several have hired new project managers who have also had to acquire new skills, both in administration and in the specific technical area of their action, as well as learning how to act as a project manager. To address these challenges, the PM Unit has utilized several working methods which complement each other.

First, the PM Unit maintains an ongoing dialogue with partners, providing support and addressing any challenges they may face. An initial project administration meeting was held, followed by one-on-one meetings with partners when needed. Annually, partners submit technical progress reports detailing their achievements in the action, for example work packages, deliverables, and milestones. This enables the PM Unit to monitor progress, identify potential issues, and plan accordingly.

Furthermore, to enhance our partners' financial management capabilities, the PM Unit has collected annual financial reports. This provided a valuable learning opportunity and prepared both the PM Unit and partners for the final Phase 1 financial reporting. Both the technical and financial management have been supported by the individual partnership agreements between Central Denmark Region (CDR) and the partners.

Also, the PM Unit has implemented many capacity building activities mainly in collaboration between action C1 and E. The Unit has organized several seminars and webinars as part of C1 to strengthen partners' project management skills and overall expertise. Also, a communication workshop was conducted to improve partners' understanding of effective communication strategies.

## 3.2 Cooperation regarding complementary actions

The PM Unit has engaged directly with all complementary actions listed in the original project application during the initial monitoring visit. This interaction enhanced the PM's understanding of these actions, their connection to CEBW, and laid the groundwork for future development and collaboration.

At this stage of the project, several partners are increasingly identifying new project opportunities. Many have already submitted applications for funding through both EU and national programs. To support these efforts and take a more strategic approach to both mapping existing and developing future complementary actions, CDR has hired a dedicated employee.

The PM Unit recognizes that many IP partners see significant potential in launching new actions and projects, as their work on CEBW highlights emerging needs. Additionally, CDEU—a project partner and CDR's EU office—is leveraging its expertise in fundraising and EU funding opportunities to develop new projects.

## 3.3. Involvement of prominent stakeholders

To ensure involvement of relevant stakeholders a PM Unit, a coordinating body, a steering group and a political committee have been established. See description of PM Unit in section 3.2.

### *Coordinating Body*

The PM Unit works closely with both The Danish Environmental Protection Agency (EPA) and The Capital Region of Denmark (CR) in the coordinating body. Meetings have taken place approximately every 3 months with a smaller pause of six months around spring/summer 2024 due to management changes in the organizations. The purpose of the meetings is addressing specific issues regarding both steering group and political committee as well as:

- All three partners are leading actions in the IP, and hence the meetings serve to keep each other up to date on these actions – both in terms of progress and challenges.
- Due to the length of the project and partnership, changes in employees at all levels are inevitable, and hence the meetings serve as an easy way in for new people in all three organizations.
- Having a close relationship makes it easier to overcome possible challenges between the partners – it simply strengthens the relationship to meet this often.

Focus of the Coordinating body in the coming years will increasingly be how to create a catalytical effect of the results of the project, and the PM Unit will discuss the best way forward with the body.

### *Steering group*

The member organizations of the Steering group are:

Central Denmark Region (Chairman) (CDR)

The Danish Environmental Protection Agency (EPA)

Capital Region of Denmark (CR)

DAKOFA – Competence Centre for Circular Transition ([Dansk Kompetencecenter for Cirkulær Omstilling - DAKOFA](http://Dansk Kompetencecenter for Cirkulær Omstilling - DAKOFA))

Bornholm Municipality (BRK)

Danish Chamber of Commerce ([Danish Chamber of Commerce: Come meet us here!](#))

Træls (private company that recycles and reuses wood - [FORSIDE - Træls - bæredygtige produkter & miljøer](#))

Aalborg University (AAU)

Roskilde University Center ([Roskilde University](#))

The Danish Plastics Federation ([English \(EN\) - Plastindustrien](#))

Confederation of Danish Industry ([Danish Industry \(DI\) - Confederation of Danish Industry](#))

Central Denmark EU Office ([CDEU](#))

Kingo Recycling A/S - private recycling company (<https://en.kingo.biz/>)

Brancheforeningen Cirkulær (Industry Association of Waste Handling - [Brancheforeningen Cirkulær - Fra affald til ressourcer](#))

During the project's first phase, there were three meetings in the group, and 6 members participated in the end-of-phase 1 conference, which the PM Unit sees as a success and a sign of commitment.

The meetings have served several purposes:

1. To get the group's members to know each other
2. To let the members learn about the project and its individual actions
3. To get advice on specific themes regarding both the project as a whole and from individual actions
4. To get technical input for the end-of-phase-1 conference held on November 20<sup>th</sup> 2024
5. Enhancing Group Members' Roles as Project Ambassadors

In addition to participating in steering group meetings, the PM Unit has invited members to engage in specific tasks that support the project's initiatives. While only two members have accepted this invitation so far, the PM Unit remains optimistic that more will join when relevant opportunities arise. Additionally, members have been involved in promoting key initiatives through articles and podcasts—an approach that has proven beneficial for both the project and the members themselves.

The steering group initially comprised more than 20 members. However, some have since left, primarily due to job transitions. This presents a challenge, as recruiting new members is both resource-intensive and complex, particularly in a group that has been active for three years.

Another ongoing challenge has been ensuring that meeting content remains relevant to all members. The PM Unit continuously works to strike this balance, and thus far, engagement has remained strong, with members maintaining interest in both the project and their roles within the group.

### *Political committee*

Members of political committee

2 politicians from Central Denmark Region

2 politicians from Capital Region Denmark

2 politicians from municipalities of Central Denmark Region

2 politicians from municipalities of Capital Region Denmark

2 politicians from the Danish Parliament

1 Danish politician from the European Parliament

Three meetings have been held in the political committee, with the primary goal of ensuring that members are well-acquainted with the project. Unlike the steering group, the committee members have less technical expertise, so an additional focus has been on introducing them to the overarching theme of circular economy. The PM Unit is actively working to maximize the committee's impact, with a particular emphasis on securing political traction for the project's insights and outcomes.

Two of the members took part in the project study tour to Amsterdam in April 2024, which was a great experience for both members and of great value to the PM Unit. Two members also participated in the end-of-phase 1 conference. Unfortunately, it has posed a significant challenge to get the members to prioritize meetings in the committee. Out of the 11 members, 6 took part in the first two meetings. The third meeting had to be postponed, because only three members took part. Especially members of the Danish Parliament have been difficult to get to participate. This is a challenge the PM Unit had foreseen, but it remains difficult to solve.

#### *Strategic partnerships outside the IP*

Furthermore, the PM Unit is increasingly working on establishing strategic partnerships outside of the project to prepare for replication and dissemination activities. The PM Unit has analysed and mapped relevant interest organizations and other actors and are working on establishing mutually beneficial partnerships. The PM Unit has already identified, reached out to and held meeting with several strategic stakeholders, and the response has been positive.

DAKOFA and Cirkulær (The Industry Association for Municipalities and Municipal Waste Companies) - also members of the Steering Committee - are two of those organizations. Federation of Danish Industries – also part of the Steering Committee – participated in the end-of-phase 1 conference showing increasing interest in the project's results.

Secretariat leader of ARI – Danish Waste and Resource industry – also participated in end-of-phase 1 conference, which the PM Unit considers a potential organization for more collaboration, even though this has been somewhat hindered due to the legislation preventing value chain collaboration.

In Action C1, the PM Unit has engaged in collaboration with Ferskvandscentret ([Ferskvandscentret](#)) about an educational programme for workers at recycling stations and sees potential in working even closer in future due to the success of the first course, where 26 workers participated and 20 more were on waiting list.

Also, EU network CCRI plays a key role in dissemination and replication at EU level, and CEBW are increasingly making strides to have partners present results at relevant events here. Most recently (March 2025), both Favrskov Forsyning (FAFO) and Aalborg University (AAU) held presentations at a CCRI webinar.

The aim with working closely with these stakeholders outside of the project is to increase the projects overall impact, because they have relevant networks and contacts that can aid the promotion and implementation of the project's solutions in organizations outside the partnership.

### 3.4 Communication with the Agency and Monitoring team

The PM Unit has had an excellent and very useful communication and cooperation with both the Agency and the monitoring team. Two physical monitor visits took place in 2022 – the project advisor from CINEA participated online at the second meeting. A few online meetings with the monitor team have also taken place during Phase 1, in relation to preparing amendments and interim report. Communication via email and the Help Desk has been used frequently by the PM Unit in relation to administrative, financial, reporting etc. questions. The monitors as well as CINEA have provided useful guidance when needed, both in the day-to-day operations of the IP and in relation to preparing amendments and the interim report.

CDR accepts that the number of monitor visits has been reduced, even though the meetings are of great value to the PM Unit.

### 3.5 Administrative changes due to amendments

Amendment no.1 to the Grant Agreement was rather comprehensive and complicated, which meant that it was both time consuming and entailed quite a large workload to prepare. Further there was an amendment no. 2, which required less time and resources. The work on the amendments has not led to administrative changes as such, but on the basis of the experiences and lessons learned from the amendment work, the PM Unit has acknowledged that similar tasks require planning and often very intense sparring with partners and sometimes extensive rewriting of actions.

Overall, the changes due to the two amendments were as follows:

- 8 partners leaving and 1 new partner joining CE Beyond Waste
- Substantial revision of action C9 (due to changes in national legislation that hindered the implementation of the original action). Linked to 5 partners leaving
- Minor revision of actions C5, C6.2, C7.1, C7.5 as well as very small changes in C14.1 and C15
- An affiliate partner (to partner AVA C7.1 lead)
- Substantial budget changes, mainly due to the 8 partners leaving
- Changes in a number of Deliverables, Milestones and Timetables
- Administrative modifications
- Amendment no.1 thus implied a revised Full Proposal, incl. revised Financial Forms

## 4. Project impact and analysis of contribution to implementation of the of Plan

In this chapter the PM provides an overview of the project impact to date as well as analysis of different aspects of the project's contribution to the APCE. In section 4.1, the environmental benefits are presented. In section 4.2, insight is provided into the economic and social benefits of the project. In section 4.3, a variety of impacts are described such as innovation, demonstration, best practice, replicability, transferability, cooperation and transboundary outcomes and effects. In section 4.4, policy implications are reviewed along with an overview of legislative impact and bottlenecks. Finally, in section 4.5 the PM provides insight into capacity building within the project, the sustainability of the project as well as comments on impacts, barriers, challenges, and lessons learned.

### 4.1 Environmental benefits

#### 4.1.1 Direct / quantitative environmental benefits

In this section we focus on direct and/or quantitative environmental benefits in relation to reductions of emissions, energy or resource savings already accomplished in Phase 1.

In CE Beyond Waste (CEBW) we aim to assist and accelerate the practical implementation of a waste management and prevention plan that primarily has been designed to contribute to the Danish government's goal of reducing GHG emissions by 70 % in 2030. The Danish waste sector still relies heavily on incineration and therefore initiatives like CEBW, that focuses on making a shift towards alternatives, are important. Also, the use of resources is a major source of CO<sub>2</sub> emissions and the CEBW actions have a focus on reducing this impact. Conserving natural resources is equally crucial. By reducing consumption through reusing, recycling, and choosing more sustainable alternatives, we can alleviate the pressure on Earth's resources, which is a key focus of CEBW.

The partnership in CEBW actively works on a range of actions to support the APCE - Action Plan for Circular Economy, 2020-2032, and its goals for reducing emissions and saving resources. In the KPI module, we have referred to and established two national quantitative targets:

1. Waste, Waste Management: Mass of non-appropriately managed waste and mass reduction due to waste prevention, valued by "Municipal waste per capita."
2. Climate Change Mitigation, Greenhouse Gas Emissions: CO<sub>2</sub>, reduction in CO<sub>2</sub>e in the waste sector, valued by "Total CO<sub>2</sub> emissions in the waste sector."

These are the targets we aim to achieve with CEBW, thereby optimizing and strengthening Denmark's ability to meet the quantitative goals set in the APCE. We have obtained measurements for the two national quantitative goals, which are further elaborated in Chapter 7 on Key Project-Level Indicators.

In all C-actions, we work towards reducing emissions and conserving resource consumption. But, since the implementation of CEBW is still in its early stages, there are currently only a few actions with concrete data on emission reductions or resource savings.

Action C6.3, developing tools to promote the transition from single-use to multiple-use textiles within the healthcare sector, has demonstrated significant results for single items:

- A multi-purpose blanket is approximately 80% implemented across the entire Central Denmark Region. This saves around 18 tons of single-use waste per year and reduces CO<sub>2</sub>e by approximately 70% compared to the single-use version.
- A thermal jacket, currently being procured for the entire region, is aiming for full implementation by 2025. This will save 2 tons of waste and reduce CO<sub>2</sub>e by approximately 70% compared to the single-use version.
- Surgical caps, test of PFAS-free fabrics for surgical gowns, drapes, and protective gowns are in the making.

In C.7, which comprises five sub-actions, the general focus is on reducing waste generated by citizens and increasing the reuse of household waste and waste from recycling centers. In C.7.2 and C.7.4, quantifiable results have been achieved in Phase 1. C.7.2 has established a new recycling area and a repair workshop, successfully reducing waste per citizen annually by 67 kg from 2022 to 2023 (compared to the expected 15 kg reduction over the entire lifetime of the sub-actions). C.7.4 has worked on reducing citizens' waste through increased awareness, behavioral changes, and new waste management practices. For example, a total of 2.5 km of brushwood fences have been established, significantly reducing waste. These brushwood fences have contributed to a CO<sub>2</sub> reduction of 2,500 tons from 2022 to 2023.

Under C.10.1, which promotes sustainable construction by increasing the reuse of building materials, an increase in construction waste being reused directly has been observed. In Horsens Municipality (Horsens Kommune – HoK, action lead) alone, the amount has increased by 88% (from 66 to 124 tons), primarily due to the increased reuse of bricks.

#### 4.1.2 Qualitative environmental benefits

In addition to the quantitative benefits already achieved in Phase 1 (see 4.1.1), several actions are expected to generate such measurable benefits in the long term and/or have achieved qualitative benefits during Phase 1. These are reviewed below, with a particular focus on the four obligatory topics. Subsequently, the integration of environmental and climate policies into other policies is described, along with contributions to sustainability and synergies with the objectives of other EU policies, particularly those addressed by the IPs.

*i. Qualitative or not yet quantified environmental benefits and four obligatory topics:*

The four obligatory topics:

1. Have there been any developments in long-term sustainable technology, from product to functional focus, from end-of-pipe to prevention?
2. Is there a higher visibility and/or engagement and participation for environmental problems and/or solutions, with regulators, decision makers, interest groups and/or other stakeholders including the general public?
3. Have there been any demonstrable behavioral or organizational or procedural changes in any stakeholder groups?
4. Are there any 'spin-off' or catalyst effects in other environmental themes and focus areas such as spatial and development planning, agriculture, forestry, or industry etc.

The four obligatory topics will be included below in the review of the relevant actions.

C2 is intended to lead to more municipal initiatives for sustainable development in the long term by improving the framework conditions for municipalities to work with circular economy and related areas.

C4 generates environmental benefits by changing companies' incentives in product marketing. Packaging, electronics, and batteries transition from being the citizen's waste responsibility to becoming the company's financial responsibility. With extended producer responsibility, companies are required to manage their products' life cycle, including the waste phase, in line with the "polluter pays" principle. This is expected to reduce consumption, particularly of virgin raw materials, and promote the development of durable products with longer lifespans. Extended producer responsibility also includes economic instruments that strengthen prevention, reuse and recycling efforts.

C5 is working on establishing a databank making it easier to compare and track data on reuse and make use of the data for waste prevention and planning, and environmental monitoring and statistics, thus paving the way for a shift towards more reuse.

C6.1, which focuses on public procurement, has developed a guide to assist public authorities in setting requirements for plastic selection. This guide also challenges suppliers to develop products with lower environmental impact and recyclable materials. Overall, this initiative can lead to reduced plastic consumption, less plastic waste, and lower levels of incineration.

C6.2, building on Doughnut Economics, has created a decision-support model to help public decision-makers—initially in municipalities—make informed choices regarding the environmental and climate impacts of procurement, road construction, renovations, or new building projects.

In addition to the quantifiable results mentioned earlier, Action C6.3 has also taken other significant initial steps toward replacing single-use hospital textiles with reusable ones, reducing environmental and climate impacts. Key actions include:

- Developing a TCO++ tool to analyze single-use textiles that can be replaced by reusable alternatives.
- Creating and testing product specifications for new multiple-use textiles in clinical settings.
- Identifying a "plug-and-play" unit for washing sterilizable textiles.
- Partnering with a company to develop and test PFAS-free textiles.

This initiative sets new standards for reusable textiles, offering substantial environmental and health benefits. It directly addresses three obligatory topics:

- Developing sustainable technologies: Eliminating PFAS in medical textiles reduces harmful chemicals, promoting sustainability through prevention rather than reactive solutions.
- Increasing engagement in environmental issues: Collaboration with the Danish Environmental Protection Agency on TCO and screening tools demonstrates a strong focus on eco-friendly solutions, influencing regulation and decision-making.
- Driving behavioral change: New product requirements reshape supply chain processes, creating demand for environmentally friendly practices among suppliers and stakeholders.

In C.7, comprising five sub-actions, the focus is generally on reducing waste among citizens and increasing the reuse of household waste and waste from recycling centers. Beyond the quantitative effects outlined in Section 4.1.1 in C7.2 and C7.4, qualitative effects from C.7.1 include the establishment of pilot neighborhood recycling stations and swap boxes. These initiatives enhance environmental awareness among citizens, integrate reuse into daily life, and increase recycling. Additionally, local communities are engaged through events such as knife sharpening and bike repair workshops.

In C7.2, new technology has been developed—an unmanned guidance system for improved sorting and recycling, adaptable to all recycling centers in Denmark. Resource savings are achieved through reuse and upcycling, such as a collaboration with a company that refurbishes and repaints used canvases, making them like new. Behavioral changes include a stronger focus on reuse among citizens and improved waste sorting through partnerships with local schools.

C7.3 has focused on changing citizens' behavior at recycling centers, encouraging them to prioritize reuse over recycling, for instance, by setting aside building materials for reuse rather than disposal.

In C7.4, efforts related to brushwood fences have increased awareness of waste as a resource that creates value when avoided. The initiative has particularly engaged citizens, children, and young people through educational materials on waste prevention and biodiversity. The project has gained national attention, with over 12 municipalities establishing brushwood fences inspired by RENO's (action lead) project. RENO's experiences have been widely shared, and the industry association Circular has incorporated brushwood fences into its strategy for preventing garden waste.

Also, C7.5 has had effects on the obligatory topics. Development of Sustainable Technologies: Focusing on repair over disposal extends product lifecycles, reduces raw material demand, and minimizes the environmental impact of manufacturing new products. Increased Engagement with Environmental Solutions: Collaboration among educational institutions, local businesses, and waste management authorities, promoting sustainability. Behavioral Changes: Young people at FGU Bornholm learn to repair appliances, fostering environmental responsibility and Recycling center staff now prioritize repairable items, shifting from disposal to reuse.

As a result of C8, working with means for high-value and closed-loop recycling of textile flows, the regional authority, The Capital Region of Denmark (CR), expects to implement the developed requirements in their upcoming tender, to be published at the beginning of phase 2, with a goal of 50% reduction in CO<sub>2</sub> emissions from textile procurement. The actual impact of this will be determined in phase 2.

C9 is, among other things, working towards developing industrial symbioses between a number of companies. If succeeding, this will transform plastic waste into a resource by promoting the use of recycled plastic instead of virgin plastic, thereby reducing CO<sub>2</sub> emissions and waste volumes.

Apart from the quantified impacts in 4.1.2, action C10.1 will develop a catalogue with specific savings for selected building materials, capable of calculating CO<sub>2</sub>, water, and raw material savings based on building materials destined for recycling centres.

In C10.2, a digital tool has been developed to document the reuse and recycling of building materials with a focus on traceability and safe handling. The tool also calculates the CO<sub>2</sub> savings achieved through material reuse. Additionally, a material screening and dialogue tool has been created to promote the

early reuse and recycling of three specific building materials: clay tiles, glass, and bricks. The tool provides calculations of both economic and climate savings from reusing the selected materials.

C11 mainly targets the obligatory topic “Developing new technology” by promoting innovative solutions for packaging waste, including: A delamination technology to recycle multilayer packaging, reducing incineration waste, pending regulatory clarification; A milk dispenser system enabling reusable containers, cutting single-use packaging, with local adoption challenges like hygiene; Reusable packaging systems for SMEs to replace disposable options, offering sustainable, cost-effective alternatives.

C12, which aims to prevent electronic and electrical equipment transforming into e-waste with a focus on Large Household Appliances (LHA), have made preliminary steps to fulfill the expected environmental results, that is a CO<sub>2</sub>e-reduction due to increased reuse rates of LHA and 6.100 tonnes of CO<sub>2</sub>e reductions. The actual impact is expected to be determined later.

Facilitated by C14.1 an automated waste sorting plant is expected to be established soon and to be operational within two years. This will be the second plant of its kind in Denmark. This will support the breakthrough of automated sorting for a better use of waste streams.

C14.2, with the purpose of developing start-ups working with products based on surplus resources and/or waste to reduce waste, expects an estimated 10-20% reduction in waste production from the companies participating in the project. As this is long-term result, it requires more time for data collection and measurement to fully assess the impact of new business models on waste reduction and will thus not be visible until later. Obligatory topics targeted: Through tailor-made courses the action has raised awareness among participants of environmental challenges and how circular business models can address them thus promoting behavioral changes that focus on sustainability.

In C14.3 aspires to accelerate circular economy within businesses by creating knowledge on CE and making CE tools and CE guidelines accessible to businesses and municipalities. Three tools have been developed, tested, and refined in close collaboration with stakeholders: Circular Economy Registration Form: A form enabling municipal staff to easily record discussions on circular topics with businesses, ensuring progress tracking without the need for direct handovers. It can function independently or integrate into existing municipal systems; Competence-Building Tool for Municipalities: A two-part tool supporting cross-department collaboration to enhance interdisciplinary dialogue with businesses and guiding staff to reliable circular economy resources; Dialogue Tool for Reusable Takeaway Packaging: A resource providing knowledge, recommended approaches, and documentation methods to prepare municipal staff for discussions with local businesses and large chains on transitioning from single-use to reusable packaging.

In C15, a citizen assembly on sustainable consumption has been established, leading to increased awareness and engagement in sustainable consumption among its members. This has also resulted in greater demand for political leadership and regulation in this area, addressing obligatory topic 2.

*ii. All IPs – multi-benefit approach:*

Although the IP is only finishing its first phase, the partnership has made some activities that already benefits other policy areas, such as integration of the environment and climate policies into other policies, contributing to sustainable development and creating synergies with other EU policies. Below we mention a few examples.

C6.2 aims to broadly integrate environmental considerations into municipal policies and strategies, including procurement and construction, through its decision-support model.

C6.3 has demonstrated direct environmental benefits with its results in reusable textiles, inspiring behavioral and policy changes.

C7.5, along with the other C7 sub-actions, contributes to sustainable development by reducing waste, saving resources, and educating the next generation on the importance of repair and reuse. It also fosters a culture of sustainability that can be replicated across other regions and sectors.

C9 directly supports Randers Municipality's (RK) business, procurement, and tendering policies.

## 4.2 Economic and social benefits

Phase 1 has included activities within specific actions that, along with additional activities in the upcoming phases, can generate positive effects in the form of both economic benefits, such as cost savings and business opportunities, and social benefits, such as employment and health improvements.

The mini guide for public procurement in C6.1. is expected to result in better opportunities to market green innovative products for SMV's with employees on the margins of the labor market.

C6.3 has had a variety of effects. A temporary project manager has been hired, and more jobs are expected in a future sterile central. 1 ½ job has been created in a private company in the UK. A number of economic opportunities have been created for private companies, particularly suppliers of medical textiles and laundries, who can now develop and provide PFAS-free solutions. Also, user interviews measured and documented an improved work environment through the use of reusable textiles creating health effects. Lastly, the transition to reusable textiles will reduce waste volumes, leading to long term savings in waste management.

In terms of social benefits, the NGS (neighborhood recycling stations) and swap boxes in C7.1 have provided economically disadvantaged citizens access to free, usable items. The NGS has served as a social hub through activities like knife sharpening, bike repair workshops, and electronics maintenance. These initiatives have fostered social interaction and strengthened community ties among diverse residents. Economically the Self-service NGS and swap boxes allow citizens to sort and deposit materials without constant staffing. Investments in technologies like video surveillance and smart sensors reduce the need for manual oversight, cutting operational costs. Also monitoring systems track waste container levels and cleaning needs, enabling demand-driven operations that reduce unnecessary tasks and costs. NGS has also led to new income opportunities for local green entrepreneurs.

C7.2 has created four new jobs, two with reduced work capacity. Social benefits include a repair workshop serving as a meeting place and practice-based community hub, with measurable impact through participant numbers in workshops and activities. Academically challenged youth gains employment experiences through hands-on projects that result in tangible, usable outcomes.

In C7.3 two recycling advisors have been hired in permanent positions, and in addition one employee with reduced work capacity. There has also been a significant economic saving following the redirection of 40 tons of collected waste from recycling processes to direct reuse, resulting in estimated savings of DKK 20,000.

The collaboration in C.7.4 with Repair Café at RENO's premises supports citizen engagement, as volunteers work in the repair café. Economic benefits include the brushwood fence activities reduces the amount brought to RENO's recycling centers, saving on transport costs both for citizens and RENO. Additionally, it lowers processing costs, as RENO now handles less garden waste than before.

C7.5. has had several positive social impacts: Through practical training and involvement in repair activities, young people and adults who are marginalized or on the fringes of the education and labor markets gain valuable skills and experience that can help them reintegrate into the workforce. By making repaired white goods available at lower prices, opportunities are created for people with fewer financial resources to purchase used appliances. Repair activities are expected to be carried out by a private company, creating economic opportunities as well as a need for additional skilled labor.

Laying the foundation for implementing greener requirements in CR's upcoming tenders, C8 has provided an economic incentive for a more sustainable product range in the market.

In C9, the collection and processing of plastic waste is expected to create jobs for individuals outside the labor market and support the development of new business models for the companies involved.

C10.1 has created ½ job at a recycling centre.

Facilitated by C14.1 an automated waste sorting plant is expected to be established soon in Central Denmark Region (area of Skive) and to be operational within two years. This will be the second plant of its kind in Denmark. The investment is likely to reach DKK 30 million and generate 10-15 new jobs.

In C14.2 an employee with reduced work capacity has been hired to assist the project manager at Holstebro Kommune (HbK). The courses taking place in this action have engaged a diverse range of participants, fostering inclusivity across ethnicity and gender. It has also empowered marginalized groups, including the unemployed. The action has unlocked significant economic opportunities by equipping participants with the tools, knowledge, and networks needed to build viable business models. As the participants startups gain traction, job creation is expected to grow.

The deliberative process in the *Sustainable Consumption Citizen Assembly in C15* —where citizens engaged in knowledge building and discussions on sustainable consumption—has proven to enhance understanding of consumption challenges and known research argues that such participation fosters democratic engagement in general.

## 4.3 Innovation, demonstration, replicability, transferability, cooperation and transboundary effects

### 4.3.1 Innovation, Demonstration and Best Practice

CE Beyond Waste (CEBW) contributes to innovation and best practices in implementing circular economy and waste reduction across multiple levels, encompassing collaboration, approaches, technologies, and methods.

Several CEBW actions have successfully fostered cross-sector collaboration by adopting new approaches to mobilization and co-creation. For example, in Action 7.4, RENO piloted a co-creative approach involving a nature-based, locally driven waste prevention initiative in collaboration with stakeholders such as local communities and schools. A tangible result is a reduction of 1,945 tons of garden

waste. RENO also views this initiative as a first step toward a new approach, redistributing roles and responsibilities between the waste management company and citizens.

C15 serves as a best practice project, building on previous experiences with citizen assemblies, such as the French Climate Citizens' Assembly. The deliberative process in the *Sustainable Consumption Citizen Assembly*—where citizens engaged in knowledge-building and discussions on sustainable consumption—has proven to enhance understanding of consumption challenges and foster democratic support for increased consumption regulation. This experience could inspire additional processes that build knowledge and facilitate dialogue on sustainable consumption. While the citizen assembly method is resource-intensive and unsuitable for scaling to larger populations, it is ideal for gathering citizen input for policymaking. Lighter formats for knowledge-building and dialogue facilitation could be better suited for broad education and outreach efforts targeting larger groups.

Actions C14.2 and C14.3 exemplify initiatives that, by the end of Phase 1, have delivered prototype models for new approaches, advancing best practices for mainstreaming circular business models in SMEs and municipalities.

While introducing circular business models in entrepreneurship programs is common, the process model developed in C14.2 positions circular economy and planetary boundary principles as foundational to participants' business ideas, rather than as an add-on.

C14.3 innovatively leverages inspection contexts to improve communication, understanding and implementation of circular principles among SMEs. It has developed tools for municipal staff to facilitate dialogues about circular economy during inspections and easy-to-understand tools for SMEs to independently integrate circular economy concepts into their operations. These tools will undergo iterative testing and refinement, followed by dissemination of the finalized concept and best practices to other Danish municipalities.

Actions within the *prevention pillar* have shown significant innovation by developing methods embedded in existing systems:

- C6.2 created a tool during Phase 1 that equips municipalities to integrate circular economy into their core decision-making processes. This tool was presented to the political leadership of Gentofte Municipality (Gentofte Kommune (GK), actionlead), which decided to adopt it for future budgeting and decision-making practices. While it is too early to measure the tool's environmental impact or the extent of circular principle adoption, positive feedback and interest from other municipal actors—evident in webinars—suggest strong appeal and replication potential.
- C6.3 focuses on reusable textiles in healthcare through innovative procurement processes. CDR has challenged conventional procurement procedures by conducting early and close market dialogues with suppliers and conducting thorough material testing. This innovative approach establishes a foundation for tenders with specific, substantiated requirements, pushing the market toward more sustainable products.

Regarding the technologies developed, C14.1, which focuses on upcycling commercial waste for reuse in the construction industry, has made significant progress with business cases and the realization of both a brick cleaning machine and an automated and digitized sorting plant for business waste, which is expected to be established in Skive Municipality (Skive Kommune (SKK) action lead) during 2025 and be operational within two years.

#### 4.3.2 Replication, Transfer and Cooperation

Fundamentally, all materials developed in CEBW are designed to be scalable and replicable across other municipalities, waste management companies, projects, etc. A variety of approaches, including models, tools, and manuals, have great potential but so far, only few have already been replicated by other partners or outside the project setting.

A concrete example is RENO's initiative, *More Nature – Less Waste* (included in C7.4). Inspired by this initiative, 12 Danish municipalities have already established brushwood fences, including another CEBW partner, Samsø Kommune (SAK). In 2024, RENO has also shared their experiences internationally through presentations in the Faroe Islands and Brussels under the Nordic Council of Ministers.

The tools from the *Circular Building Material Relay* (C10.2) are open-source and readily accessible to municipalities and other actors. Within the City of Copenhagen, these tools have been incorporated into the Urban Renewal MBA program, meaning that a method developed under CEBW is now being applied in practice beyond the project framework.

The potential for replication is significant, particularly for tools and methods that are easy to adapt to different contexts. In C6.1, the developed plastics guide and mini-guide for green procurement are structured simply and clearly, enabling public sector procurement officers in all municipalities to make waste-reducing and circular purchasing decisions from day one.

Reuse actions (C7) also hold substantial potential for transfer to other cities, regions, and countries.

In C7.1, the developed Neighborhood Recycling Stations (NGS) and swap boxes have proven effective in promoting reuse in urban environments where space and mobility are often limited. These solutions are adaptable to local conditions and can be scaled to other contexts, making them both flexible and economically sustainable. As part of the action, detailed materials have been created, including a business case for the NGS and infrastructure descriptions, covering everything from location and technical specifications to operational models and practical considerations. These resources are designed to facilitate the implementation of similar initiatives in other cities aiming to promote circular economy and sustainable reuse solutions.

The redesign of Skive Recycling Center (C7.3) is projected to shift at least 375 tons of waste from recycling to direct reuse before the project ends. Through measures such as design prioritizing reuse, user nudging, and staff training, Nomi4s has created a model that other waste management companies can draw inspiration from and replicate.

The reuse and repair model developed in C7.5 has strong potential for application in other contexts, regions, countries, and sectors. Based on the experience gained and educational materials developed, there is a solid foundation for creating a dedicated repair track that could be integrated into vocational training programs, such as the Danish vocational basic education (EGU). This action has also spurred exciting collaborations across various sectors, including education, waste management, private industry, and academia. For instance, partnerships have been established with the white goods industry and Aalborg University as a knowledge partner. While the individual partners may not be unique, the combination of sectors and stakeholders is innovative and holds significant potential for replication in other regions of Denmark and Europe.

To ensure broader application of methods and approaches outside the project, numerous seminars, webinars, and conferences involving parties outside the project partnerships have been facilitated.

Many of these events were organized by the PM Unit (see sections regarding Capacity Building (action C1) and dissemination (action E)).

Moreover, the integration of external actors and stakeholders into the methodological design of many CEBW actions has created a platform for shared understanding of challenges and opportunities in circular economy across value chains. For example, the construction guide developed in C10.1 is based on nine network meetings with broad participation from municipal sectors and industry professionals.

Replication will receive increased focus in Phase 2. This includes building knowledge about funding mechanisms and complementary actions. To support this effort, the PM Unit hired an employee in 2024 dedicated to working with complementary actions, including the development of new ones. Additionally, CDEU (CEBW partner) will host webinars on fundraising.

#### 4.3.3 Transboundary Outcomes and Impacts

While transboundary impacts have not yet been a core focus in this early stage of the project, some examples show how the project has established connections with other European partners, paving the way for more direct impacts in the future. Examples include:

In 2023, C7.4 was invited by Norway's ambassador to Brussels to present initial results and lessons learned at an event focusing on nature-based solutions.

The C11 action has actively fostered cross-project collaboration with the initiatives RELOOPED and REDOL, which offer potential avenues for transferability and cooperation on a larger, international scale. The RELOOPED project, which focuses on circular packaging solutions across retail chains in Denmark and Poland with further partners in Sweden and Lithuania, has allowed C11 to link its findings with broader European efforts. By sharing lessons learned from its MFA and workshop processes, C11 has contributed to RELOOPED's goals of minimizing packaging waste and optimizing circular solutions in retail environments.

Additionally, C11 has established valuable connections with the REDOL project, a large-scale initiative focused on circular economy strategies in five key value chains, including packaging and plastics. With partners from countries such as Spain, Italy, the Netherlands, and Denmark, REDOL has enabled C11 to explore synergies in multilayer packaging recycling and technology scalability, e.g. with Spain's ITENE research center. Bornholm's (BRK - actionlead C11) role as a replicator city in REDOL together with Amsterdam and Prato strengthens its position as a testing ground for solutions that can be transferred to other European cities.

Action C6.3, which explores multiple-use of textiles in healthcare, has established relationships internationally, e.g. under the auspices of ENCORE Gelderland (NL) and with market players from the global value chain, which has strengthened knowledge sharing and cross-border collaboration.

The PM Unit continues to build relationships with European partners to enhance the project's replication potential. Notable activities include:

- October 2022: An Estonian EPA delegation visited CDR, and the PM Unit delivered presentations on CEBW. The relationship remains active, with potential follow-up visits to Estonia.
- April 2024: The PM Unit organized a 3-day study tour to the Netherlands, where about 50 participants visited Amsterdam for shared inspiration. The connection is ongoing.

- Circular Cities and Regions Initiative by EU (CCRI) Engagement: At CCRI's first general assembly, CDEU arranged for Aarhus Municipality and private company Tomra to present their reusable cup system collaboration. At CEBW's End-of-Phase 1 conference, CCRI provided insights into their network, funding, and counseling opportunities.

CDR's Brussels office, CDEU, plays a critical role in promoting project results to EU stakeholders and establishing new relationships. Additionally, the PM Unit will reinforce the focus on European networking through CCRI, CINEA, and other relevant channels. The goal is to enhance European impact and add value through further replication of project results.

#### 4.4 Policy implications and feedback

The PM Unit works with the political committee on addressing specific legislative challenges and support future implementation and take-up of more circular legislation. Two of the members even joined the study tour to Holland in 2024. With representatives from every political level in Denmark, the committee is a strong foundation for this work, even though direct impact is obviously difficult since the committee has no judicial power in Denmark.

The PM Unit has also sought to enable legislative change through the organization in Central Denmark Region (CDR). Due to the work in the IP, "reduced consumption" is now a theme, the Central Denmark Region (CDR) works strategically on. This has a direct impact on specific initiatives deriving from CDR that involve actors from both the region and across the country. The PM Unit has been involved in planning and contributing to three workshops, with more than 40 participants from different organizations in a setup called "*Regional Political Forum*". It is the aim of the forum to work actively on reducing consumption through specific initiatives as well as having impact on future decisions made by the region.

Several of the C-actions also work towards enabling circular legislation. A few examples are:

- In action C15, the citizens assembly has put forward a string of recommendations with the aim of changing both specific local and national legislative barriers. With the impact of a strong group of citizens, the assembly has also directly involved municipalities across the country that are now obligated to work on specific projects that have derived from the recommendations.
- Another example is action C6.2, where Gentofte municipality is making great progress in developing a framework and toolset which integrates environmental and circular concerns in the political decision-making process.
- C7 actions (pillar reuse) have previously been hindered by national waste fee regulations. In Denmark, waste fees are governed by the so-called 'rest-in-itself principle,' which means that the fees paid by citizens for waste management can only cover the actual costs of waste collection and treatment. As a result, these fees could not be used to finance other initiatives, such as alternative circular solutions. However, in December 2024, an amendment to the Environmental Protection Act was introduced. This change now allows municipalities and waste companies to allocate a small portion of the citizens' waste fees to support recycling and circular swapping solutions. This is a significant step towards a more circular economy, enabling recycling centres and waste management companies to continue developing swapping areas for users and fostering collaborations with local reuse shops and businesses. Partners in CEBW played a key role in bringing this issue to political attention through their work within the project, cooperative networks across CEBW, and within the industry association Cirkulær.

#### 4.4.1 Legislative bottlenecks and barriers

The IP's actions have encountered various legislative challenges at European, national, and local levels, obstructing or hindering implementation.

##### Complex and unclear legislation

Several actions—such as C7.2, C7.3, C9, C10.1, C14.1, and C14.3—have been impeded by complex, time-consuming, or unclear regulations.

For example, action C7.2 highlights ambiguities in national legislation regarding waste prevention, particularly concerning the scope of permissible repair activities. This legal uncertainty fosters doubt and reluctance within organizations, stalling progress.

Similarly, current waste and environmental regulations are poorly aligned with circular construction practices. Companies face significant complexity and costs when navigating these rules, especially when attempting to produce new products from waste materials. Although these regulations are set at both European and national levels, implementation often falls to municipalities. However, administrative procedures vary widely, and knowledge of permitted industrial processes rarely transfers between municipalities.

To address this legislative barrier, action C14.1 will utilize external expertise to develop a guide on producing with waste as a raw material, helping stakeholders navigate regulatory complexities more effectively.

##### Inopportune legislation

Other actions report, e.g. by C6.3, C7.1, C7.3, C7.4, C9, C10.1, C10.2, C11, C12, C13, C14.1 and C14.3, challenges posed by inopportune legislature that directly interferes or counteracts their efforts to create more circular practices within their field.

One example is C9, where legislative changes led to an amendment of the action in 2023. New legislation was introduced as an outcome result of the political agreement – "Climate Plan for a Green Waste Sector and Circular Economy" (Klimaplan for en grøn affaldssektor og cirkulær økonomi, Juni 2020). The Climate Plan led to new legislation on waste treatment, with a new division of labour between the public and the private sector when it comes to material recovery of waste introduced in law L898/2022, a revised waste announcement – (affaldsbekendtgørelsen, BEK 2512, 10-12-2021) and the waste operator announcement (affaldsaktørbekendtgørelsen, BEK 938, 20-06-22). The intention in action C9 was to digitize knowledge about materials and material flow along the value chain and this wasn't possible with the new division of labour between the public and private sector. Because of this several partners chose to withdraw from C9 and the IP and thus, a new action C9 was created with Randers Municipality as new lead partner (Amendment 1, 2023). This new legislation also impacted other actions such as C7.1, C7.3, C13. However, they are handling the challenge to their respective work within the scope of their action description.

Within the same theme, actions C7.1, C7.4, C10, C12 and C13 point to the fact that European and national legislature limits their agency because they are a public or semipublic organization.

Renosyd (RENO), action C7.4, explains that their work with waste prevention is considered a competitive task which can also be undertaken by private companies. And according to Danish legislation,

partly public waste companies as RENO may only carry out various monopoly tasks such as waste collection and treatment as to not distort the free market. This impedes RENO's agency and hinders progress.

Due to the Extended Producer Responsibility, the accountability of disposing of Waste from Electrical and Electronic Equipment (WEEE) falls upon the private manufacturers or the companies they outsource this task to in so-called "collective arrangements". This complicates Favrskov Forsyning (FAFO) aim of extending the lifetime of white goods since they have no rights over the WEEE-fraction. Fortunately, FAFO has made progress during Phase 1 in persuading a few industries to enter dialogue or even a contract regarding the use of their electronic waste.

#### Lack of legislation

Several actions report that current legislation is constructed in a way that promotes business-as-usual. Thus, new legislative measures are needed that actively promote circular solutions and business models. Several actions point to this, e.g. C6.3, C7.2, C8, C10.2, C11, C14.1, C14.3, C15, A1 and C4.

Both A1 and C15 problematize that while it is required of the municipalities to decrease CO<sub>2</sub>-emissions within scope 1 and 2 there is no requirement to decrease consumption-based emissions from their citizens or to establish circular practices at a systemic level. Such a legislative measure and political demand would significantly strengthen work in the actions and the overall objectives of the APCE. However, progress is being made. All Danish municipalities have committed to strive to obtain the objectives in C40's Cities Climate Transition Framework. So far, all municipalities have achieved this, and a few are already in the process of being recertified. To gain such recertification the municipal climate plans must initiate efforts to reduce consumption-based emissions. By aspiring to achieve recertification the municipalities are thus progressing in the right direction even though it is still on a voluntary basis.

Other examples of lacking legislation can be found within specific fields such as textiles, construction, and recycling of household waste.

Action C6.3 questions the lack of European legislation that prevents the use of PFAS in medicinal textiles. Currently legislative demands directly promote the use of PFAS which hinders the market movement towards more circular alternatives.

For C10.1 and C10.2 the use of more circular materials and practices are hindered by legislative demands for construction materials in the construction process. Currently it is risky and expensive for entrepreneurs and contractors to reuse and recycle materials. To counteract these incentives C10.2 stresses the need for regulation responsibility of recycled materials and questions the lack of demands imposed on entrepreneurs for circularity in construction agreements. Furthermore, C10.2 suggests legislation or regulation such as a "sustainability supplement" to help reduce the costs of choosing circular and recycled building materials.

Action C6.1 points to a lack of preventive legislative measures against principles of planned obsolescence. This enables manufacturers to continue making products that easily break and/or are very difficult to repair and recycle. This is a problem within many fields such as WEEE in action C12 and construction in action C10.1 and C10.2.

#### 4.4.2 IP impact on local, national or international policy

### Quality of multi-purpose mechanism, synergies and integration

Overall, the project has succeeded in bringing both partners from CEBW and stakeholders outside of the project together to initiate synergistic networks that have the potential to increase the impact of the project itself many times.

One example of this is the end-of-phase 1 conference held in November 2024, where over 200 participants found their way to a conference showcasing results from all actions in the first phase of the project. 2/3s of the participants were from outside of the project, and several new relations were formed at the conference.

The success of the conference is down to a strategic and well-organized communicative effort during phase 1, where focus has been to communicate both thematically and in terms of form and width that has been relevant to people and organizations both within CEBW and outside. Therefore, today the project is well known in networks and contexts where circular economy is relevant – and specifically among municipalities and waste handling companies, where we register an increasing awareness and interest in the results coming from all the C-actions of CEBW.

### Replicability and transferability

There is an increasing awareness among the partners of CEBW that results and solutions of the C-actions must be of interest to other organizations across Denmark (and EU), because the impact of their results will only matter if scaled.

Because of this, it is a focal point for many partners to continually consider how best to ensure and increase the disseminative effects of their work. One of the ways they ensure this is by using elements of Design thinking in their methodological approach. This is a cooperative and iterative process used by most of the actions (chp. 6.1). An example of this is action C14.3 who've developed CE tools and CE guidelines accessible to businesses and municipalities in all of Denmark. C14.3 have cooperated across businesses, industry associations, The Danish Environmental Protection Agency (EPA) and municipalities to ensure cohesive and meaningful tools with replicability across municipalities.

The PM Unit works actively in connecting partners of CEBW to relevant stakeholders and the partners themselves are in direct communication with other stakeholders to ensure that their results can be of relevance in other contexts and organizations.

Further, the PM Unit works closely with all partners to secure visibility, which is the first step in acquiring replication and transferability. This is done by showcasing the results of the actions in webinars, study tours, seminars, end-of-phase 1 conference, podcasts, newsletters, and articles – and presentations outside of the scope of CEBW.

In phase 1 the focus has primarily been on creation, conceptualization and testing. During phases 2 and 3 the focus will shift to implementation, replication and transferable activities. The PM Unit will support and promote this shift through dialogue, capacity building seminars, networking and awareness-raising.

### Green public procurement within the IP

The PM Unit has prioritized sustainable choices on food and printed articles in all seminars, conferences, and study tours. This is in line with the organizational values of CDR. The PM Unit have contributed to the CDR's overall Sustainability policy that focusses on Circular Economy, Electricity, Water and

Heat, Logistics, Transportation and Mobility as well as Social Responsibility. The Circular Economy matter has several goals e.g. lowering the carbon footprint of the hospitals and sustainable procurement, where demands and collaborations are made with suppliers to think and act more sustainably. Furthermore, the PM Unit has mobilized relevant actors across the country to work with consumption as a “wicked problem”. Amongst others, this has resulted in a recommendation to develop a political decision-making tool which supports organizations in taking holistic decisions that takes human well-being into account and respects planetary boundaries.

CEBW has also contributed to the CDR’s Strategy for sustainable hospitals and continues to do so through action C6.3, that develops several products that are much more sustainable than what is otherwise on the market for hospitals.

Many of the actions also have this focus. For instance, C6.1 has developed a tool to promote more sustainable procurement. C10.1 has developed a guide for municipalities on how to increase circularity in construction through tools such as incorporating circularity in their tender materials.

#### *EU environmental footprint and ECO-labeling schemes*

There have been several webinars and seminars focusing on the limited knowledge and use of ECO-labeling scheme during the first three years of the project, and several of the actions have also provided solutions to support them. As mentioned, C6.1 and C6.3 have created tools and products which increase the knowledge of circular economy and promote the use of ECO or CE schemes in public procurement. Also, as cited above, C10.1 has developed a guide on how to design better public procurement tenders of sustainable and circular building materials. C10.2 have also designed a Circular Economy tool (CØ2) which is a material-, screening- and dialogue tool that calculates both financial and climate savings when reusing wing tiles, glass and bricks. Finally, C8 are in the process of developing procurement criteria for end-of-life handling of public textiles and expect to finalize in 2025. During phase 1, they have gained several insights and have adapted a more holistically approach which will improve the final product for procurers.

#### *Uptake of EU research*

Unfortunately, the application for NEWCIRC – a project mentioned in Form B3, Full Proposal – was not approved along with several other Horizon2020-applications, which inhibits this IP in transferring results and experiences from these. However, several actions seek inspiration from the EU, and much of it is facilitated by the PM Unit and CDEU (CEBW partner in Brussels).

For instance, Aalborg University (AAU) has promoted reuse and repair through thorough documentation and research and based on EU legislation. Further, some of the partners have visited stakeholders in Brussels for inspiration, and some have participated in both webinars and online network meetings organized by CCRI. Also, more than 50 from the CEBW partnership went to Amsterdam on a study tour arranged by the PM Unit, which has provided much inspiration and network for the partners. Among other inputs, the partnership visited a private socioeconomic company working in the repair sector. This visit provided valuable knowledge for stakeholders in Denmark working with repair and repair cafés.

#### *Pump priming effects*

See chapter 4.2 regarding economic benefits and investments.

## 4.5 Capacity building, sustainability and other comments on impacts, barriers, challenges and lessons learned

### 4.5.1 Capacity building activities

In Phase 1, the capacity building activities have primarily focused on:

1. Making the context for each action understandable and manageable with the PM Unit addressing legislation and organizational structures.
2. Ensuring that action leaders were equipped to handle their responsibilities.
3. Seeking and contributing inspiration and research.

Consequently, the task of relating to and creating coherence with complementary actions was not a primary focus during the initial period. The PM Unit will advance this aspect in Phase Two.

Capacity building is facilitated at three overarching levels: across all C-Actions through C1, that is a part of project management activities, among specific C-Actions with shared agendas, and internally within each C-Action.

In the cross-cutting initiative C1, activities are organized within an annual framework that includes seminars, conferences and webinars. Additionally, networks are continuously formed with inspiring external partners. The focus of C1 is predominantly on professional topics, project management, facilitation, and dissemination. Partners must be capable of leading complex projects that involve multiple stakeholders and interests, while maintaining a steadfast focus on objectives, desired outputs, and progress.

Key professional topics have included prevention, reuse, and recycling, examined through legislative frameworks, construction, textiles, plastics, WEEE, composite materials, strategies to prevent food waste, and methodological approaches relating to new governmental roles, circular economy, oversight, decision-making tools, and citizen engagement.

These professional topics align with the areas highlighted in the APCE (Action Plan for Circular Economy), reflecting the movement up the waste hierarchy as proposed in the plan. However, it is crucial to note that professional knowledge alone does not establish the necessary foundation for progress and innovation. Therefore, the project management and facilitation components aim to enhance the capacity for driving progress, incorporating specific themes such as managing stakeholders with diverse interests, strategic communication, and effective meetings, blending practice and instruction.

Organizationally, most partners are situated within operational units and departments focused on regulatory tasks, making the cross-cutting elements especially valued.

Across C-Actions, subgroup collaborations focusing on business waste have resulted in joint training programs centred on circular business models. In individual C-Actions, there has been an enhanced capacity-building effort relating to professionalism, organizational improvements, and administrative changes.

An appreciated study trip to Amsterdam fostered further networking and new learning across the board. Also, in February 2025, training for reuse advisors at ReUse Centers was conducted.

This work is conducted in collaboration with CEBW's communication efforts, which enhance dissemination and retention of methods and knowledge through webinars, podcasts, and articles. The project's platform, Connect, along with newsletters and the website, also ensures ongoing learning and upskilling across initiatives.

#### 4.5.2 Long term sustainability of CE Beyond Waste

In C1, collaboration occurs with leaders and policymakers within the partnership, including a program aimed at ensuring institutional anchoring, which is currently under development.

The identification of barriers in C2 is also critical for ensuring long-term sustainability. This includes addressing legislative and other barriers at both local and national levels, as well as challenges related to fostering development and innovation in departments focused on operational tasks. The work in C2 is progressing and is expected to result in political recommendations.

In the next phase of the project—Phase 2—emphasis will also be placed on dissemination and replication. The project management team will provide frameworks to facilitate the communication of results to a broader audience. And thus, the longevity of the IP's results is strengthened.

The connection to other projects, such as ACT—a LIFE IP project scheduled to run from 2025 to 2032—is also pivotal to ensure that methods and knowledge are effectively applied there.

#### Amendments haven't impaired sustainability

There are no major deviations from the approved project description—particularly regarding project management—that have impaired the sustainability of CEBW. However, the "Climate Act" from 2020 introduced a new division of labor between public authorities and private companies, impacting the stakeholders involved in the waste-to-recovery and recycling value chain for materials from households and businesses. The public sector's role has been restricted to only the collection and initial processing of waste.

The consequences of these changes have been dealt with in Amendment no 1 and section 4.4.1

In the transition between Phase 1 and Phase 2, we can conclude that the changes have only had a minor impact on the valorization and long-term sustainability of the project.

#### Strategy for sustainability within the IP

The multi-level partnership, which is the basis of the IP, will consolidate long-term ownership among beneficiaries and stakeholders. It will ensure that the circular solutions and business models developed in the IP meet the needs and interests of all stakeholders, thereby making the solutions more robust and viable. The IP will mobilize stakeholders to increase, build, and test new knowledge and to organize and take lead on activities and implementation beyond the project, as well as to cooperate in innovative partnerships across sectors. Furthermore, during the IP the beneficiaries will be supported in applying for further funding for complementary actions from local, national and international funds. In conclusion, the capacity, relations, and cooperation built through the IP ensure that beneficiaries and stakeholders can function as co-deliverers of the APCE after the end of the IP.

#### The after life of CEBW's actions

The project runs for a period of 8 years and is now moving into the 4<sup>th</sup> year. Therefore, it is still unsure how and which actions will be sustained post the IP. But some actions have given their preliminary guess:

- A1: A tool for municipalities that promotes Circular Economy.
- C4: Basis for the implementation of expanded producer responsibility.
- C5: Contributes to the data foundation for increased recycling.
- C6.1: The guide will serve as a basis for collaboration between businesses and municipalities after the project concludes.
- C6.2: The decision-making tool is expected to be widely implemented and utilized.
- C6.3: Implementation of methods for tenders and collaborations that promote reusable textiles.
- C7.1: Hope for the continued development of recycling infrastructure and up to four new hires in the recycling sector.
- C7.2: Employment of two individuals in subsidized jobs for people with reduced work capacity with both continuing their work and development in the recycling sector post-CEBW.
- C7.3: Appointment of two employees to manage a new give-and-take area at the recycling center.
- C7.4: Competence development for 20 employees, introducing a new approach to community-based collaboration through the project "More Nature, Less Waste."
- C7.5: Continued partnership between BRK and FGU to extend the lifespan of white goods is expected after CEBW, with a new sustainability line anticipated at FGU.
- C8: Knowledge gained from the action on how textiles can be produced and treated for longevity will be implemented within the organization and integrated into tenders and operations.
- C9: Environmental staff in the municipality have gained new knowledge about Circular Business Models from the C-Action, which will be utilized in the future. Additionally, a new area of work concerning the sorting of plastics is expected to create job opportunities for marginalized individuals.
- C10.1: Guidance for Circular Economy in existing buildings has been developed and is accessible to all; there is a political desire for its implementation within the administrations of the three municipalities moving forward.
- C10.2: Tools and case collections are available for everyone in the construction industry via the Copenhagen Municipality website, promoting the use of recycled building materials.
- C11: Bornholm has become a testbed for new circular solutions, including in the composites sector.
- C12: Established collaboration between industry organizations, the public sector, and Aalborg University contributes to an extended lifespan for more white goods.
- C13: New composting methods for household and garden waste have been developed and are assumed to have been implemented; new tender models have been adopted.
- C14.1: It is expected that more individuals will work on IRC-related topics in the future, with an automated waste sorting plant to be established in Skive, creating over 10 jobs.
- C14.2: Programs for Start-Up Academy, unemployed individuals, change agents, and education for primary school children are expected to continue.

- C14.3: The tools promoting greater circularity in businesses are being utilized by oversight personnel across numerous municipalities.
- C15 Methods for citizens involvement described and distributed.

To learn more, see section 6.3 “Technical implementation” under each action.

*Resources and capacities behind sustaining CEBW*

In the next phase, time and resources have been allocated to ensure both dissemination and replication of promising methods and results. The project management prioritizes the organization of seminars and webinars focused on communicating these results, as well as engaging with interest organizations and others who can assist in the dissemination efforts. The project will continue for another five years, making it premature to evaluate each action at this stage; however, previous responses indicate the enduring outcomes through established indicators.

*Crucial dissemination and post-CEBW actors*

To ensure dissemination of effects will continue after the IP is finished, it is essential to engage parties that can facilitate the dissemination and implementation at the national level. Therefore, we are focusing on interest organizations such as the KL - Association of Local Authorities, Circular - the Circular Economy Business Association for waste management companies, DAKOFA - Waste and Resource Network Denmark, as well as universities, leaders, and policymakers. This engagement is already underway through collaborations, invitations to participate in events, involvement in the steering committee and political committees under CEBW, and strategic partnerships to promote promising methods. The Danish Environmental Protection Agency (EPA) and the Ministry of Environment, as the responsible authority for APCE, will naturally also be involved in the work.

## 5. Implementation of the complementary actions

The purpose of this chapter is to show the progress of monitoring the multiplying effect of mobilised complementary funds and projects. In section 5.1 the coordinating mechanism undertaken by the PM Unit are described. In section 5.2 an overview of relevant complementary projects are provided. Lastly, section 5.3 comments on the contribution of complementary actions to the implementation of CEBW.

### 5.1 Coordination mechanism(s) established with other funds

CDR holds a central coordinating role in managing complementary actions, tasked with tracking existing initiatives and fostering new ones. This includes creating an overview of funding applications and other projects developed by partners and stakeholders that supports the implementation of the Action Plan for Circular Economy (APCE).

Several CEBW partners possess both the capacity and ambition to initiate new projects based on insights gained from CEBW's actions. During the first monitoring meeting, the PM Unit engaged all original complementary actions to gather updates on their progress.

As the IP reaches a stage where tangible results and experiences emerge, partners are increasingly focused on developing new projects that can evolve into complementary actions. This focus will intensify in Phase 2. To support this, the PM Unit hired a new staff member in 2024 to oversee complementary actions and drive new developments. Additionally, CDEU (a CEBW partner) will host webinars on fundraising and project development to further strengthen this effort.

### 5.2 Summary status of the complementary actions

33 complementary projects with a **total amount of 65.008.959 euros** were either granted or initiated during Phase 1.

Table of complementary actions, reports, dates, financing

Related IP actions / Partners involved	Project name	Source of funding	Amount foreseen in the application (EUR) <sup>5</sup>	Amount committed by 1 <sup>st</sup> Interim	Who are the local beneficiaries from Denmark? Please provide references, web links to reports available, dates and other relevant details. Highlight how the IP facilitated the implementation of the complementary action or fund.
<b>EU funds</b>					
C6, C10, A1	City Loops	Horizon2020	10.387.336	0	Høje-Taastrup and Roskilde Municipalities <a href="https://cityloops.eu/resources/key-publications">https://cityloops.eu/resources/key-publications</a>
C10 BRK	Public Demand as an Accelerator for Circular Construction	Interreg Öresund-Kattegat-Skagerrak	1.300.000	835.024	<a href="https://gate21.dk/projekt/circular-builders/">https://gate21.dk/projekt/circular-builders/</a>
C14.1 SKM	Build4People Partnership: Design for adaptability, re-use and deconstruction of buildings, in line with the principles of circular economy	Horizon2020	T.B.D.	-	SKM are part of Horizon application lead by CERTH from Greece. The project revolves around selective demolition and circular reuse of building materials. <a href="https://www.horizon-europe.gouv.fr/design-adaptability-re-use-and-deconstruction-buildings-line-principles-circular-economy-33127">https://www.horizon-europe.gouv.fr/design-adaptability-re-use-and-deconstruction-buildings-line-principles-circular-economy-33127</a>

<sup>5</sup> Divided by factor 7,5 from DKK to Euro



C7.5 BRK	RELOOPED	Interreg South Baltic	560.000	-	RELOOPED (2023-2026). The project supports BRK's vision of becoming a waste-free island by 2032. Amongst others, this project develops new and more resource-efficient solutions for food packaging within the retail sector. <a href="https://bofa.dk/project/relooped/">https://bofa.dk/project/relooped/</a>
-	Sustainable Bottomline Bornholm – CSC Keramik	ERFU	13.735	-	This specific part of the project promotes sustainable ceramics through testing the use of recycled materials. Ceramics is an area that CEBW doesn't cover. <a href="https://denmark.representation.ec.europa.eu/system/files/2024-06/EUK%20magasiner_Bornholm_sk%C3%A6rm.pdf">https://denmark.representation.ec.europa.eu/system/files/2024-06/EUK%20magasiner_Bornholm_sk%C3%A6rm.pdf</a> (page 7-8)
C7.5 BRK	Pedersker - A sustainable meeting point	WASTEMAN	33.333	33.333	Social meeting places and strengthening of local identity through circular local economy in BRK. <a href="https://brk.dk/Indflydelse-Politik/Projekter/afsluttede%20projekter/Sider/Pedersker.aspx">https://brk.dk/Indflydelse-Politik/Projekter/afsluttede%20projekter/Sider/Pedersker.aspx</a>
C7.5 BRK	STRIVE: The Association Folke-mødet	Interreg South Baltic	353.333	-	The STRIVE-project (2024-2027) promotes sustainable tourism in relation to major festivals, through innovation, cultural exchange and co-operation across borders. <a href="https://www.cleancluster.dk/en/project/strive/">https://www.cleancluster.dk/en/project/strive/</a>
C7.5 BRK	HEPHAESTUR: Future of Craft Green Living Lab	Horizon Europe	320.000	-	The HEPHAESTUR-project promotes innovative craftsmanship and circular economy using BRK as a green living lab. Copenhagen Business School (CBS) <a href="https://bofa.dk/project/hephaestus/">https://bofa.dk/project/hephaestus/</a> <a href="https://hephaestuscraft.eu/">https://hephaestuscraft.eu/</a>
C7.5 BRK	REDOL	Horizon 2.4	346.667	-	The REDOL-project test circular solutions within 5 selected value chains starting in Aragonien with BRK as a replicator/follower city. <a href="https://cordis.europa.eu/project/id/101091668">https://cordis.europa.eu/project/id/101091668</a> <a href="https://www.redolproject.eu/">https://www.redolproject.eu/</a> <a href="https://bofa.dk/281447-2/">https://bofa.dk/281447-2/</a>

C13 BRK	VINNY	Horizon	360.000	-	<p>The VINNY-project supports BEOF's (Bornholm Energy and Supply) testing of advanced nanoencapsulation of bio-based pesticides and fertilizers for circular and sustainable viticulture.</p> <p>BEOF supplies biochar and oversees in-field tests in the VINNY project. Its role supports sustainable agriculture by providing resources for developing biofertilizers and testing bio-based solutions directly in the vineyards.</p> <p><a href="https://projectvinny.eu/">https://projectvinny.eu/</a></p> <p><a href="https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/894537105/project/101130039/program/43108390/details">https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/894537105/project/101130039/program/43108390/details</a></p>
C6.3, C8 CDR	CEMTEX Closing the loop on Circular Medical Textiles for the transition to a Circular Economy	InterReg Europe	1.740.555	-	<p>CEMTex builds on the learnings and results of C6.3. In collaboration with regions in other countries CDR aims to further develop and implement circular medical textiles in the health care sector.</p> <p>CEMTex identifies the many bottlenecks in both public procurement frameworks on the demand-side as well as the logistical and compliance issues on the supply side and will provide solutions and best practices to help build better policy instruments that can favor both the production use and re-use of circular medical textiles and boost regional value chains and the circular economy in general.</p> <p>Learn more: <a href="https://www.interregeurope.eu/cemtex-closing-the-loop-on-circular-medical-textiles-for-the-transition-to-a-circular-economy/">CEMTex - Closing the loop on Circular Medical Textiles for the transition to a Circular Economy   Interreg Europe</a></p>
<b>Total EU</b>				<b>15.414.959</b>	
<b>Other public funds</b>					
C1, C6, C10.1, C10.2, C13 CDR	CDR Sustainability Strategy	CDR	3.600.000	3.600.000	<a href="https://www.rm.dk/om-os/organisation/baredygtighed/region-midtjylland-strategi-for-baredygtighed/">https://www.rm.dk/om-os/organisation/baredygtighed/region-midtjylland-strategi-for-baredygtighed/</a>
CR	CR projects	CR	147.000	147.000	CR projects

C6, C7.3	CR Green Public Procurement	CR	2.100.000	2.100.000	<a href="https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/groen-omstilling-af-hospitalerne/CO2-indsatser-i-koncerncentre/Sider/Groenne-krav-til-vareindkoeb.aspx">https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/groen-omstilling-af-hospitalerne/CO2-indsatser-i-koncerncentre/Sider/Groenne-krav-til-vareindkoeb.aspx</a>
CR	CR Waste Management Plan	CR	300.000	300.000	Funding for circular projects, general in CR <a href="https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/en-groen-region/cirkulaer-oeconomii/Sider/Affald-og-Ressourcer-p%C3%A5-Tv%C3%A6rs.aspx">https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/en-groen-region/cirkulaer-oeconomii/Sider/Affald-og-Ressourcer-p%C3%A5-Tv%C3%A6rs.aspx</a>
C12 AAK	New Partnerships	AAK	1.338.000	1.338.000	<a href="https://www.sustaineurope.com/aalborg%20%99s-climate-partnerships-taking-action-for-a-greener-future-20240904.html">https://www.sustaineurope.com/aalborg%20%99s-climate-partnerships-taking-action-for-a-greener-future-20240904.html</a>
BRK projects, general	Innovative Public Procurement	BRK	5.500.000	5.500.000	Funding for general project surrounding innovative public procurement in Bornholm <a href="https://www.brk.dk/Indflydelse-Politik/Politikker/Documents/Udbuds-%20og%20indk%C3%B8bspolitik%20-%202021-2024.pdf">https://www.brk.dk/Indflydelse-Politik/Politikker/Documents/Udbuds-%20og%20indk%C3%B8bspolitik%20-%202021-2024.pdf</a>
C7.2 FAFO	Hadsten recycling center expansion	Favrskov Municipality	3.218.000	3.218.000	Funding for the expansion of the recycling center in Hadsten <a href="https://favrskov.dk/borger/fysisk-planlaegning/ny-genbrugsplads-mellem-hinnerup-og-hadsten">https://favrskov.dk/borger/fysisk-planlaegning/ny-genbrugsplads-mellem-hinnerup-og-hadsten</a>
C6.2 GK	Dashboard	GK	54.000	54.000	Development of a dashboard for GK that, for the first time in a municipal context, can calculate the climate footprint and costs of municipal procurement agreements. The dashboard makes it possible to prioritize efforts where they have the greatest effect on the economy and climate. <a href="https://www.kl.dk/oekonomi-og-administration/oekonomi-og-styring/omstilling-og-udvikling/nyhedsbrevet-raaderum/2021/nr-27/gen-tofte-kommune-formaar-at-skabe-overblik-over-klimaaftryk-og-oekonomi-paa-indkoebsonraadet">https://www.kl.dk/oekonomi-og-administration/oekonomi-og-styring/omstilling-og-udvikling/nyhedsbrevet-raaderum/2021/nr-27/gen-tofte-kommune-formaar-at-skabe-overblik-over-klimaaftryk-og-oekonomi-paa-indkoebsonraadet</a>
C6.2 GK	Spar 5	GK	134.000	134.000	Spar 5 or "Shopping Circle East" is a joint municipal procurement collaboration consisting of: Frederiksberg, Gentofte, Gladsaxe, Lyngby-Taarbæk, Rudersdal, Høje-Taastrup and Ballerup Municipality. The collaboration involves entering into tenders/agreements in areas where it is assessed that the municipalities can advantageously optimize the procurement processes.

<u>Indkøb til kommunen - Gentofte Kommune</u>					
C7 MK	Waste Management Plan	MK	1.000.000	1.000.000	Development of MK's waste management plan <a href="#"><u>Opdatering af affaldsplan</u></a>
C14 HbK	BroPas	HbK	1.741.000	1.741.000	BroPas aims to create more green jobs within the circular economy – everything related to recycling, climate friendliness and sustainability. Partnering with VIA University College and the Lifestyle & Design cluster in Herning Municipality. HbK have invested in BroPas to establish and support the work of CEBW and to enhance and develop the physical meeting point "The Slaughterhouse". <a href="https://ugeavisen.dk/holstebroonsdag/nyt-projekt-paa-slagteriet-groenne-ivaerksaettere-faar-bropas-i-holstebro">https://ugeavisen.dk/holstebroonsdag/nyt-projekt-paa-slagteriet-groenne-ivaerksaettere-faar-bropas-i-holstebro</a>
RSD	RSD APCE	RSD	874.000	874.000	Funding to improve and sustain general circular projects in RSD <a href="https://regionsyddanmark.dk/media/d4yjhbra/klimastrategi_wgac-1-1.pdf">https://regionsyddanmark.dk/media/d4yjhbra/klimastrategi_wgac-1-1.pdf</a>
C13 BRK	Biomass	GUDP	1.410.000	1.410.000	<a href="https://gudp.dk/Media/638658168041785895/GUDP_%C3%85rsberetning_2020.pdf">https://gudp.dk/Media/638658168041785895/GUDP_%C3%85rsberetning_2020.pdf</a> (p. 29)
C1, C10.1, C14 SIK	SIK Waste and Ressource Plan	SIK	3.362.000	3.362.000	<a href="#"><u>Affalds- og Ressourceplan 2021-2026</u></a>
C7, C9 TK	TK Waste Management Plan	TK	3.000.000	3.000.000	<a href="#"><u>Forside - Affaldsplan - Thisted Kommune</u></a>
C2, C3, C7 and C9	VK Waste Management Plan	VK	11.000.000	10.666.667	<a href="#"><u>Affaldshåndteringsplan og -regulativer - Viborg Kommune</u></a>

C7 RENO	More Nature – Less Waste	Nordisk Minis-terråd	500.000	-	Funding for further development of RENO's action in CEBW "More Nature – Less Waste". Construction of 2,200 meters of brush fence in Odder and Skanderborg municipalities, <a href="https://renosyd.dk/kvashegn/bag-om-projektet-mere-natur-mindre-affald">https://renosyd.dk/kvashegn/bag-om-projektet-mere-natur-mindre-affald</a>
C6.3 CDR	Reduce con- sumption from Regional politi- cal forum	CDR	134.000	134.000	<a href="https://www.ru.rm.dk/om-os/strategi/ny-udviklingsstrategi/reduc-&lt;br/&gt;eret-forbrug/">https://www.ru.rm.dk/om-os/strategi/ny-udviklingsstrategi/reduc- eret-forbrug/</a>
C7 BRK	Gerner Jahncke I/S	Danish Arts Foundation	12.000	12.000	The project supports machine investments of local recycling of wine bottles. <a href="https://www.gernerjahncke.dk/">https://www.gernerjahncke.dk/</a>
<b>Total public</b>			<b>39.424.000</b>		
<b>Private funds</b>					
C8 CR, GATE21	Re:Wair - Craft- ism	Tuborgfonden	296.000	219.652	The non-profit association RE:WAIR was founded in 2020 and aims to create a movement where youth can come together and take up the fight against fast fashion and clothing waste.  They work for a more sustainable textile and fashion industry by providing youth with knowledge and tools and building a community around the fight against textile waste and clothing waste. <a href="https://www.rewair.org/">https://www.rewair.org/</a>
C7, C12	Volunteer groups project	Velux Founda- tion	874.000	797.907	Application for financial support to a cooperative project that engage volunteers in reuse and recycling of waste.
C14.1 SKK	Automated sorting of con- struction waste,		T.B.D	-	SKK are in dialogue with a private company about an investment of app. 4 million Euro. The company offers automated sorting of con- struction waste for recycling.

	Skive Municipal- ity				
<b>Total private</b>			<b>1.170.000</b>		
<b>Total com- plemen- tary</b>			<b>56.008.959</b>		



### 5.3 Discussion on the contribution of complementary actions to the implementation of the targeted Plan

In Phase 1, the PM Unit focused intensively on establishing a strong technical and administrative foundation for the project, as outlined in Action F. This groundwork has enhanced the PM Unit's capacity to keep track of the complementary actions and assess their impact on the Action Plan for Circular Economy (APCE) plan in the upcoming phases.

Moving forward, complementary actions will become a key strategic priority. To support this, CDR has hired a dedicated employee to drive progress in this area, reflecting the PM Unit's high expectations for the coming phases.

Many actions only began yielding results in the later stages of Phase 1, marking the first steps towards new project development in Phase 2. Some actions have yet to deliver outcomes. Additionally, certain originally planned complementary actions were never realized and, therefore, did not contribute to the plan's implementation. Similarly, while some CEBW partners have applied for new projects based on Phase 1 findings, not all applications secured funding—representing a temporary setback.

Nevertheless, it is still early in the process. The PM Unit expects that by the end of Phase 2—and especially in the final phase—the work with complementary actions will have significantly matured, along with an improved ability to evaluate how they enhance the implementation of the plan.

## 6. Evaluation of Project Implementation

In this chapter the PM evaluates a number of aspects of the project, reflecting on the current implementation status. In section 6.1, the methodologies applied by both the PM and actions are discussed. In section 6.2, the PM reflects on the effectiveness of the dissemination activities of the C-actions. Finally in section 6.3, the technical and substantial progress and impact of all actions with focus on expected results, key achievements and major issues.

### 6.1 Methodology applied

#### 6.1.1 The PM Unit's methodological approach

In terms of the technical part of the project the PM Unit's overall methodologic approach has been to base the efforts on close dialogue with the project's partners to establish their needs. This approach has allowed the PM Unit to design support both individually for the partners and for the partnership as a whole.

In order to support the partners in the best way possible, the PM Unit has strived to enable them to take control and manage their time, expenses, and activities effectively. For example, by creating thorough guidelines, holding webinars, and establishing individual agreements with each partner, the PM Unit has sought to provide a solid foundation for the partners to feel competent and confident in their tasks. These initial efforts were followed by continuous availability for guidance as the partners worked on their actions.

In the project, capacity building (action C1) has been prioritized substantially with the intention of strengthening progress and technical quality in every C-action and across all C-actions. At the same time, focus has been on promoting cross sectoral and cross organisational cooperation. Besides the technical focus directed at increasing quality of employees and organisations – and hence their ability to implement the plan, the PM Unit has also focused on building project management skills in partners. It is of utmost importance that the partners can lead complex actions, work in a field of many stakeholders and interests whilst maintaining focus on purpose, desired output and progress. To obtain this, the PM Unit has prioritized to work with action C1 in the following way:

- An organization has been developed at the structural level, which, in a recognizable annual cycle, continuously holds seminars, conferences, webinars, and forms networks with others outside the project.
- The PM Unit has held numerous meetings with the individual C-Actions to strengthen specific capacity-building needs and thereby ensure progress.

In the following, examples are given as to how the PM Unit has strived to provide the partners with the competences to work with a cross-cutting and innovative mindset and methodology during the course of the project.

#### Innovation in an operating organization

As an innovation project, all actions work towards developing innovative solutions, but working with innovation requires a specific mindset, which is not always in place in organizations primarily working with operating tasks.

Specifically, municipalities and waste management companies have many tasks of an operating nature, and hence the mindset in the organizations are primarily set on solving these tasks. This makes

it difficult for employees working with innovation to succeed, because they can encounter opposition – especially from their leaders. An example of this is action C12. As a waste management company, the core task of Favrskov Forsyning (FAFO) is collection and management of household waste. This and consequent tasks are thus prioritized and therefore the innovative work in C12 has at times been put aside.

To counteract this, the PM Unit has held seminars focusing on this specific topic and building capacity and knowledge in the employees to make them better equipped to engage in dialogue with their leaders and organizations. The response from such employees to these seminars has been very positive, especially since they are very often unsupported in their own organizations.

#### Cross organisational project management

A well-known challenge for many employees in Danish organizations is to perform project management involving employees from other organizations. This is, among other reasons, due to the fact that these employees have other important tasks, and because their loyalty lies with their own organizations. C14.1 + C6.1

As in the above, the PM Unit has held seminars addressing this issue as well, and also with a focus on facilitating meetings with the participation of employees from other organizations.

#### 6.1.2 The methodological approach of the C-actions

The C-actions in CEBW have used a range of different methodological tools depending on the circumstances and objective of their work. However, a common denominator in most actions has been their use of elements from Design Thinking. The actions in question include C6.1, C6.2, C7.1, C7.2, C7.4, C7.5, C8, C10.1, C10.2, C11, C14.1, C14.2 and C14.3. Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. The aim of this method is to create innovative solutions based on the expectations, needs and attitudes of relevant actors to ensure that the results can have 'real-world' impact. The actions have thus valued dialogue and co-creation with citizens, employees, stakeholders, non-profitable organizations, cooperations etc. which is an advantage in developing and implementing sustainable circular solutions.

One example of this is action C11. They established continual feedback loops to refine the interventions in food packaging solutions and ensure that they were aligned with the stakeholders' needs and capabilities. For instance, while some participants initially viewed certain solutions (e.g., milk dispensers) as radical, they became more open to piloting these ideas after seeing how they could be implemented on a small scale. The iterative nature of the action helped stakeholders build confidence in the innovative solutions, facilitating a more collaborative approach to tackling complex waste challenges of composite food cartons. Another instance is action C7.4. They have consistently engaged both employees and citizens to understand their needs, motivations, perceptions, attitudes, and behavioral patterns regarding the establishment of a new recycling center. This continuous involvement enabled them to design a center that meaningfully influenced the actions of both users and employees, contributing to the goal of reducing household waste.

Design thinking has thus increased the success of the circular solutions by allowing the action leads to adapt and redefine their choice of solutions. By doing so they ensure a higher cost-efficiency of the actions. By continually matching the needs, capabilities and understandings of relevant users and stakeholders they minimize spending on unsustainable practices.

A successful example of this is C8 where a wide selection of users across the organization were involved in testing textiles and design for a new more circular uniform in the healthcare sector. This created a feeling of co-determination and increased the chances of better (both more environmentally and functional) use of the clothing. Simultaneously, the action engaged in dialogue with procurers, laundries and suppliers to co-create new procurement demands in the market and increased the prospect of a common direction for demand of greener textiles.

Several actions have also reported that not only did the Design thinking approach ensure high value input it also created motivation and worked as a driving force for citizens and stakeholders alike. C7.2 states that engaging with local reuse stores and communities helped to create 'social proof' of the benefits of reuse. By creating networks for involvement and other social activities the action helped to push norms and challenge expectations of what reuse means and how your community engages with it.

Even actions that didn't employ Design thinking, e.g. by C9 and C13, report that dialogue with stakeholders are beneficial for motivation and progress. Action C9 has engaged in dialogue with plastic generating companies in attempts to recycle household plastics in closed resource loops and create inter-industrial symbiosis. Unfortunately, the market isn't quite mature enough to provide the necessary data for this. But the action lead reports a considerable interest and highlights the importance of networking to create trust between the companies. Developing and sustaining this circle of trust will ultimately be pivotal for the success of the action.

#### Limitations and learnings from Design thinking

The method of Design thinking also comes with limitations. First, action C7.1 reports how an innovative and iterative process can challenge progress since a vast flow of perspectives complicates the choice of what should be included and what should be excluded in the action. For C7.1 it has been necessary to delimit the action to ensure that it remains manageable and focused on the original objectives. Thus, a key lesson is to remain continuously guided by the objectives of the action to avoid becoming overwhelmed or deviating due to complications and conflicting perspectives.

Another potential limitation is a decreased ability to disseminate the results. For action C7.5 the approach has resulted in ad hoc and piecemeal trials of individual solutions and systems, without establishing a cohesive framework for data collection or a structured method for scaling up the activities. This lack of systemic application has made it difficult to gather comprehensive data and apply solutions at scale, hindering the development of a more integrated, scalable system. The focus on trial and error, while useful for immediate learning, has left gaps in terms of broader implementation and evaluation of the action's impact. Thus, in the next phase an important challenge to overcome is how to disseminate the learnings in a meaningful way.

Lastly, the approach relies on the participation of relevant actors, and some struggled with engagement, as seen in C6.1, C7.1, and C14.2. For instance, C6.1 reports that some stakeholders failed to attend cooperative network meetings, resulting in a lack of technical insights. This may have potentially hindered the advancement of the plastic procurement tool. However, the action lead concludes that the network served as a driving force toward the objectives, facilitating common decision-making and the implementation of the tool. Despite challenges with engagement, they have still achieved progress and results.

#### Research, testing and analysis

Besides elements from Design thinking, some C-actions have also conducted extensive research or performed tests to ensure progress and successful results. Through this and subsequent analysis they have increased their understanding of their subject area as well as the ensured important technical knowledge about the necessary steps for success. Amongst others this includes C6.3, C7.1, C8, C9, C10.1, C11, C12 and C13. For instance, C6.3 tested different textiles in regard to function, type of laundry protocols and the overall longevity. This helped establish whether different textiles were suitable in terms of more circular solutions. Another example is C12 who spent a considerable amount of time researching different ways of increasing reuse of electronic and electrical equipment, focusing on Large Household Appliances (LHA). This provided a very extensive amount of data and knowledge but also posed a challenge when trying to convey and use the research in a tangible way. C12 has thus experienced some of the same limitations and learnings as e.g. C7.5.

Some C-actions have conducted business analyses of the fiscal sustainability of different models and solutions e.g. by C7.1, C13, C14.1 and C14.2. By doing so they can adjust and shift their work focus in a way that is more cost-effective. C13 focusses on circular and sustainable management of biomass flows. In the pre-development stage, the action lead Samsø Kommune (SK) discovered through several analyses that it wasn't financially viable for the municipality itself to manage a pyrolysis plant. Instead, they are considering pursuing cooperation with private companies.

## 6.2 Dissemination

In this section the effectiveness of the dissemination activities is discussed as well as any challenges or drawbacks.

### Challenges

One challenge the PM Unit experienced early on was that the partners—understandably—focused primarily on communicating with their own organizations, politicians, and citizens, often overlooking the narrative of the overall project. This has since improved, with the PM Unit gently but consistently reminding partners to emphasize how their efforts contribute to the broader LIFE IP project and context.

We faced challenges in terms of achieving broad public awareness of the solutions developed in CEBW through classic PR initiatives such as press releases. This is understandable, as many of the activities and results primarily involve processes and methods. Such "brainwork" often lacks strong, PR-friendly visuals and cases, despite the significant outcomes.

Entering Phase 2, as more actions produce concrete tools and tested cases to present, there will be a strong foundation for dissemination work with expected high interest and impact.

### Successes and Impact

That said, all C-actions have been quite active and have utilized a variety of communication channels to disseminate their findings and innovations. Especially in terms of reaching their primary target groups—professionals—most project partners have been very successful with their chosen communication activities. Below are some examples:

At Kredsløb Genbrug (AVA), action C7.1, one of the most effective approaches has been targeted communication to decision-makers, waste management companies, housing associations, and other actors in waste handling. Through tours and presentations, they have sparked interest in their reuse

solutions, received valuable feedback, and strengthened relations with potential collaborators and authorities. AVA held 10–15 tours for municipalities and waste companies, resulting in increased interest and valuable collaboration opportunities. One of the main elements of C7.1's concept, the "Godsbanen Nærgenbrugsstation" (Neighborhood recycling station) was also nominated for the Circular Economy World Goals Award by the industry association Cirkulær, enhancing the project's recognition within the sector.

The partners behind action C14.1 have shared an interesting insight. Participation in professional conferences and events related to circular construction has been beneficial in terms of creating visibility for the project. But in terms of reaching concrete results, the many face-to-face meetings with companies and organizations have been the most successful. Through these meetings, they have gained valuable inspiration and facilitated new partnerships and projects. The anticipated establishment of an automated waste sorting plant locally in the city of Skive is an example of such a result.

In addition to the actions' own communication efforts, the PM Unit has done a lot to promote both individual actions and promote actions with similar work areas by combining them thematically in webinars and seminars (see Section C1 and E). This has helped ensure that messages reached a broader range of relevant stakeholders. It also allowed project partners to recruit test participants from target groups such as other municipalities. For example, C15 presented a guide designed to help municipalities in their initiatives aimed at citizens' consumption, C14.3 received feedback on a tool to promote circular economy through inspections, and C6.2 reached out to potential test municipalities—all through webinars hosted under the auspices of CEBW.



*Both digital tools and printed materials have been produced to support the dissemination of solutions developed in Circular Economy Beyond Waste. Here are a few publications from subprojects C6.1, C15, and C10.1.*

#### Dissemination internationally

Dissemination beyond national borders has begun. Several CEBW actions have been invited to participate in events across Europe to present their projects. In 2023, RENO was invited by the Nordic Council of Ministers to Brussels, where there was significant interest in their combined biodiversity and waste initiative featuring brushwood fences (C7.4).

In October 2024, the City of Copenhagen gave a presentation on the digital tools developed for material screening (C10.2) at CINEA & DG ENV's online event "Networking Meeting – LIFE and the Construction and Demolition Waste."

These kinds of activities could be scaled up in future phases to promote dissemination and mutual learning with international stakeholders.



*Rikke Edberg from RENO speaks in Brussels to politicians and other Nordic projects also working on Nature-Based Solutions.*

## 6.3 Technical Implementation

### Short reading guide

For the action description in chapter 6.3, the following is valid for all actions:

- All actions are engaged in the LIFE IP via WP1 until 31.12.2029 (and whatever time the end report is required to finish)
- For all actions with timetables and work packages, the action specific work packages begin from work package 2.
- When reading the timetables, any deviations from amendment no. 1 and 2 will be marked with an orange square (example below) - and the explanation for the delay will be right below the timetable.

### C6.3 Timetable

Phase	Phase 1			Phase 2			Phase 3					
	Year	2022	2023	2024	2025	2026	2027	2028	2029			
WP	I	II	I	II	I	II	I	II	I	II	I	II
<b>C6.3</b>												
<b>WP1</b>												
<b>WP2</b>												
<b>WP3</b>												
<b>WP4</b>												
<b>WP5</b>												

- The timetables show progress on the actions' work packages. In the above example, work in WP2 was concluded in first half of 2022, and work in WP5 was commenced in second half of 2022. WP3, will be concluded at the end of 2025, whereas WP 4 and 5 will be completed in the first half of 2025.
- Actions D, E and F have no action specific timetables or work packages, since they are placed in WP1 of all other actions and hence run through the entire project – and even as far as 2030 (action F) and 2033 (action D).
- When reading the tables for deliverables and milestones, a few clarifications should be noted.
  - The category "Official/Approved deadline" is either the original deadline or the changed deadline approved by CINEA in either Amendment no 1 or 2.
  - In the category "Actual date of completion / If delayed, new deadline" actions with delays that influence Phase 2 or 3 are marked with **red** to clarify a deviation. See example below. Dates in black show the date of completion of the deliverable or milestone.
  - All achieved milestone are listed as "N/A" under the category "In BUTLER". No milestones have been added to BUTLER as this is not a requirement.

Name of the Deliverables	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Catalogue of activities, workshops and information initiatives	WP3	30.06.2025	Delayed	31.12.2025	-
Educational material for schools, firms, and educational institutions	WP3	31.12.2024	Delayed	31.12.2025	-
Sustainability policy	WP5	31.12.2024	Delayed	31.12.2025	-

### The structure of section 6.3

The project activities of CEBW are divided in 5 pillars. Therefore, the structure of the technical report is also pillar-based. The following table provides an overview of the tables.

Pillar	LIFE IP Objective	Supporting actions within the IP	Supporting complementary actions
Waste prevention	IP objective 1 (waste prevention) and IP objective 3 (regulation)	A1, C6, C15	See supported actions or areas in the table from chapter 5.2
Waste reuse	IP objective 1 (waste prevention), IP objective 2 (circular waste management) and IP objective 3 (regulation)	C7	See supported actions or areas in the table from chapter 5.2
Waste recycling	IP objective 2 (circular waste management) and IP objective 3 (regulation)	C8, C9, C10, C11, C12, C13, C14	See supported actions or areas in the table from chapter 5.2
Supportive actions	IP objective 3 (regulation)	A2, C1, C2, C3, C4, C5	N/A
Obligatory actions	-	D1, D2, E1, E2, E3, E4, F1, F2	N/A

The report will first provide a brief overview of the progress and results of the pillar and then go into detail of the corresponding actions.

### 6.3.1. Waste prevention pillar

The prevention pillar contributes to O1 and O3 of CE Beyond Waste by creating a useful framework for estimating and communicating the value and costs of circular initiatives (A1), establishing a circular procurement taskforce promoting the public demand for recyclable and more sustainable plastics in AK (C6.1), upgrading municipal departments in terms of supporting the economic and political decision making based on the double bottom line (C6.2), supporting the shift from single-use textiles to multiple-use textiles through innovation procurement in CDR (C6.3) and mobilizing and building competencies for deliberative processes among municipalities and other stakeholders by organizing a Citizens Assembly (C15).

Overall, the pillar has seen significant progression, and all actions have succeeded in developing tools, models, products and/or events expected for Phase 1. Action C6.1 and C6.3 have developed and tested new tools and products for public procurement that will be implemented in tenders and thus influence the market to move in a more circular direction. Both action A1 and C6.2 have succeeded in creating decision-making tools for the public sector supporting the circular transition. The tools support and influence mainly the professional (A1) and political (C6.2) level, respectively. Lastly, action C15 has involved and mobilized citizens for circular purposes resulting in 'The Citizens' Assembly's vision and recommendations' and five pilots across participating municipalities.

With the exception of minor delays for action C6.2 and C6.3, all expected deliverables and milestones have been completed within Phase 1. The next step for the actions in the prevention pillar is further testing and/or implementation of their results with several also increasing their disseminative efforts to support replication – particularly A2 and C15.

## **Action A1: The Value Case of circularity – Communicating the value of circular transition**

Beneficiary responsible for implementation: Capital Region of Denmark (CR)

Foreseen start date: 01.01.2022

Actual start date: 01.09.2022

Actual/anticipated end date for action specific activities: 31.12.2026

### **Purpose of action**

The purpose of this action is to create a useful framework for estimating and communicating the value and costs of circular initiatives and will, when implemented, result in a higher degree of confidence with circular efforts among beneficiaries. This will, presumably, lead to enhanced dissemination and replication of the circular best practices and solutions developed in the IP. In the following paragraph the activities and results from Phase 1 are presented.

### **PM unit's (CDR) overall assessment of action**

It is PM Unit's assessment that the work done in action A1 with a decision-making tool for the public sector, can enable better decisions supporting the circular transition. It is also evident that the work done has been carried out with a well-founded and systematic approach. The tool is divided into sections, all of which relate to municipal authority areas, ranging from mobility to food, housing, and consumer products. It provides inspiration for new approaches through examples, as well as an assessment approach for initiatives that straightforwardly address the degree of human well-being and the impact on planetary boundaries. The tool has been developed through contributions from academia and think tanks, as well as testing in municipalities and subsequent re-evaluations. In order to make the tool even more useful a digitalized version is recommended.

### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **A1 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
Action	I	II	I	II	I	II	I	II
A1								

#### **Explanation for timetable delays (if any)**

n/a

#### **WP1: Beneficiaries, mapping needs**

Establish a user panel with selected beneficiary representatives
Make a prioritized mapping of needs and outputs relevant for capacity building and strategic processes, based on user panel input
<b>WP2: Developing framework</b>
Facilitate discussion of content, specifying and qualifying the needs of the beneficiaries
Explore existing data and knowledge addressing those needs
Identify methodologies and content that are useful for the beneficiaries
Develop the framework for assessing and communicating value and costs of circular measures
<b>WP3: Demonstration, dissemination</b>
Demonstrate the potential results that can be achieved by using the framework
Disseminate the framework through C1

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
A framework for estimating and communicating the value and costs of circular initiatives	WP1, WP2	31.12.2024	Completed	31.12.2024	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
User panel has been established	WP1, WP2	30.06.2023	Achieved	31.12.2024	N/A
User panel has contributed to development of the framework	WP1, WP2	31.12.2024	Achieved	31.12.2024	N/A
Beneficiaries have used the framework for capacity building and/or strategic processes within the organisation.	WP3	31.12.2026	Achieved	31.12.2024	N/A

### Explanation for delays in Deliverables and Milestones (if any)

Milestone “User panel has been established” has been delayed twice previously, primarily due to personnel changes and maternity leave.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “A framework for assessing and communicating the value and costs of circular initiatives in public organizations, including real-life examples.” AND **Expected:** “Beneficiaries will use the framework for capacity building and/or strategic purposes (for example discussing circularity, deciding the next circular initiative or designing a circular strategy) within the organization.”

The framework (a deliverable in the action) was finalized by the end of 2024 in a format that allows for the ongoing addition of new initiatives, best practice cases, etc.

The development of the framework – referred to as “a guide” in the following - has been preceded by extensive research on existing and forthcoming tools, as well as an analysis of effective measures. This includes examples of how municipalities can engage with citizens' consumption patterns and lifestyles. The research involved desk studies, interviews, participation in various networks and seminars, and a survey among 40-50 municipal employees who attended a webinar on April 23, 2024.

A1 is actively developing a guide for municipalities that:

- Presents a wide range of initiatives municipalities can launch to support a shift toward sustainable and circular consumption patterns among citizens.
- Showcases successful case studies from other municipalities.
- Facilitates the comparison of different initiatives based on their transformational potential, well-being potential, and impact on planetary boundaries.
- Provides municipal staff with a tool to assess the effectiveness of potential initiatives using qualitative parameters.

The guide was tested and reviewed by several municipalities in the second half of 2024 and has been presented in a webinar for CEBW partners and municipal staff for feedback. Subsequently, it will be further developed to better meet the municipalities' needs.

Below is a figure from the guide to show the graphics used. The figure shows the interaction between the following elements:

Approaches to Reducing the Global Consumption Footprints and a wide range of municipal initiatives and 'best practice' cases. The guide includes initiatives in the following four consumption areas: Mobility; Food; Housing; Consumer Products. Additionally, the guide contains cross-cutting initiatives that have a positive impact across several or all of the above consumption areas. The guide also contains principles and Methodology for Assessing the Impact of Initiatives addressing both qualitative and quantitative impact. Such as transformative potential; Well-being potential; Climate footprint and other planetary boundaries

For each initiative in the guide, the effect on the three parameters has been assessed and illustrated.

**Introduktion**

Hvad indeholder guiden?

- Strategier til at reducere forbrugsaftrykket
- Bred viste af kommunale tiltag og best practice cases
  - Guiden indeholder tiltag inden for følgende fire forbrugsområder:
    - Mobilitet
    - Fødevarer
    - Bolig
    - Forbrugprodukter
  - Desuden indeholder guiden **tværgående tiltag**, der har en positiv indvirkning på tværs af flere eller alle de ovenstående forbrugsområder.
- Vurdering af værdiskabelse og effekt
  - Effektvurdering af hvert tiltag på følgende tre parametre:
    - Transformativt potentiiale
    - Trivespotentiiale
    - Klimaaftryk og de øvrige planetære grænser
- Principper for vurdering af effekt
  - Principper for vurdering af effekt på de tre parametre, så en kommunal medarbejder selv kan lave vurderingen på et niveau som helst tiltag.

**Figure: Introduction page from the pilot version of the guide (in Danish)**

Additionally, CDR has maintained ongoing knowledge sharing with action C6.2, which is developing a framework for the qualitative assessment of effects on well-being and climate/environment in municipal procurement.

In 2025-2026, CR will focus on the implementation of the framework. This entails clarifying the framework's hosting, format, etc., after which it will take its final form, likely digital, and become operational. Furthermore, we then expect that the framework will be utilized by municipalities in their work on both current and future climate action plans, waste management plans, and other relevant strategies. This applies to both CEBW participating municipalities and non-participating municipalities.

### Communication

As part of the framework development, CEBW/CDR in collaboration with CONCITO (Denmark's leading green think tank) and C40 (C40 is a global network of nearly 100 mayors of the world's leading cities that are united in action to confront the climate crisis) have hosted a webinar within the Climate Alliance (a partnership supporting the municipalities' climate plans) designed to inspire municipalities to address the climate impact of citizens' consumption and refine the associated tool. A Menti survey was conducted among participating municipalities during the webinar.

### **B. Evaluation**

This paragraph presents the progression, successes, and obstacles of the action.

#### Progress, Outcome Evaluations, Successes, and Learning Points

We have developed a guide, which has been uploaded to Butler (The Deliverable "A Framework for ..." in A1) that provides municipal staff with an overview of initiatives that can help keep citizens' consumption within planetary boundaries, as well as an indication of which initiatives have an impact on transformational change, well-being, and planetary boundaries. In our work, we have drawn inspiration and background knowledge from research regarding consumption's significance in relation to planetary boundaries, the dynamics influencing citizens' consumption patterns, and the links between well-being and sustainable consumption.

We have engaged with numerous municipalities concerning their work on citizens' consumption, identifying barriers, and reviewing existing best practice catalogs and evaluation tools. Additionally, we

have coordinated and shared knowledge with C40 and CONCITO, the Climate Alliance's knowledge partners. The municipalities involved in development of the pilot version were Helsingør, Hørsholm, Brøndby, Gladsaxe, Gentofte, Sorø, København, Skanderborg, Hjørring, Middelfart, Fredericia and Albertslund. Afterwards we held a webinar hosted by CEBW as part of action C1 with 70 participants, and during the webinar we conducted a Menti Survey regarding the themes in the guide. In the fall of 2024, the nine municipalities got back a pilot version of the guide, and a new webinar hosted by CEBW took place afterwards in order to get feedback on the finalized pilot version. This webinar hosted 102 participants.

We have engaged in dialogue with several CEBW partners, such as Gentofte Municipality (GK), which is developing a qualitative impact assessment tool that assesses the impact of decisions on planetary boundaries. The nine planetary boundaries are explained here:

<https://www.stockholmresilience.org/research/planetary-boundaries.html>.

Also, we have drawn inspiration from C1 activities such as external networking meetings, seminars, and conferences, where we have learned about how municipalities and waste companies are working on waste prevention, behavior change, and citizens' consumption patterns.

Joint events within C1 have particularly benefited A1 through inspiring presentations, such as Amsterdam Municipality's work with the doughnut model, and insights from short discussions. The Doughnut model is a framework for sustainable development that balances essential human needs with the planetary boundaries. It aligns with circular economy by promoting resource ecological limits and reducing waste.

Lessons learned will likely become more apparent later—both when we deploy the pilot version with the test municipalities and when we develop the digital version of the tool in 2025.

### Challenges and Delays

We have faced several challenges, which are detailed here:

The difference between an approach that emphasizes time-consuming analyses of known facts and an approach that works with hypotheses about the future is one of the significant challenges of our time. It appears that a data-driven approach, which reduces the desired future outcome based on historical data, is considered more acceptable and carries greater validity than a descriptive approach, where hypotheses about the future are formed based on existing knowledge, and these assessments are integrated as contributions to the desired change.

With this framework, we aim to transform how municipalities approach citizens' consumption patterns and decision-making.

The biggest challenge is shifting the way we define and evaluate good decision-making. Traditionally, decisions are guided by factors like economic considerations, CO<sub>2</sub> emissions, and environmental regulations—particularly in areas like construction. However, this narrow focus often overlooks a more holistic perspective that truly respects planetary boundaries. As a result, projects that seem environmentally friendly on paper may still cause unintended harm, such as groundwater depletion or biodiversity loss.

A key obstacle is the lack of a compelling narrative for this broader approach. Civil servants and politicians are accustomed to methods that prioritize measurable data and quick wins, making it difficult to embrace a more comprehensive and long-term perspective.

Another challenge is that the field is evolving rapidly, and we are working in parallel with other initiatives. This is time-consuming and has delayed our progress, as we want to ensure that our framework is coordinated with other tools, such as the Climate Alliance's tool for accounting for consumption-based emissions, so they can complement one another. The tool among other things is available here <https://www.realdania.org/whatwedo/grants-and-projects/the-climate-alliance>. The Climate Alliance is a partnership that originates from the DK2020 partnership consisting of the 98 municipalities in Denmark, supporting a Climate Action Plan showing the way to net-zero emissions by 2050.

We have investigated where the guide developed in this action A1 can be best anchored to achieve the widest dissemination among municipalities, and the Climate Alliance is an ideal platform. However, integration depends on external processes, as it must be embedded in a new shared knowledge platform. The Climate Alliance, with a budget separate from CEBW, provides a framework for developing solutions to local and national climate challenges. It facilitates collaboration, supports municipalities in securing funding for local projects, and strengthens climate action plans. As an early initiative, the alliance is developing a standard for assessing consumption-based emissions.

We have encountered organizational challenges, including staffing issues, changing management, parental leave, and a lack of experienced personnel on the team. This has delayed the framework's development.

#### **C. Targets and Goals for Phase 2, 2025-2027**

We will transform the A1 framework developed in 2024 into a user-friendly format for municipalities (with external consultancy support) and host it in an appropriate location, such as the Climate Alliance's knowledge platform, to ensure widespread adoption.

Additionally, we will continue efforts to raise awareness about the framework and potentially further develop it as needed.

#### **D. After Life**

We hope that many municipalities will utilize the A1 framework in their work on climate action plans, waste management plans, and other strategies, leading to more transparent decision-making processes and prioritizations. Ultimately, we expect this to result in a greater number of initiatives that reduce the resource and climate footprint of citizens' consumption.

Our aspiration is that municipalities will increasingly make decisions based on a more holistic approach, thereby becoming significant contributors to national and global CO<sub>2</sub> reductions and resource savings.

It is our hope and aspiration to anchor the A1 framework to secure the widest possible dissemination among municipalities and for now the best solution seems to be with the Climate Alliance (cf. Explanation in "Challenges and delays")

### **Action C6: Circular Public Procurement as a Driving Force for Circular Transition**

While Green Public Procurement (GPP) has been mainstreamed in most public organisations for years, Circular Public Procurement (CPP) remains a blind spot.

C6 contributes to CE Beyond Waste O1 and O2 by establishing a circular procurement taskforce promoting the public demand for recyclable and more sustainable plastics in AK (C6.1), upgrading municipal departments in terms of supporting the economic and political decision making based on the double bottomline (C6.2), and supporting the shift from single-use textiles to multiple-use textiles through innovation procurement in CDR (C6.3).

In the APCE, GPP and CPP are also described as important means to prevent waste and promote better use of natural resources. C6 aims at the implementation of CH1 Section 1.1 Visions, targets and indicators; CH3 Section 3.1 Circular Design, Section 3.2 Products and materials without problematic chemicals, Section 3.3 Resource efficient businesses, Section 3.4 Green and TCO procurement, Section 3.5 Circular business models, Section 3.6 Repair and life extension, Section 3.7 Reuse; CH4 Section 4.6 EPR for packaging, Section 4.12 No waste in the nature, in the ocean and on the streets; and CH7 Section 7.1 Minimise unnecessary use of plastics, Section 7.2 Solutions across the value chain, design and more knowledge, Section 7.3 More recycling of plastic waste and Section 7.4 Microplastics.

C6 demonstrates EU added value by implementing the CEAP target 2.2. Empowering consumers and public buyers and ECOD. C6 will transfer relevant approaches from the EU guides for public practitioners when relevant e.g., Public Procurement for a Circular Economy as well as incorporate the sector-specific EU GPP criteria in procurement actions.

### **Action C6.1: Procurement as a driver for less resource consumption and more recycling of plastics**

Beneficiary responsible for implementation: Aarhus Kommune (AK)

Other beneficiaries participating: Kredsløb Genbrug (AVA)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2024

The main activities for this action were scheduled to be finalised in Phase 1, and this has been fulfilled.

#### **Purpose of action**

The purpose of this action is to implement, scale and further develop a tool on sustainable and circular procurement of plastics and establish a taskforce, that drives the processes. The tool was developed prior to action start to dramatically reduce plastic waste and increase plastic recycling rates within Aarhus Municipality (AK). The existing tool can be found here:

<https://www.e-pages.dk/aarhuskommune/944/html5/>

In addition to its implementation, the taskforce is also tasked with inspiring other public organizations and private companies to adopt the plastic tool. The following sections describe the activities and results of this action in Phase 1.

#### **PM unit's (CDR) overall assessment of action**

This action has completed its work packages within the timeframe. The PM unit assesses that the task force and the developed tools address a need to increase procurement officers' knowledge about plastic. Preliminary results (see under 'Results') indicate that the material is already contributing to reducing the procurement and use of single-use plastic across departments in Aarhus Municipality. The tools stand out for being simple and practical for the target group of procurement officers in their daily work and can be relatively easily replicated—also internationally through translation into other languages.

The Plastic Strategy in Aarhus Municipality is a dynamic tool that is continuously developed from 2020 to 2025. The strategy is consistently converted into practical tools that can be effectively utilized within the municipality. The PM unit notes that the work in the action has resulted in outcomes that exceed the expected results. A central component of the strategy is the development of a procurement tool that focuses on partial deliveries. This tool ensures that purchases better meet the established sustainability and plastic usage objectives.

Aarhus Municipality's understanding and ability to collaborate with stakeholders across the entire value chain is essential. This includes ongoing collaboration with Danish Industry, particularly their plastics division, which supports the initiatives within the strategy.

The strategy is continuously adjusted to address new challenges and opportunities, making it dynamic and responsive to changes in both local and national contexts

Aarhus Municipality's Plastic Strategy represents a proactive approach to plastic management aimed at sustainability through innovative tools and collaboration with relevant stakeholders. The strategy

has the potential to set a standard for effective plastic use in municipal practice and promote a circular economy in the field.

### Action progress

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### C6.1 Timetable

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C6.1</b>								
<b>WP1</b>								
<b>WP2</b>								
<b>WP3</b>								
<b>WP4</b>								
<b>WP5</b>								

#### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
Setting up appropriate monitoring systems to measure the effects of the taskforce's work and the plastic tool (compare baseline with the status at end of the project).
Setting up appropriate communication to inspire other municipalities, companies and networks (disseminating good examples, sharing knowledge, etc.).
<b>WP2 Analysis and development</b>
<ol style="list-style-type: none"> <li>Map the structural conditions for procurers and identify barriers and opportunities in the current conditions and adjust the plastic tool accordingly to smooth the process of CPP.</li> <li>Supplement the plastic tool with other tools targeting the needs of public procurers and companies concerning core performance or business basis.</li> <li>Collect knowledge and experiences through visits and interviews in relevant departments in AK and companies – primarily SMEs.</li> <li>Map the share of plastic procured in AK today, which can be recycled or reused.</li> </ol>
<b>WP3 Support for public procurers</b>
<ol style="list-style-type: none"> <li>Support and capacity building to public procurer to address what they see as barriers for sustainable procurement and support to the full implementation of the plastics tool.</li> <li>Visits and guidance are voluntary and free of charge.</li> </ol>
<b>WP4 Support for procurers in SMEs</b>

<ol style="list-style-type: none"> <li>Establish dialogue with procurers in companies to offer support on sustainable procurement.</li> <li>Support and capacity building to private procurers to address what they see as barriers for sustainable procurement and support to the full implementation of the plastics tool.</li> <li>Visits and guidance are voluntary and free of charge.</li> </ol>
<b>WP5 Replication and dissemination</b>
<ol style="list-style-type: none"> <li>Exchange of knowledge with GK, to ensure synergy between two municipal procurement projects.</li> <li>The results of the taskforce and the results from applying the plastic tool are expected to be widely disseminated and replicated to other Danish municipalities via e.g., the professional network for buyers POGI.</li> <li>Dissemination of results at EU level could take place via SPP Regions (Sustainable Public Procurement Regions), Public Buyers for Climate and Environment or similar networks.</li> </ol>

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
1 overview of the tools to be applied in the taskforce (incl. the guidance "Sustainable Plastic Choices" prepared as part of AK's Plastic Strategy).	WP2	30.09.2022	Completed	30.09.2022	YES
A replicable taskforce concept based on the experiences in the project made available to inspire other municipalities to set up similar taskforces	WP5	31.12.2024	Completed	31.12.2024	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Establishment of the taskforce. Analysis of barriers and suggestions on how to challenge them. Development of a short report on identified solutions to address structural barriers in the sustainable and circular	WP2	30-09-2022	Achieved	30.09.2022	N/A

procurement of plastic. Period 2022 to medio-2022.					
Taskforce in operation in AK and collaboration with relevant SMEs. Description of taskforce concept. Development of a toolbox. Dissemination and replication of results via networks, business partners, business departments, etc. Period 2022-2024.	WP3, WP4	2022-2024	Achieved	01.02.2024	N/A
Project evaluation and decision about possible next step.	WP5	30-06-2024	Achieved	30.06.2024	N/A

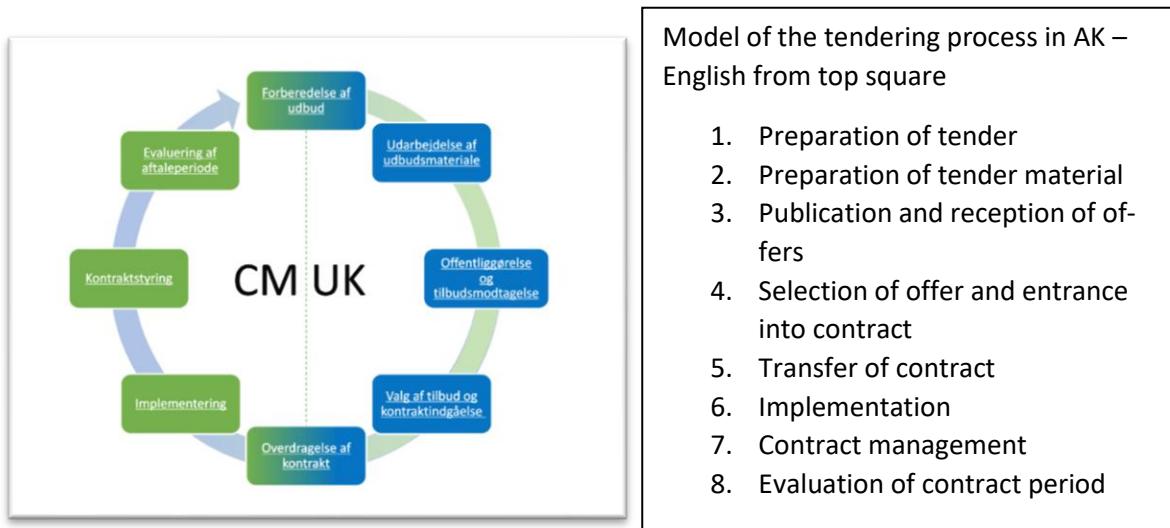
### Explanation for delays in Deliverables and Milestones (if any)

n/a

#### A. Expected and achieved results

##### The correlation between expected and achieved Results

**Expected:** “Offer training in the use of the plastic procurement tool to all full-time procurement staff and all part-time procurement staff tasked with procuring a significant proportion of plastic products in the City of Aarhus.”



As part of CEBW action C6.1 and Aarhus Municipality's plastic strategy, a taskforce was established focusing on plastic waste prevention. The taskforce consists of staff from AK, Procurement and Tendering department, as well as AVA that are representing the recycling division of the municipality's waste management service. The taskforce has successfully achieved the expected results for Phase 1, as detailed below.

The taskforce has integrated a new procurement process in which the plastic tool is now an essential part of the preparatory tendering process to ensure the best choice of plastic (when tenders include plastic products).

In the preparation of tenders, the procurement consultant contacts the taskforce to discuss circular economy opportunities for the specific tender. This ensures that the plastic tool is implemented in the tendering process, helping the municipality focus on reducing and recycling plastic.

**Expected:** *"50% increase in the number of applicable tenders (where plastic is a significant component) that are requesting recycled/recyclable/reusable plastic solutions. Early in the project, appropriate monitoring indicators and measures will be planned to be able to assess this."*

All future tenders in the Procurement & Tendering Department will be conducted following the new process, which will lead to alternatives to virgin plastic being included in the tenders, where possible.

**Expected:** *"Inspire other municipalities and companies to use the tools developed through engaging in minimum 10 appropriate events e.g. via the professional procurers' network POGI."*

The taskforce has successfully inspired and disseminated knowledge about the plastic tool. In total, we have participated in over 40 events to spread awareness about the project's work. A list of the events is attachment 12.

There were 2 webinars held (at Plastindustrien and CEBW), with over 100 participants in attendance. The action also participated in one of CEBW's podcasts (<https://www.spreaker.com/episode/om-stillingen-til-gronne-indkob-er-ikke-nem--56499965>).

The team was nominated for Plastprisen 2023 (Plastic Award) for their work with Aarhus Municipality's plastic guidance, recognized for raising awareness about plastic possibilities and taking on additional social, educational, and environmental responsibilities. The nomination is Attachment 2.

Read about the nomination her:

[https://www.plastforum.dk/article/view/1025204/her\\_er\\_de\\_nominerede\\_til\\_plastprisen\\_2023\\_hvem\\_skal\\_vinde](https://www.plastforum.dk/article/view/1025204/her_er_de_nominerede_til_plastprisen_2023_hvem_skal_vinde)

**Expected:** *"Offer minimum 30 companies training in using the tool."*

We have shared our CE concept and toolkits with more than 30 small and medium-sized businesses, partners, and internal departments in Aarhus Municipality through dialogues and/or presentations of our CØ concept.

The tool can be found here: [Plastvejledning](#)

#### Communication

The action has also produced several key communication outcomes during Phase 1:

- Dissemination of AK's plastic guidance:
  - Two webinars in Plastindustrien and CEBW
  - Nominated for the Plastic Award 2023 (Attachment 2, Annex 5)
- Guidance and disseminative effort regarding 'Klimakluden' an airlaid cloth in paper that serves as an alternative to foam cleaning cloths, reducing CO<sub>2</sub> by 80 %:

- Presentation on Klimakluden at IKA Annual Conference 2023(Attachment 3, Annex 5)
- A video guide on how to use the cloth in the elder sector
- User manual for the Children's Sector (Attachment 4, Annex 5)
- Washable Packaging:
  - Several different communicative materials for schools
    - A campaign in Søndervang School (Attachment 5, Annex 5)
    - LinkedIn posts including but not limited to a [film from Søndervang School](#)
- [Mini-guide – Easy Use of Partial Delivery Rule](#)



Mette Rich from AK presenting the Mini-guide at the End of Phase 1 conference.

## B. Evaluation

This section evaluates the action's progress, successes, and challenges.

### Progress, Outcome Evaluations, Successes, and Learning Points

The action has progressed well despite fluctuating availability of resources. We have initiated and completed numerous activities, resulting in new tools and products. However, it cannot be excluded that more of the actions mentioned could have been implemented by now with a more stable resource base.

Also, the action has led to tangible changes in daily practices in our organizations.

### Challenges

The action has faced several challenges, as outlined below:

- Internal structural organizational changes have affected staff resources.
- Organizational barriers, such as siloed departments.
- Internal work processes are difficult to change, and in some areas, there is a lack of maturity and transition to new internal directions.
  - This requires new workflows and familiarity with the product.
  - It challenges individual comfort zones.
  - The shift from familiar to unfamiliar solutions in a busy daily routine, with a strong focus on time and cost, weakens the effectiveness of the process.
  - Introduction of new and unknown work processes.

- Lack of market maturity among external suppliers makes the transition more difficult, as the market is developing new products alongside the action's progress.

### C. Targets and Goals for Phase 2, 2025-2027

We expect ongoing updates to the established tools. These updates will be carried out by the project Lead, AK, in collaboration with potential partners.

### D. After Life

Several of the fully developed tools have already been implemented in the internal processes related to tendering and operations within AK to ensure the appropriate focus on material choices and CE.

We expect the action's plastic selection guidance to be integrated into Aarhus Municipality's tender and contract processes upon full completion. This is crucial for highlighting the partial delivery rule and leveraging the full potential of municipal procurement behavior, with a resulting lower carbon footprint.

Furthermore, the tools have been developed with the intention of being replicable in other contexts, as circular economy is about sharing knowledge and breaking down silos.

### **Action C6.2: Economic and Political Decision-making based on the Double-bottom line**

Beneficiary responsible for implementation: Gentofte Kommune (GK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of this action is to upgrade municipal financial departments and political financial committees in terms of being able to make decisions by adhering to a double bottom line. C6.1 aims to upgrade the foundation for decision making by integrating tools, templates and training in CE for use in public procurement processes.

Amendment No. 1 addressing the withdrawal of Horten, caused a revision of the action. The revised c-action will deliver the same kind of calculation tools and activities as the original version, but the scope of relevance and dissemination has been broadened. (The scope is now a triple- bottom line). In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action Amendment 1**

This action has made significant progress in Phase 1 in developing a high-quality test version of a decision-making tool. The City Council of Gentofte Municipality has assessed and indicated its intention to use the tool in selected decision-making processes going forward. Based on this—along with the great interest from other municipalities—we assess that the tool and this approach of integrating sustainable and circular aspects early on have the potential to make a significant impact on practice in relation to economic decision-making processes within the municipal sector in Denmark.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C6.2 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C6.2</b>								
WP1								
WP2								
WP3								
WP4								

WP5															
WP6															
WP7															

### Explanation for timetable delays (if any)

The reasons for delays in the Timetable for WP3-WP7 are primarily, that the original project manager fell ill, and following a period of illness, subsequently experienced a stress-related sick leave. The new project manager, after being hired, had to redefine the content to make the elements actionable and also familiarize himself with the municipality's procedures, as he was recruited from a non-municipal system.

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
<ol style="list-style-type: none"> <li>1. Exchange of knowledge with other relevant C-Actions to ensure synergy between any relevant initiatives.</li> <li>2. Evaluation model(s) and evaluation report template will be developed</li> <li>3. Best practices will be disseminated to other Danish municipalities to replicate successful tools, successful tools and processes.</li> <li>4. Dissemination of results at the EU level could take place via KL or another relevant organization.</li> <li>5. Dissemination of tools and knowledge at an educational level.</li> </ol>
<b>WP2 Design of CE Metrics including Economic nomenclature.</b>
<ol style="list-style-type: none"> <li>1. Design of CE Metrics (Econometric methodology)</li> <li>2. Designing a nomenclature for environmental accounting and budget structure to ensure an applicable economic structure and level for granularity</li> <li>3. Integration of CE Metrics and the nomenclature to ensure a common level of information suitable for economic and political decision-making based on the double bottom line.</li> <li>4. Integration with existing economic accounting schemes and organizational structure locally in each municipality</li> </ol>
<b>WP3 Roadmap to and Environmental Extended Budgetary Proces</b>
<ol style="list-style-type: none"> <li>1. Mapping and evaluating the existing budgetary process in order to amend the process to include environmental accounting on circular economy onwards</li> </ol>

2. Develop the procedural guidelines to support the existing budgetary process as well as the developed tools and templates.
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<b>WP4 Environmental Accounting (CE)</b>
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<ol style="list-style-type: none"> <li>1. Develop a dashboard (calculation tool) for business intelligence purposes</li> <li>2. Develop a template for bottom reporting to provide the municipalities with valid indicators monitoring cost levels as well as the CE metrics</li> </ol>
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Develop a methodology that ensures that the CE metrics applied in the dashboard are easily transferrable into the existing accounting structure to ensure a clear transparency between each CE metric and economic transactions in terms of accounting.
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<b>WP5 Implementation of double bottom line concept on an organizational level.</b>
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<ol style="list-style-type: none"> <li>1. Implementation of the double bottom line concept in the municipal organization.</li> <li>2. Establish the necessary cross- departmental cooperation, support and mutual understanding of the double bottom line concept. This activity includes a one-day seminar and 2-3 workshops</li> </ol>
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Ensure that the roadmap to CE is directly linked to the existing (financial) decision-making processes in the municipality and is communicated clearly to decentral budget-responsible managers in the organization.
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<b>WP6 Capacity Building and Competence Upgrading.</b>
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<ol style="list-style-type: none"> <li>1. Vocational training in collaboration with knowledge institutions <ul style="list-style-type: none"> <li>• Establish a solid understanding for CE metrics on both political and administrative level in participating municipalities</li> <li>• Provide a basic knowledge in terms of using and understanding the CE metrics and applying the CE dashboard as an integrative tool in the budget process</li> <li>• Provide a solid understanding and experience with political decision making on the double bottom line including CE metrics.</li> </ul> </li> </ol>
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<b>WP7 Implementation of environmental accounting for Circular Economy.</b>
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<ol style="list-style-type: none"> <li>1. Practice oriented approach to implement environmental accounting <ul style="list-style-type: none"> <li>• Support the decision making in each participating municipality applying the newly acquired tools and knowledge</li> <li>• Work in close cooperation with the financial departments on the administrative level and the political level</li> </ul> </li> <li>2. Evaluation in order to adjust and finetuned both the dashboard, reporting template, the roadmap and the supporting process documents to ensure a cohesive process.</li> </ol>
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## Deliverables and Milestones



Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
A calculation tool for measuring the degree of circular economy effects in a way that translates into the financial budget scheme in regions and municipalities.	WP2	31.12.2025	On track	-	-
A user-friendly dashboard based on the metrics in the calculation tool to support the financial decision-making process in regions and municipalities.	WP4	31.12.2026	Not started	-	-
Competence development and course modules for both for the political board (i.e. financial committee), the board of directors and the top-level management in regions and municipalities as well as key staff in the financial departments	WP5, WP6	31.12.2027	Not started	-	-
The roadmap itself: A step-by-step guide circular accounting and budgeting in municipalities and regions	-	31.12.2027	Not started	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Project implementation plan	WP2	31.03.2023	Achieved	31.03.2023	N/A
A calculation tool for measuring the degree of circular economy effects in a way that translates into the financial budget scheme in regions and municipalities	-	31.12.2024	Achieved	31.12.2024	N/A
A userfriendly dashboard based on the metrics in the calculation tool to support the fi-	WP4	31.12.2025	Not started	-	-

nancial decision-making process in regions and municipalities					
Competence development and course modules for both for the political board (i.e. financial committee), the board of directors and the top-level management in regions and municipalities as well as key staff in the financial departments	WP5, WP6	31.12.2026	Not started	-	-
The roadmap itself: A step-by-step guide for circular accounting and budgeting in municipalities and regions	WP3	31.12.2026	Not started	-	-
Implementation, adjustment of processes and procedures as well as finetuning of metrics and dashboard based on feedback and experience gathered at this point	WP7	31.12.2027	Not started	-	-
Transversal activity plan and interim reports	WP7	31.12.2027	Not started	-	-
Process- and evaluation report (good cases and/or learning processes)	WP7	31.12.2029	Not started	-	-

#### Explanation for delays in Deliverables and Milestones (if any)

Explanation mentioned under timetable delays above

##### A. Expected and achieved results

###### The correlation between expected and achieved results

**Expected:** “3-5 municipalities or regions have participated in the process and evaluated the roadmap for environmental accounting and CE metrics as part of their budgetary process”

**Expected:** “3-5 municipalities or regions have actively gained some hands-on experience within their own organization with putting the environmental accounting and CE metrics into use in relation to the political budgetary process”

**Expected:** “3-5 municipalities or regions have gained hands-on experience with utilizing the dashboard for environmental accounting and CE metrics within their own organization”

**Expected:** “10-15 economic officers from financial departments have completed the course and participated actively in the relevant activities in the project”

**Expected:** “3-5 CFOs have completed the course and engaged in relevant activities and dialogue”

All expected results are tied to activities in phases 2 and 3. Therefore, no concrete results can be pointed to yet. However, we are making improvements, and the current status is provided below.

**Status on activities:**

Work is progressing on all work packages. The revised timeline shows when the main efforts are expected to take place in each work package (see below).

In Phase 1, we decided to use the Doughnut Economics concept as a framework for developing an overarching decision support tool, and to use other tools as frameworks for developing individual components. The action is developing in an iterative process, where new elements are tested in prototype versions before being evaluated and improved. The Doughnut model, developed by economist Kate Raworth, combines the 9 planetary boundaries, human well-being, and the UN Sustainable Development Goals into a single framework for sustainable development. The inner circle represents social foundations necessary for well-being (such as health and education), while the outer circle defines the ecological limits that must not be exceeded (all parts of the 9 planetary boundaries, such as CO2 levels and biodiversity).

By integrating these aspects, the Doughnut model creates a space for societies to thrive socially while respecting environmental limits. It promotes practical solutions that support both human welfare and environmental protection, offering a clear framework for aligning policies with the UN Sustainable Development Goals and minimizing negative ecological impacts.

We've also established contact with other CEBW partners, municipalities, and stakeholders to exchange knowledge and experiences. Also, to develop relevant environmental and circularity metrics, we have been active in several forums, such as Statistics Denmark, Danish Standards/ISO, and an Interreg Baltic cooperation project. To visualize these metrics, the goal is to create a CE Dashboard. Work is now underway to explore how this can be implemented in Gentofte Municipality, likely via a PowerBI interface where relevant data can be displayed. The guidance document/CE dashboard is currently under development and nearly finished. The guidance document includes guiding questions for decision-makers regarding environmental and social aspects. An example of such a question could be, "How does a particular case impact its surroundings?" This involves assessing impacts as positive, neutral, or negative in relation to the seven planetary boundaries, which have been included because they are relevant for municipal governance. In the assessment you also include time, place and actors.

It has also become clear that changing the budget decision-making process requires a long-term and early effort. A new approach to the decision-making process is needed when weighing economic, environmental, and social aspects.

In the end of Phase 1, the focus has been on the first draft of a decision support model that can account for all considerations, not just the double bottom line but the triple bottom line. In preparing the first version of the decision support tool, internal meetings were held where the Doughnut Economics concept was presented, thus providing a basic understanding of the trade-offs involved in decision-making. Presentations were made in several units and leadership forums.

In the fall of 2024, a new collaboration project started with Copenhagen Business School. This project will examine models for how various considerations (economic, environmental, and social) can be balanced when the units for measurement/assessment differ, when there are time discrepancies between externalities, and when decisions must be made in light of a complex history and uncertain

future. The starting point will be to apply concepts from financial accounting to these analyses, which can support elements of the decision support tool.

One region and two municipalities have provided feedback on the development of the decision support tool, and work will continue towards the expected results in the upcoming phases.

### Communication

This action has also produced several communication outcomes linked to activities and results in Phase 1. See the overview below. The overview is a part of an excel spreadsheet, that also contains information of the target groups. Not all links are active, some refers to LinkedIn posts.

Date	Where	What: link to presentations, podcasts, articles etc.	out-reach
13-11-2023	Webinar Gentofte Municipality - all departments	GK-OE-og-P_intro_klima_miljo_CEBW_20231113	70
17-05-2024	Partnership for public purchasers	20240517_ansvarligindkoeb_circular_omCEBW6-2_afholdt	40
19-09-2024	Inspirations meeting Municipality of Copenhagen	20240919_om_budget-proces_KK	1
04-09-2024	Article in the magazine Monday Morning	<a href="#">20240904_mandag-morgen_naevner_CEBW_GK-projekt</a>	?
08-10-2024	Copenhagen Business School- course	20241008_CBS_baeredyg_strategier_kursus	25
11-10-2024	Podcast- CEBW- A world without waste	<a href="#">20241011_om_6-2_beslutningsmodel_i_CEBW_podcast</a>	?
11-10-2024	Newsletter CEBW	<a href="#">20241011_om_6-2_beslutningsmodel_i_CEBW</a>	?
12-10-2024	LinkedIn posted and re-posted	<a href="#">-repost om podcast 20241012_om_6-2_beslutningsmodel_i_CEBW_linkedin</a>	812
26-11-2024	LinkedIn post - The national organisation for responsible purchase	<a href="#">202411_linkedin_ansvarligindkober</a>	1019
20-12-2024	LinkedIn post	<a href="#">202412_linkedin_post_KB-temamode</a>	1009
19-11-2024	BLOXHUB, Doughnut Economics in the Built Environment	20241119_bloxhub_DE_meeting.pdf (indkaldelse)	50
25-11-2024	Conference Danish Federation of Industries	20241125_ansvarligindkoeb_aarsmode_gen-tofte_til_deling	200
04-12-2024	GATE21/CEBW webinar	<a href="https://www.youtube.com/watch?v=GaNOMF5rk9w">https://www.youtube.com/watch?v=GaNOMF5rk9w</a>	40

05-12-2024	linkedin post - stillingsopslag	<a href="#">202412_linkedin_stillingsopslag</a>	729
19-12-2024	Lecture - Knowledge-center for Digital Trade	20241219_email_om_mode_videncenter-for-digital-handel-mercur	1
05-02-2025	Ballerup Municipality	20250205_Torus_ballerup_kommune	5

## B. Evaluation

Through the evaluation of activities in Phase 1, several successes and important learning points have emerged.

### Progress, Outcome Evaluations, Successes, and Learning Points

In Phase 1, we held meetings with several actions within CEBW, and both to address the actions that could have an interest in using the tool, for instance C6.1 working with purchase and other types of decisions making and A1, working with a decision-making tool as well.

Participation in webinars contributed to an overview and insight into what is happening in other projects. Particularly, the IP project's study trip to the Netherlands was valuable for both internal anchoring (as we had the opportunity to participate from two departments in the Municipality) and externally, as the trip provided useful input and new contacts that have since been beneficial in the development of C6.2.

### Challenges

Phase 1 has been marked by two significant challenges:

- *Revisiting the Action Description:* In 2022/23, it was decided to revise the action description to focus not just on procurement but on the entire budget process. This change was made to align the align with the municipality's ambitions, as adopted by the Finance Committee.
- *Staff Turnover:* Around the same time the revised description was approved, one of the key project staff members left the team. As a result, not all competencies were present to the same extent for the development of sub-goals.

The combination of these two changes meant that certain elements needed to be reconsidered, and we had to find the best way to move forward.

Despite revisiting the action description and personnel changes, we assessed that it did not make sense to adjust the overall deliverables and milestones, which are expected to be achieved according to the plan.

## C. Targets and Goals for Phase 2, 2025-2027

We will continue to develop the decision support tool in an iterative process, with the goal of completing two rounds in Phase 2:

1. As part of the budget process for 2026, up until October 2025
2. As part of the budget process for 2027, up until October 2026

In Phase 2, the focus will shift towards establishing relevant CE indicators and metrics that can support decision-making, ideally with data availability via dashboards.

#### D. After Life

The goal is for the decision support tool to become an integrated part of the work with environmental and climate considerations in Gentofte Municipality after the completion of CEBW. The learnings and tools can potentially be disseminated to other Danish municipalities. A dissemination process, which has already been started.

### **Action C6.3: Exploration of multiple-use textiles in healthcare through a value-chain approach and CPP**

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities: 31.12.2025

#### **Purpose of action**

The purpose of the action is to explore the shift from single-use textiles made of virgin non-woven plastic materials to multiple-use textiles made by recycled or renewable fibres in the healthcare sector.

#### **PM Unit (CDR) overall assessment of action**

The initiative is very promising, addressing the transition from single-use to multiple-use textiles in the healthcare sector. It is a complex issue, and the transition needs to tackle the functional needs of users. A significant issue is PFAS, which emerged as a significant challenge after the action commenced. The need for coating surgical kits and other garments has been highlighted, and a safe alternative is currently undergoing testing.

The entire lifecycle — from production and purchase to use and end-of-life — is being addressed. Various solutions for reusable textiles in hospitals have been identified, aiming to develop a 'plug-and-play' system that enables effective practices. The initiative has successfully established cooperation with producers, laundry service providers, users, and NASA.

The work performed has been systematic, with testing and assessment integrated into the methodology. Criteria for success have been clarified by a steering committee composed of representatives from the entire value chain. This encompasses aspects such as infection control, durability, user comfort, end-of-life management, environmental impact, and economic sustainability.

The action has been presented at several international conferences, and we assess that the results achieved have significant potential for replication both nationally and at the EU level.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C6.3 Timetable**

Phase	Phase 1			Phase 2			Phase 3			
	Year	2022	2023	2024	2025	2026	2027	2028	2029	
WP	I	II	I	II	I	II	I	II	I	II
C6.3										
WP1										
WP2										

WP3																			
WP4																			
WP5																			

### Explanation for timetable delays (if any)

The delays are caused by the choice to develop a PFAS-free textile, which has significantly increased complexity. It also meant that the original supplier had to be switched, and the development work needed to be reset, and it was therefore delayed. However, the potential of a PFAS-free textile to apply to all types of textile products used in hospitals is massive.

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
<ol style="list-style-type: none"> <li>1. Establish management structure in CDR and plan the corporation with actors along the value chain.</li> <li>2. Plan dissemination and replication strategy in order to communicate and share results during the project implementation process.</li> <li>3. Setting up appropriate monitoring systems to measure effects.</li> </ol>
<b>WP2 Baseline mapping</b>
<ol style="list-style-type: none"> <li>1. Carry out a baseline study of all single-use and multiple-use textiles procured by CDR with more precise information about types of material, weight per item, chemicals, etc.</li> <li>2. Map the value-chain to identify environmentally friendly and work-safe alternatives to single-use textiles on the existing market.</li> <li>3. Establish a 'candidate list' of single-use textiles to be replaced by multiple-use textiles in co-ordination with health and hygiene staff.</li> <li>4. Develop a TCO++ tool capable of analysing environmental and economic impacts of introducing multiple-use textiles e.g., waste reduction, environmental consequences, health issues, security of supply, patient safety, etc.</li> </ol>
<b>WP3 Innovation at product level</b>
<ol style="list-style-type: none"> <li>1. Define success indicators for the development of multiple-use e.g., gowns. in co-creation with clinical staff and suppliers at a joint workshop.</li> <li>2. Design and test min. 10 multiple-use textiles selected from the 'candidate list' (includes sewing prototypes, test in clinical environments, laundry performance, etc.).</li> <li>3. Production of product specifications will allow CDR to communicate with the market and create demand at the pre-commercial procurement level.</li> </ol>

<b>WP4 Innovation Service System</b>					
<ol style="list-style-type: none"> <li>1. Test and collect data on the performance of multiple-use textiles in the laundry to determine the life-expectancy.</li> <li>2. Document the gains from reduced workload related to the waste management and disposal of single-use textile, alongside documenting benefits of washing multiple-use textiles in a super-efficient laundry.</li> <li>3. Identify filter solutions for handling the increase of micro-plastic particles in the wastewater from multiple-use textiles and develop a solution according to relevant standards.</li> </ol>					
<b>WP5 Innovation Procurement</b>					
<ol style="list-style-type: none"> <li>1. Carry out an early market dialogue with suppliers based on the results from service design. Depending on the analysis of the supply chains carried out WP1, it might be necessary to organise 2 workshops.</li> <li>2. Formulate min. 10 product specifications and tender documents, based on WP3 and WP4, in compliance with legal requirements of tenders and the relevant standards.</li> <li>3. Discuss the tender document in workshops with Health Care Without Harm and the Green Procurement Group under DR.</li> </ol>					

### Deliverables and milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
1 plan of a new service system able to document the performance of multiple-use textiles	WP4	31.03.2023	Completed	31.03.2025	YES
1 overview of product specifications for min. 10 multiple use textiles	WP3	31.12.2025	On track	-	-
1 overview of min. 10 tender documents based on the early market consultation/innovation procurement	WP5	30.06.2025	On track	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER

Baseline study of existing procurement is carried out, and TCO++ tool is developed.	WP2	31.11.2022	Achieved	31.11.2022	N/A
Product specifications for 10 multiple-use textiles developed in two phases.	WP3	31.03.2025	Achieved	30.02.2025	N/A
Tender documents for 10 multiple-use textiles developed in two phases during the early market consultation/innovation procurement.	WP5	30.06.2025	On track	-	-

### Explanation for progress and/or delays in Deliverables and Milestones (if any)

#### Deliverables:

- *1 plan of a new service system able to document the performance of multiple-use textiles:* Revolution Zero's "pod" solution for sterilizable hospital textiles meets this deliverable. Development of PFAS-free textiles are underway. Additionally, a development agreement with Revolution Zero is in place for the development and testing of PFAS-free textiles, significantly raising the standards for multiple-use textiles.
- *1 overview of product specifications for min. 10 multiple use textiles:* 4 completed
- *1 overview of min. 10 tender documents based on the early market consultation/innovation procurement:* 4 completed

#### Milestones:

- *Baseline study of existing procurement is carried out, and TCO++ tool is developed:* Completed.
- *Product specifications for 10 multiple-use textiles developed in two phases:* 4 completed
- *Tender documents for 10 multiple-use textiles developed in two phases during the early market consultation/innovation procurement:* 4 completed

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** "A TCO++ tool is developed to: a) compare different solutions designs within textiles and b) to analyse which single-use textiles could be replaced by multiple-use textiles with positive climate, environmental and financial effects."

The TCO++ tool is not paid for by the LIFE-programme but has been developed in collaboration with the EPA and is used in this action. It is available here: <https://denansvarligeindkober.dk/tco-vaerktojer>. It supports tenders and includes tools for analysis and textile screening. The organization "Den ansvarlige indkøber" ("The responsible purchaser") is based on a collaboration between the Danish Business Authority, the Danish Local Government Association, Danish Regions, the Ministry of the Environment, the Ministry of Employment, the Ministry of Finance, the Danish Agency for Governmental and Local Government Purchasing. Their purpose is to support the public sector in making more sustainable purchases, and it is a crucial place to share results.

**Expected:** "Product specifications developed for min. 10 new types of multiple-use textiles tested in a clinical environment."

Two products have been implemented in CDR's hospitals as part of the mandatory Sustainability Action Plan. Links to these two products can be found here: [Tekstilprojektet - Center for Bæredygtige Hospitaler](#)

Development of further products is dependent on the test of a new PFAS-free textile, which is currently being tested. Once this textile hopefully clears the tests, it will be used to develop further products. There is a risk that the action will reach less than 10 product specifications due to their choice of developing a PFAS-free textile. This is currently in the final testing phase and hopefully results will come soon.

**Expected:** *"Tender documents for 10 multiple-use textiles developed through an early market dialogue in preparation for innovation procurement."*

Once the PFAS-free textile is approved from the tests, tender documents will also be completed, since the tender documents depend on the products being developed.

### Communication

The action has produced several key communication outputs related to Phase 1 activities and results:

- 10 LinkedIn posts at "Center for Bæredygtige Hospitaler"'s [LinkedIn-page](#)
- BI Report measuring reduced consumption results from:
  - o The multiple-use jacket (Attachment 6, Annex 5).
  - o The multiple-use blanket (Attachment 7, Annex 5)
- One regional hospital campaign during trials of jacket (Attachment 8, Annex 5).
- Two internal articles about the action
  - o [Tekstilprojektet - Vores Bæredygtighed](#)
  - o [Tekstilprojektet - Center for Bæredygtige Hospitaler](#)
- TCO tool available on the public website: <https://denansvarligeindkober.dk/tco-vaerktoejer> (search "textiles").
- Two Tech Packs

The action has received significant attention internally and from other Danish regions and the EU, due to presentations in the Danish Parliament and at international conferences (e.g. Healthcare Without Harm, an international organization dedicated to providing resources, knowledge, and inspiration for the health care sector to help reduce its environmental impact). This has broadened understanding and support for the action's goals.

### **B. Evaluation**

The evaluation of Phase 1 activities highlighted several successes and key lessons.

### Outcome Assessments, Successes, and Lessons Learned

The action achieved several notable results:

- Transitioning to reusable textiles significantly reduces CO<sub>2</sub>e emissions, as documented by the TCO++ tool.
- Improvements in working environments for developed and tested textiles have been verified through extensive clinical testing.
- Reusable textiles show substantial waste reduction potential. For example, the developed products (blankets and warm jackets) save 20 tons of waste annually.

Knowledge sharing was enhanced through:

- Participation in a national stakeholder group.
- Close collaboration with clinicians across regions.
- Strengthened market dialogue with suppliers (e.g., via EU-Supply).
- Strategic engagement with relevant market actors.

Focusing on PFAS-free medical textiles positioned the action as an international frontrunner in this field.

Key lessons from Phase 1 include:

- *Cross-departmental collaboration:* Successful implementation requires strong internal cooperation across departments and CDR.
- *Sustainable materials:* Recycled or renewable fibers are not yet viable for medical textile supplies. The design focused instead on circularity, ensuring products are durable in industrial laundries while meeting necessary standards.
- *PFAS-free solutions:* Due to heightened awareness of PFAS's harmful effects, the focus on PFAS-free medical textiles became central in our work. This high ambition challenges the market, as PFAS is currently the only solution for liquid-repellent coatings that withstand industrial laundering and meet operational garment standards. This requirement complicates market engagement and risks delays.

### Challenges

Collaboration across the public and private sectors in a complex value chain presents challenges.

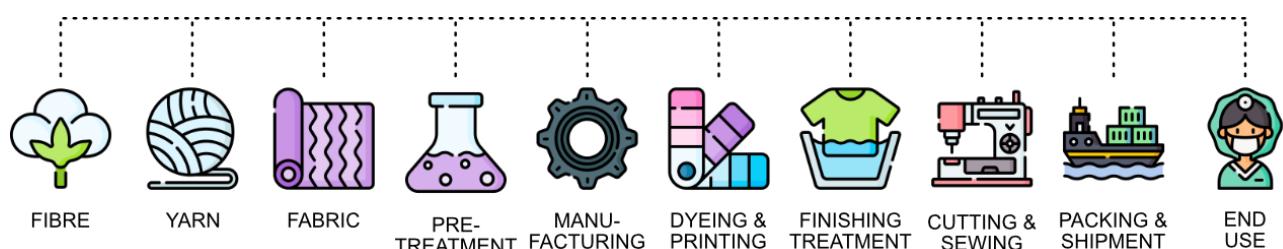


Figure 2: The complex supply chain and stakeholder landscape when developing textiles for hospitals

Key issues in public-private innovative cooperation (PPI):

- *PFAS-free alternatives:* Finding PFAS-free solutions that meet durability and functionality requirements is challenging. These textiles must endure industrial laundering, provide adequate protection, and feature PFAS-free impregnation—a solution yet to be developed.
- *Supplier selection:* Identifying and retaining the right development partner has been time intensive. The first round revealed a partner lacking essential capabilities, necessitating a second round with clearer criteria. While this sharpened objectives, it consumed resources.
- *Motivation and focus:* Maintaining the development partner's commitment is difficult without guaranteed procurement. Ensuring mutual benefits and managing expectations are vital for sustained engagement.

To advance the PFAS-free agenda, political, regulatory, and technological alliances are essential.

### C. Targets and goals for Phase 2, 2025-2027

Phase 2 will proceed with funding from CEBW and CDR's broader initiatives for transitioning to reusable textiles. The ambition is to develop a circular economy (CE) textile strategy.

Key activities in Phase 2:

- *Solution testing:* Continued testing of PFAS-free solutions in laundries to ensure durability and functionality, including an innovative membrane-based solution originally designed for aerospace textiles that avoids coating while meeting required standards.
- *Pilot trials:* Expanded pilot trials in clinical environments to gather data and feedback.

Further development efforts:

- *Alliances:* Strengthening collaborations with Nordic countries and the National Health System in England to promote PFAS-free solutions and share expertise.
- *Regulatory engagement:* Working with Danish authorities (e.g., the Medicines and Environmental Agencies) to expand PFAS restrictions to include workwear.
- *Product specifications:* Developing and testing remaining product specifications to achieve action goals.

Goals for Phase 2:

- Identify and implement PFAS-free solutions that meet required standards.
- Expand international partnerships to promote sustainable textile solutions and increase market demand for PFAS-free products.
- Prepare for full-scale implementation of reusable textiles in CDR hospitals, including necessary investments in infrastructure like a sterilization facility.

### D. After-Life

The action is expected to be implemented in CDR, aligning with the region's ambitious CO<sub>2</sub> reduction targets.

Future perspectives:

- *Scaling and dissemination:* The action has potential for national and international adoption, including other Danish regions, European healthcare systems, and private companies. Knowledge sharing, collaboration, and implementing developed tools can facilitate this expansion.
- *Political and financial support:* Broad implementation requires public funding, EU support, and private investment.
- *Innovation and development:* Ongoing innovation in PFAS-free solutions and circular textile systems will be critical for achieving long-term sustainability and waste reduction goals.

By building on achieved results and experiences, CDR and other organizations can continue driving sustainable solutions and advancing a circular economy.

### **Action C15: A Nation-wide Citizens' Assembly on Responsible Consumption – The Citizen as an Active Participant in the Circular Transition**

Beneficiary responsible for implementation: The Capital Region of Denmark (CR)

Other beneficiaries participating: Region of Southern Denmark (RSD), Rudersdal Kommune (RUDK), Frederiksberg Kommune (FBK), Vejle Kommune (VEJK), WeDoDemocracy (WDD)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2026

#### **Purpose of action**

The purpose of this action is to mobilize and build competencies for deliberative processes among municipalities and other stakeholders. A citizens' assembly will be established and produce recommendations, which will be politically processed in the participating municipalities and regions.

Through the latter parts of Phase 1 and 2, promising recommendations from the Citizens' Assembly will be tested in pilot projects. Subsequently, the citizens' recommendations and the results of the pilot projects will be disseminated across all Danish regions and municipalities. In the following paragraphs the activities and results from Phase 1 are presented.

Amendment No. 1 included Kolding Kommune (KOK) leaving CE Beyond Waste. Since KOK's primary role was within Action C15, its responsibilities were redistributed among the other partners already engaged in C15 or were similar to tasks that these partners were in charge of elsewhere in Denmark

#### **PM unit's (CDR) overall assessment of action**

Working with a deliberative method concerning responsible consumption and thereby engaging citizens as active participants in the circular transition, has been an ambitious process. The initial step of selecting and activating citizens along with an advisory board, as well as ensuring communication with politicians regarding the produced recommendations, has been successfully completed with the involvement of many stakeholders, and all objectives have been achieved.

Anyhow, selecting a representative group of citizens through the use of NemID – a digital login solution that provide citizens with a secure way to verify their identity online - was a time-consuming task. The participants were narrowed down from 40,000 respondents to 46-50 participants. Whether the method chosen were adequate for reaching a representative target group may be seen as a weak point. Additionally, the availability of methods and time allocation that align with the desired broad demographic sample could be questioned. However, a comparison made between the general population and the participants suggest that the differences are minor. All groups within each characteristic remain represented, and therefore, they do not significantly impact the overall representativeness of the citizens' assembly. Comparison is available in deliverable "The Citizens' Assembly's vision and recommendations".

Beyond the methodological concern, the PM Unit assesses that the work has been systematic and conducted at a high level of ambition. Politicians in the two involved regions and three municipalities have positively received the recommendations and visions, despite their general nature and lack of

targeted focus on state, regional, or municipal specificities. Currently, efforts are being made to implement five recommendations in pilot projects involving the five stakeholder organizations.

### Action progress

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### C15 Timetable

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C15</b>								
WP1								
WP2								
WP3								
WP4								

#### Explanation for timetable delays (if any)

N/A

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
Furthermore, WP1 will:
<ol style="list-style-type: none"> <li>Establish and involve a steering committee representing the management level of the action partners.</li> <li>Establish and lead a project group representing the employee level of all the action partners.</li> <li>Develop an Action Implementation Plan, outlining the details in the process</li> <li>Manage the overall project process and steering the action through milestones, deliverables, etc.</li> </ol>
<b>WP2: Mobilisation and capacity building</b>
<ol style="list-style-type: none"> <li>Design, plan and implement awareness-raising and capacity building activities (e.g., meetings, training) with relevant employees, management and/or politicians in municipalities and regions – to ensure broad buy-in among all relevant internal stakeholders and prepare the organisations for the Citizens' Assembly process.</li> <li>Facilitate networking and capacity building activities for municipalities and other stakeholders who wish to exchange ideas and experiences about citizens' involvement in green and circular transition. The activities will connect beneficiaries with other stakeholders engaged</li> </ol>

or interested in citizen involvement in green and circular transition. It will serve both to identify and integrate state of the art knowledge into C15 and to disseminate results and experiences to other relevant stakeholders. Of particular importance is a close collaboration and coordination with parallel initiatives such as the DK2020 partnership, the Green Democracy Fund alliance and the Blueprint for Denmark initiative.

3. Building a communication strategy, platform and plan as well as ensure strategic and on-going communication activities. Communicating broadly to the surrounding world about the Citizens' Assembly both before, during and after it is at work in a way that engages all stakeholders in the process. For instance, by a broad and open invitation to suggest themes and questions to be discussed in the Citizens' Assembly and to bring the citizens' recommendations to practical use. This will ensure widespread awareness of and ownership of the process, giving the citizens' recommendations a broader legitimacy, attention and impact.
4. Establishing a thematic working group under the IP Advisory Board (cf. C1), representing key stakeholders that are crucial for replication of the action and the impact of the citizens' recommendations. The Advisory Board working group observes the process in the Citizens' Assembly and provides input. This will ensure a high degree of ownership with the key stakeholders as well as alignment with their current agendas.

WP2 will be led by CR. RUDK, FBK, VEJK and RSD will be actively involved, particularly in activity 1.

### WP3: The Citizens' Assembly

1. Establishing the organisational setup around the Citizens' Assembly – e.g., establishing an impartial third-party secretariat (in compliance with the OECD Good Practice Principles for Deliberative Processes for Public Decision Making) as well as a board of experts assisting the deliberative process.
2. Recruit citizens for the Citizens' Assembly. This will be done through random sampling from which a representative selection is made, based on demographics and other relevant criteria.
3. Schedule and plan the meetings in the Citizens' Assembly, including the knowledge and inspiration that they will be presented to during the process and the themes and challenges they will be discussing.
4. Facilitate the citizens' meetings in the Citizens' Assembly, including the formulation of the assembly's vision and recommendations.
5. Convert the citizens' recommendations to a format fit for political decision-making processes through a process involving both the board of experts, the partners and the citizens.
6. Designing and running the administrative and political processing of the citizens' recommendations in the relevant committees and the municipalities and regions.
7. Producing step-by-step-guide and templates for running a similar Citizens' Assembly. The aim is to make it affordable and manageable for municipalities, regions and other organisations to replicate and practice deliberative democracy as a tool for a circular and sustainable transition.

WP3 will be led by WDD, acting as a third-party secretariat for the Citizens' Assembly. All the activities will also involve beneficiaries.

### WP4: Local pilot actions

1. Reviewing the citizens' recommendations and selecting the recommendations most suited for testing through local pilot actions, deciding which partners will lead what pilot actions.
2. Mapping existing knowledge and best practices within the selected areas of focus to ensure that the pilot actions build on current research and knowledge. The pilot actions will employ existing best practices either in a new context or on a larger scale and will at the same time strive to overcome barriers for and promote more responsible consumption patterns.
3. Initiating and implementing the local pilot actions – in collaboration with civil society organisations and/or other stakeholders, where relevant – thereby contributing to the realisation of selected citizens' recommendation(s). It is expected that the municipalities/regions self-finance the pilot actions to some extent as they are meant to benefit other local/regional agendas.
4. Communicating and disseminating the results from the local pilot actions to all regions and municipalities in DK for instance through the DK2020 partnership, which is connecting all Danish regions and municipalities in a common effort to reduce carbon emissions by introducing ambitious municipal climate action plans and corresponding actions.

WP4 will be led by RSD and will involve partner municipalities, CR, civil society organisations and/or other stakeholders depending on the content of the pilot actions.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
The Citizens' Assembly's vision and recommendations	WP3	01.07.2023	Completed	01.07.2023	YES
A package of guidelines and templates for replication of the Citizens' Assembly, including lessons learned in the process	WP3	01.10.2023	Completed	01.10.2023	YES
A report describing results and lessons learned from the local pilot actions	WP4	01.02.2026	On track	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Stakeholders invited to suggest themes and questions to be discussed in the Citizens' Assembly	WP1	01.10.2022	Achieved	01.10.2022	N/A

The Citizens' Assembly's vision and recommendations produced and communicated in public	WP3	01.11.2023	Achieved	01.11.2023	N/A
The local pilot actions implemented and finalised	WP4	01.11.2025	On track	-	-

### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

The Citizens' Assembly on Sustainable Consumption has been carried out as planned, with five physical meetings over six months. Participants developed their vision and recommendations based on expert knowledge and stakeholder input, creating a solid foundation for political action and citizen engagement.

Overall, we, in CR, assess that the assembly has significantly influenced both citizens' understanding of sustainability and the political agenda. It has created a platform for further discussion and action, contributing to shaping future initiatives on sustainable consumption.

**Expected:** *"A proven concept for involving citizens in political decisions on sustainable consumption and circular transition"*

A validated concept for involving citizens in decision-making has been developed as part of WP3 and deliverable "A package of guidelines and templates for replication of the Citizens' Assembly, including lessons learned in the process". This concept can be applied in future initiatives to ensure citizens' voices are heard in political decisions.

**Expected:** *"A vision for responsible consumption and at least 100 policy recommendations and specific action ideas"*

75 recommendations have been prioritized and published as part of WP3. While the goal was 100, the citizens chose to focus on the most pressing and relevant issues, prioritizing quality over quantity. The issues considered in the recommendations are consumption, citizen involvement, food and agriculture, energy, construction, education, urban development, sustainable living and just transition. The recommendations are available in deliverable "The Citizens' Assembly's vision and recommendations" and published online: [ANBEFALINGER - BÆREDYGTIGT FORBRUG APRIL 2023](#)

**Expected:** *"At least 10 political decisions at the municipal and regional level supporting citizens' vision"*

Several political decisions supporting the recommendations have already been made within the participating municipalities, with more to come. This work has been supported through WP4. The decisions are:

- **Vejle Municipality, 22/11-2023:** Approval of the Green Vision Addendum to the Mobility Plan. The Green Vision Addendum outlines the key elements necessary to steer mobility in Vejle

Municipality towards a greener direction, supporting future accessibility and a healthy lifestyle.

- [Green Vision Supplement to the Mobility Plan](#)
- **Vejle Municipality, 11/9-2024:** Establishment of charging stations for e-bikes and bicycle parking at 10 locations across the municipality. This initiative aims to promote the use of e-bikes among both commuters and tourists.
  - [Now you have more charging options for your electric bike - Vejle Municipality](#)
- **Rudersdal Municipality:** New Green Procurement Policy.
  - <https://rudersdal.dk/media/2648/download?inline>
- **Rudersdal Municipality:** New Developer Policy.
  - <https://rudersdal.dk/media/2257/download?inline>
- **Region of Southern Denmark:** An assessment is being conducted to determine whether regional development funds can be used more effectively to prioritise initiatives that contribute to addressing climate challenges.
- **Region of Southern Denmark:** The region will support the transformation of public transport companies into mobility service providers, enabling more flexible mobility solutions in both urban and rural areas. The goal is to ensure access to sustainable mobility solutions across the entire region of Southern Denmark.

**Expected:** *"At least 5 local pilot actions demonstrating how citizens' recommendations can be implemented"*

Five pilot actions have been planned and started in 2024. These will serve as practical examples of how the assembly's recommendations can be implemented, providing valuable insights into effective solutions and methods for promoting sustainable consumption. The recommendations have been published and discussed politically within all five partner organizations. Five pilot actions have been decided:

- Frederiksberg Municipality: "Reusable Takeaway Packaging" focuses on innovative solutions for reusable packaging in local businesses.
- Vejle Municipality: "Sharing Together" aims to create sharing communities that reduce the need for individual ownership while maintaining quality of life.
- Rudersdal Municipality: "Climate Families" focuses on reducing CO<sub>2</sub> emissions through sustainable habits and gathering experiences from local families.
- Region of Southern Denmark: "Climate Competencies for Cultural Actors" aims to equip cultural actors to integrate climate issues into their activities, informing citizens about sustainable alternatives.
- Capital Region of Denmark: "Materials for Municipal Work" focuses on improving communication between municipalities and citizens about climate footprints and actions.

CR has compiled an overview of the pilot actions and the corresponding project descriptions on our website under the headline "Follow-up on the Citizens' Assembly's Recommendations": [Projekt: Opfølgningspå borgersamlingens anbefalinger | Region Hovedstaden/](#)

All questions are reviewed with a comparison of the questionnaire responses, followed by a summary of the overall changes in attitudes towards sustainable consumption. The note concludes with a section providing feedback to the organizers.

**Expected:** “At least 30 municipalities/regions showing increased interest in citizen involvement in political decisions promoting circular transition”

We are on track to meet this result. We are experiencing a growing interest in citizen involvement and the transition to circular and sustainable consumption patterns among various stakeholders in Denmark, including municipalities, which are increasingly incorporating these aspects into their local climate plans (Read more in section 4.4.1 *Legislative bottlenecks and barriers, Lack of legislation*)

In total, over **900 people** have participated in events, dialogue processes, and other initiatives in which we have played a role, focusing on the citizens' assembly, citizen engagement methods, and/or sustainable consumption among citizens.

Overall, the achieved results show that the assembly has significantly influenced both citizens' understanding of sustainability and the political agenda across municipalities in Denmark. It has created a platform for further discussion and action, contributing to shaping future initiatives on sustainable consumption.

C15 have participated in:

The citizens' assembly's recommendations and an audio journey into the future can be found here: <https://borgerforum.regionh.dk/da-DK/projects/borgersamlingens-anbefalinger>

A preliminary follow-up on the citizens' assembly's recommendations, which was sent to the assembly's members (and published on the Capital Region of Denmark's citizen forum) in March 2024, can be found here: <https://borgerforum.regionh.dk/da-DK/projects/opfolgning-pa-borgersamlingens-anbefalinger>

- 01-09-2022 – Debate on the citizens' assembly at the Climate People's Meeting (150 participants)
- 28-09-2022 – Presentation for University of Copenhagen students on the citizens' assembly (approx. 20 participants)
- 31-10-2022 – Presentation on the citizens' assembly at the C1 webinar on citizen engagement (35 participants)
- September–December 2022 – Dialogue with a group of municipalities on a potential joint development project on consumption patterns and citizen involvement (approx. 15 participants from six different municipalities)
- 24-02-2023 – Presentation for University of Copenhagen students (approx. 25 participants)
- 09-05-2023 – Presentation for DAF's Behavioural Network (approx. 20 participants)
- 17-06-2023 – Debate at the People's Meeting (approx. 20 participants)
- 29-08-2023 – Panel debate on Denmark's global consumption emissions (approx. 150 participants)
- 01-09-2023 – Debate at the Climate People's Meeting (approx. 150 participants)
- 05-10-2023 – Presentation for University of Copenhagen students (approx. 20 participants)
- 27-10-2023 – Presentation at the CircWaste final seminar (approx. 160 participants)
- 31-10-2023 – Presentation for DAKOFA's youth network on circular economy (approx. 35 participants)
- 20-11-2023 – Debate at the Danish Parliament (Christiansborg) on the citizens' assembly's recommendations and how to act on them at the national level (45 participants)

- 30-05-2024 – Presentation at the Wellbeing Economy Conference in Copenhagen (approx. 60 participants)

**Expected:** *“Surveys before and after the Citizens’ Assembly documenting changes in citizens’ attitudes towards responsible consumption and political measure*

Report based on surveys conducted before and after the Citizens' Assembly has also been conducted (Attachment 9, Annex 5). The preparation of the report is based on the two questionnaires sent out to all participants before and after the citizens' assembly and assesses their attitudes towards sustainable consumption and political regulation of sustainable consumption. The sections compare the responses from the questionnaires and describe whether and how participants change their answers and attitudes after participating in the citizens' assembly. Some questions only appeared in the questionnaire after the citizens' assembly, and therefore no earlier responses are available for comparison. The answers in percentages are rounded to approximate figures for easier overview.

#### Communication

The Citizens' Assembly's vision and recommendations, along with the future audio journey, are available online, providing the public with access to the developed knowledge and recommendations (see online link above). The assembly has created a comprehensive platform for dialogue on sustainable consumption, engaging citizens, experts, and decision-makers.

As described above various activities have been held to raise interest, including:

- *Debates and presentations:* At the Climate Folk Meeting, with up to 150 participants, and presentations for students at the University of Copenhagen.
- *Dialogues with municipalities:* From September to December 2022, dialogues with representatives from six municipalities were held on a joint development project, creating a network of stakeholders committed to sustainable consumption.
- *Panel debates:* Discussing global consumption emissions and the need for political action, attracting media and public attention.

As mentioned, over 900 people participated in these events, focusing on citizen engagement, sustainable consumption, and climate change.

Media coverage of the assembly has been extensive, including interviews, articles, and press releases highlighting key topics and recommendations. For instance, P4 Copenhagen aired extended segments where citizens and politicians discussed the significance of the presented recommendations.

#### **B. Evaluation**

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged.

#### Successes

The action has successfully built competencies on sustainable consumption and citizen involvement among staff, leadership, and politicians in the partner organizations.

Furthermore, The Citizens' Assembly demonstrates that when citizens are equipped with knowledge about the resource and climate impact of consumption and have the opportunity to discuss future visions and possible actions with others, they tend to call for greater political regulation in this area.

Moreover, they envision a future with lower consumption and a simpler life based on values beyond material goods. This is valuable insight, especially considering that many policymakers are hesitant to regulate individual consumption.

### Lessons Learned

Throughout the process, we have gained several important insights:

- Clear success criteria are essential for sustainable recommendations. Participants' focus has often been shaped by present-day and geographic biases, which can hinder prioritization of future generations' needs.
- Stronger political support is needed for citizens' recommendations to ensure they are taken seriously.
- A key dilemma highlighted during the national launch was that citizens and politicians are waiting for each other—citizens expect political regulation of consumption, while politicians await stronger public pressure. However, a Citizens' Assembly alone has not generated sufficient momentum, even at municipal or regional levels.

If more citizens received the same education as the assembly members, broader public pressure for regulation might emerge. Thus, a key takeaway is that democratic support for regulation can be built through knowledge-sharing and public dialogue on consumption's climate and resource impact, as well as effective measures for sustainability.

Notably, several assembly members expressed their surprise, in the surveys, by how unsustainable Danish consumption is and how far the country is from sustainability. Some even felt misled by past governments "sugarcoating reality." A crucial step for policymakers could be to honestly communicate the scale of the challenge and the changes needed for true sustainability.



From a meeting in The Citizens' Assembly on Sustainable Consumption.

### C. Targets and Goals for Phase 2, 2025-2027

In the next phase, pilot actions will be implemented, evaluated, and reported, focusing on collecting experiences and lessons learned. More events will be held to promote citizen involvement and sustainable consumption among municipalities to support replication across Denmark.

Furthermore, DAKOFA (Danish Competence Center for Circular Transition) and CR plan to expand the outcomes of the region's pilot project to all municipalities through several channels:

- The Climate Alliance, a partnership between Kommunernes Landsforning (The Union of all municipalities across Denmark) and Realdania (Non-profit organisation)
- Dakofa's network
- Other relevant channels

### D. After Life

The initiative will continue to contribute to a larger movement raising awareness about the impact of consumption on Denmark's global resource and climate footprint. It will also support a cultural shift in citizen engagement, which is essential for promoting sustainable consumption patterns and lifestyles in the future.

### 6.3.2 Waste reuse pillar

The reuse pillar contributes to O1, O2 and O3 of CE Beyond Waste by testing a new infrastructure for recycling centres across the city of Aarhus to make direct reuse more convenient to citizens (C7.1), exploring how a repair workshop in a recycling centres can be a catalyst for circular behaviour, waste prevention and socio-economic value for local communities (youth, citizens, etc. C7.2), rethinking reuse stations in rural areas and supporting circular business models (C7.3), taking an anthropological approach to waste prevention via nudging and developing reuse and repair café to include marginalized young people and develop their circular skills (C7.5).

Waste companies are at the centre of C7, each with differentiating focuses, but all of them go beyond the traditional operations of a waste company to enhance reuse, raise awareness and change behavior among households and citizens. Unfortunately, the pillar has seen some delays due to a number of different local challenges for action C7.2, C7.3 and C7.5. Action C7.3 has only experienced a minor delay. The challenges are considered in depth in the corresponding sections for the actions. However, the work of these actions have progressed within the possible scope and fully expect to meet the newly proposed deadlines. Action C7.1 and C7.4 have completed the expected deliverables and milestones within Phase 1.

Overall, the pillar has resulted in several new designs for waste and reuse infrastructure. Action C7.1 and C7.4 have developed and tested solutions, swap boxes, mini reuse centres and establishing of brushwood fences, which have already led to high citizen engagement and replication. Action C7.2 and C7.3 have designed and tested new layouts for direct reuse areas in existing reuse stations. Also, actions C7.5 are developing an organizational model aimed at supporting vulnerable youth in their local area. Also, the actions have developed or are in the process of developing sustainability policies (C7.2, C7.3) suitable business models (C7.1, C7.5) for their solutions and educational materials for schools or other educational purposes (C7.2, C7.3, C7.4, C7.5) to ensure the sustainability of the work in the pillar.

### **Action C7: Reuse as a Driving Force for Waste Reduction, Socio-economic Impact and the Sustainability of local areas**

C7 contributes to O1, O2 and O3 of CE Beyond Waste by testing a new infrastructure for recycling centres across the city of Aarhus to make direct reuse more convenient to citizens (C7.1), exploring how a repair workshop in a recycling centre can be a catalyst for circular behaviour, waste prevention and socio-economic value for local communities (youth, citizens, etc. C7.2), rethinking reuse stations in rural areas and supporting circular business models (C7.3), taking an anthropological approach to waste prevention via nudging and developing reuse and repair café to include marginalised young people and develop their circular skills (C7.5). Waste companies are at the centre of C7, each with differentiating focuses, but all of them go beyond the traditional operations of a waste company to enhance reuse, raise awareness and change behaviour among households and citizens.

C7 points to the potentials of the reuse stations in relation to serving a broader purpose such as circulating more products among citizens, letting NGOs take a greater share, etc. By letting reuse stations take a greater share CE and inviting civil society in, this is also expected to lead to greater consciousness on waste generation and the role of reuse.

Increasing reuse in all waste fractions within households, enterprises and other institutions is a major aspect of APCE and to the relative redefinition of the role of the reuse stations. C7 contributes to the APCE CH1 Section 1.1 Visions, targets and indicators; CH3 Section 3.3 Resource efficient businesses, Section 3.5 Circular business models, Section 3.6 Repair and life extension, Section 3.7 Reuse; CH4 More and better recycling; CH5 Section 5.2 Less food waste; and CH7 Plastics in a circular economy.

C7 demonstrates European added value by supporting the WFD (Annex IV) as well as the Directive on Packaging (2018). C7 also underpins the work of the Government, regions, and municipalities to support SDG 12.

### **Action C7.1: A new infrastructure for waste prevention and reuse in AK**

Beneficiary responsible for implementation: Kredsløb Genbrug A/S (AVA)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2024

#### **Purpose of action**

The purpose of the action is to develop and implement a new infrastructure for direct reuse in AK, making reuse more accessible and engaging for citizens.

Amendment No. 1 resulted in an inclusion of Kredsløb A/S (AVA-AF) as an affiliate partner. As part of Amendment No. 2, a content change was approved. The key adjustment was that the original plan to develop a business case for a reuse shopping mall as an activity and deliverable was no longer a realistic scenario. Instead, the focus shifted to using insights from the first local reuse center to shape a business case for the second and future local reuse centers, which will now serve as a deliverable.

The following sections outline the activities and results achieved during Phase 1.

#### **PM unit's (CDR) overall assessment of action**

The PM Unit finds that the overall ambition of the action has been achieved, showing results in real life. The model developed is a part of the infrastructure in the Municipality of Aarhus and many of the developed principles can be used in other municipalities.

Two very well-functioning and innovative local recycling stations are tested and integrated into areas of a build environment, one has been established in a vacant retail space in the middle of Aarhus, the other on a vacant area, next to a new quarter in the city. In addition, 6 minor stations/swap boxes have been placed on six locations in the city.

We note that the action management has emphasized the importance of making the stations aesthetically pleasing and easily visible from the outside. This approach ensures they remain attractive with minimal effort from the waste handling company, effectively keeping the sites clean and well-organized.

Close dialogues with Aarhus Municipality have ensured that recycling infrastructure becomes an integral part of future urban plans. This effort will continue, supported by the materials produced from the final infrastructure plan.

The main activities of this action were scheduled to be finalised in Phase 1, and this has been fulfilled.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

## C7.1 Timetable

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C7.1</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
AVA will host a seminar for other municipalities and waste companies in the Danish waste management sector to share knowledge and experiences from C7.1 and produce an article to be published in professional forums, like the Danish Waste Association, to create and maintain synergies between actors as a part of Capacity Building C1
<b>WP2 Mapping and analysis of needs</b>
<ol style="list-style-type: none"> <li>1. Assessment of needs among citizens, transporters and housing associations across AK.</li> <li>2. Measure and map material flows, including a sample of weighing (waste containers).</li> <li>3. Map best practice.</li> <li>4. Study trip to e.g., to ReTuna in Sweden, Berlin or Oslo.</li> <li>5. Integration with other urban planning and functions.</li> </ol>
<b>WP3 Development and testing of prototypes</b>
<ol style="list-style-type: none"> <li>1. Set up one local mini reuse centre. AVA will rent a vacant store in the city centre or an existing shop in order to facilitate citizens exchanging reuse goods and recycling waste.</li> <li>2. Set up three bulky waste stations at different location of the city, which will be designed and tested.</li> </ol>
<b>WP4 Concept development</b>
<ol style="list-style-type: none"> <li>1. Develop a concept for a local reuse centre. The existing recycling centres will be examined, focusing on whether and how they can be upscaled to an urban context, which entails much less physical space and serving citizens arriving by foot or bicycle.</li> <li>2. Develop a concept and business case for a reuse shopping mall. Drawing on insights from the reuse shopping centre, ReTuna, in Sweden, AVA will draw up a business case for a reuse shopping mall that will be key for the new infrastructure. The reuse shopping mall will have two functions: It will gather the various reuse flows in Aarhus, and it will be a place for civic learning activities on sustainable living. Setting up a</li> </ol>

<p>shopping mall will require external funding. Hence the first step will be to explore opportunities and potential stakeholders, including humanitarian non-profits.</p> <p>3. Develop a concept for cooperation between housing associations. A concept will be developed for increasing cooperation on reuse in the private and public housing sector so that solutions can be implemented where citizens live. AVA will be in dialogue with housing associations and private owners of condominiums in the city centre to explore these stakeholders' interests in renting/buying bulky waste stations or other reuse solutions. Based on these efforts, a concept for cooperation as well as methods for citizen involvement will be developed.</p>
<b>WP5 Finalise the concept</b>
<p>1. Completion of concept and evaluation. The initiatives (ref. WP2-4) will be evaluated regarding optimisation and further expansion. The blueprints for the full concept will be drawn together for implementation. The results will be a concept sketch and a detailed list of several concrete areas of focus and tools of optimisation to be used in the future.</p>

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Business case for a local reuse centre	WP4	31.12.2024	Completed	07.01.2025	YES
Concept for cooperation with housing associations	WP4	31.12.2024	Completed	07.01.2025	YES
A full concept and development plan for the continued implementation of a fully built infrastructure for reuse and waste prevention in AK	WP5	31.12.2024	Completed	07.01.2025	YES
Complete concept and knowledge sharing	WP5	31.12.2024	Completed	07.01.2025	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Completion of needs assessment and clarification of prototype design	WP2	01.04.2023	Achieved	01.04.2023	N/A
Enactment of mini local reuse centres and bulky waste management facilities completed	WP3	01.04.2023	Achieved	01.04.2023	N/A

Completion of concept and business case for a local reuse centre	WP4	30.06.2024	Achieved	30.06.2024	N/A
Completion of final concept for infrastructure	WP5	01.10.2024	Achieved	01.10.2024	N/A

### **Explanation for delays in Deliverables and Milestones (if any)**

The content change in Amendment No. 2 resulted in the renaming of one Deliverable and one Milestone, as well as the postponement of the Milestone. All Deliverables and Milestones have now been completed or achieved.

#### **A. Expected and achieved results**

##### *The correlation of expected and achieved results*

**Expected:** “*Tripling reuse in AK by 2026: 30% of the goal of tripling the reuse output by 2026 (part of AK Waste Plan 2021-2026) equals 1.000 tonnes in 2026.*”

Progress is on track. Initiatives such as the six swap boxes and two local reuse stations have already driven notable improvements, and the target is expected to be achieved within the planned timeframe. AVA is currently assessing reuse volumes to measure progress, though this activity is conducted outside CEBW.

**Expected:** “*The implementation and test of both a mini local reuse centre in a vacant store and three bulky waste reuse stations. The mini local reuse centre will lead to a minimum yearly output of 30 tonnes of reuse. A similar output is expected for each of the bulky waste reuse stations.*”

A mini reuse center has been established in a vacant store in Aarhus, achieving an annual reuse output of 10,9 tones. Additionally, three swap boxes have been implemented, with an expected annual output of 3 tonnes per box.

**Expected:** “*100 citizens visiting the reuse centres.*”

The target of 100 daily visitors has been met. Our records indicate 50-60 logins per day via MitID (Danish Digital Identification system - [MitID er Danmarks digitale ID - MitID](#)), but observations confirm that most logins represent two visitors, achieving an average of 100 visitors daily.

**Expected:** “*A business case for a reuse shopping mall in Aarhus.*”

Drawing on insights from the first reuse station, a business case for a mobile, modular reuse station has been developed. This led AVA to self-finance another station, which opened in August 2024 to explore operational synergies.

**Expected:** “*3 partnerships regarding the leasing or purchasing of bulky waste reuse stations will be established with three housing associations.*”

We have successfully established partnerships and dialogues with housing associations regarding leasing swap boxes and reuse concepts. The concept is primarily based on the cooperation with Aarhus

Omegn, Ringgarden and ALBOA, all house associations, and has been presented in a larger group of housing associations Brabrand Boligforening, AlmenBo, Boligkontoret Aarhus, AAB, and others.

A pilot project is already undertaken, and more partnerships are expected to expand by 2026. To support this, AVA has developed a website and guidelines to inspire housing associations to take on a more active role in reuse efforts.

**Expected:** *"Every aspect of the infrastructure will be integrated with the general planning at the municipal level."*

Collaboration with Aarhus Municipality is ongoing to integrate reuse infrastructure into urban planning, supported by material developed as part of the final infrastructure plan.

#### Communication

A presentation summarizing best practices, experiences, and learnings has been prepared for knowledge sharing with stakeholders and partners.

#### **B. Evaluation**

This paragraph presents the progression, successes, and obstacles of the action.

#### Progress

One key success is the shared understanding within AVA of how future reuse infrastructure should function. CE Beyond Waste (CEBW) has contributed to internal support, fostering innovation and risk-taking. This has enabled initiatives such as self-service systems, lockers, and an architect-designed indoor reuse station.

#### Outcome Evaluations, Successes, and Learnings

- *Adaptation Through Collaboration:* Adjustments to meet external requirements, such as swap box design changes for accessibility and aesthetics, have improved acceptance.
- *User Engagement and Technology:* Citizens have embraced self-service solutions, facilitated by MitID and other technologies. This approach has proven cost-effective and efficient.
- *Organizational Maturity:* AVA now views reuse as a core element of a circular strategy, integrating reuse tasks into daily operations with a focus on efficiency and innovation.
- *Inspiration from Best Practices:* Study tours within CEBW provided valuable insights, refining solutions like waste fraction management in reuse stations.
- *Scalability Potential:* Funding challenges have been addressed by integrating swap boxes into bulky waste systems. Future scaling opportunities include intelligent technologies for monitoring and optimization.

#### Challenges

Our efforts have not been without challenges:

- *Building Permits:* Securing permits for swap boxes delayed implementation but established a smoother process for future projects.
- *Urban Planning Integration:* Efforts are ongoing to embed reuse infrastructure into urban planning, supporting reduced car reliance and sustainable development.

### **C. Targets and goals for Phase 2, 2025-2027**

AVA will continue operating and evaluating reuse solutions. Key initiatives include assessing long-term viability and expanding reuse infrastructure. Decisions on permanent implementation and further development of swap boxes and reuse stations are expected in early 2025 and early 2026.

### **D. After Life**

WP 1 will ensure Phase 1 learning guide strategic planning and scaling of future reuse infrastructure, supporting economic and environmental sustainability beyond CEBW.

### **Action C7.2: The recycling centre as a catalyst for community development**

Beneficiary responsible for implementation: Favrskov Affald (FAFO)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2027

#### **Purpose of action**

The purpose of the action is to develop and demonstrate new concepts, collaborative methods, and processes that bring citizens and communities together around reuse activities, making circular economy tangible and actionable. In C7.2, FAFO is rethinking how recycling centres can actively promote positive waste behaviour. The following sections outline the activities and results of the action in Phase 1.

#### **PM unit's (CDR) overall assessment of action**

Creating a new culture around the use of a reuse/recycling centre takes time, as it requires not only the establishment of facilities and activities but also the mobilization of people who see the value in engaging in new collaborations and initiatives. FAFO has work packages planned until 2027 but has already made significant progress in involving local citizens, volunteer organizations, and schools in reuse activities. We therefore assess that C7.2 has the foundation to reach its goal on time - and actually demonstrate new ways of using the reuse centre as a catalyst for community development in a rural district.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C7.2 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C7.2</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

#### **Explanation for timetable delays (if any)**

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
<b>WP2 Increasing participation in direct reuse</b>
<ol style="list-style-type: none"> <li>1. Develop and test a concept for direct reuse at an unattended recycling centre based on behavioral design and best practices from other recycling centers in DK/EU. Recycling centers with unattended opening hours require innovative solutions for direct reuse to accommodate the challenges arising from the absence of guidance from physically available personnel.</li> <li>2. Make an area for direct reuse and pilot experiments there to gain experiences that can be scaled to all of the recycling centres in Favrskov Municipality.</li> <li>3. Establish collaborative networks with local organisations and businesses to develop concepts that promote reuse and repair; conduct a series of workshops and network meetings to include businesses and local organisations in the development of the recycling centres.</li> <li>4. Develop communication activities and campaigns at the recycling centre, aimed at nudging citizens' behaviour towards more direct reuse, repair and waste prevention.</li> </ol>
<b>WP3 Develop a Repair Workshop</b>
<ol style="list-style-type: none"> <li>1. Establish an open repair workshop for citizens to meet and socialise around repairing activities, get products repaired, receive information on how to repair and participate in repair-centred events.</li> <li>2. Communicate and involve citizens through campaigns and events with local stakeholders – incl. technical colleges, cafés, art schools and sewing communities (online/physically); spread Information about the new repair activities to all visitors of the recycling centre.</li> </ol>
<b>WP4 Educational courses for schools and institutions</b>
<ol style="list-style-type: none"> <li>1. Develop and execute a new concept for educational courses directed at schools and institutions, focusing on waste prevention, reuse, and repair. The aim is to engage schoolchildren in courses that combine learning objectives from school courses with sustainability-oriented learning on waste, climate and the environment.</li> <li>2. Support the educational courses by school field trips that combine tours of recycling centres and workshops at the repair workshop.</li> </ol>
<b>WP5 Developing competences to support sustainability</b>
<p>Train project managers in stakeholder involvement; focus on the activities to be executed in the project; engage local stakeholders in the project.</p> <p>Develop a sustainability policy for internal use that can help motivate and engage FAFO personnel to take personal responsibility for addressing waste prevention.</p>

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER

Catalogue of activities, workshops, and information initiatives	WP2	31.12.2027	Not started	-	-
Educational material for schools and educational institutions (WPX)	WP4	31.12.2023	Completed	31.12.2023	YES
Sustainability policy (WPX)	WP5	01.07.2025	On track	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Test of unattended recycling area performed	WP2	31.12.2024	Achieved	09.01.2025	-
Opening of Hadsten Recycling Centre	WP3	01.07.2025	Delayed	<b>01.07.2026</b>	-
Finished concepts for schools and institutions	WP4	31.12.2023	Achieved	31.12.2023	-
Developed sustainability policy	WP5	31.12.2024	Achieved	31.12.2024	-

#### Explanation for delays in Deliverables and Milestones (if any)

The delay in the Milestone is mainly caused by a screening of the geographic area that revealed obstacles such as issue with a planned supply of water placement and gas pipelines. The phase involving a new assessment of where to place the site and evaluation of that has been followed by a consultation period involving the citizens. This has also delayed the initiative. The administration in the Municipality of Favrskov is now preparing a draft local plan, which is expected to be presented at the city council June 2025.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

This section presents both quantitative data on results achieved and examples of efforts and methods that contributed to meeting the goals.

**Expected:** *"Reduction of municipal waste output by, on average, 15 kg per citizen annually, relative to the expected municipal waste output in 2024."*

From 2022 to 2023, we have reduced our municipal waste output by 67 kg pr citizen annually. The bigger part of this reduction is on the recycling station, where the average amount of waste pr. citizen was reduced from 668 kg. pr. citizen to 601 pr. citizen. It could be an indicator, that initiatives on the recycling station within direct reuse, has contributed to a reduction in waste. But still, we have to take into account, that the amounts of waste generated pr. Year usually fluctuate by up to 10% +/-, thus making calculations uncertain. In spring 2025 supplementary survey will be carried out at the recycling

station. The data is at this point based on Affaldsviden/ Knowledge about waste, a platform across the municipalities: <https://affaldsviden.info/>. Affaldsviden.dk, is a benchmarking platform for waste companies operated by the company JHN Processor. Here, all of FAFO's waste data is collected from both the household collection and the recycling centre.

Overall, we have struggled to provide an accurate figure that does not carry too many uncertainties, as the amounts of waste data generally fluctuate from year to year- often without a specific reason being identifiable. Many different factors can influence citizens waste generation, not just our work and communication, for instance: inflation, increasing opportunities to sell second hand items, increase or decrease in affluence, greater awareness among citizens, growing opportunities to purchase resusable items instead of single use products etc.

**Expected:** *"One new reuse and a repair workshop at Hadsten Recycling Centre."*

In May 2024, we established a new reuse area and a repair workshop at Hammel Recycling Centre. A citizen-engagement meeting was held in collaboration with VedvarendeEnergi, a consultancy company, where volunteers and Repair Café Hammel actively participated.



From the opening of a 'give and take' reuse area and a repair workshop.

**Expected:** *"By 2027, 25 kg of waste per citizen turned into direct reuse."*

This result pertains to Phase 2 and cannot yet be reported.

**Expected:** *"10 new innovative collaborations with local actors."*

Six new collaborations focused on direct reuse have been established.

- Volunteers and students from FGU Hadsten (FGU is a school preparing youths to start an education) participated in developing a lending project for event tableware.
- We've partnered with a local paint store to reuse surplus paint for art canvases.
- FOFA facilitated collaboration with local thrift shops to optimize reuse, including book exchanges between stores.
- Implemented a new login system for unmanned access to the reuse area.

**Expected:** *"Creation of 35 sustainable jobs, volunteer jobs and internships."*

Seven positions have been created, including hiring staff to visit kindergartens and conduct activities based on the book *Rappeskralde*. The book contains both information about the impact of use of resources and CO2 emissions, different cases and a variety of exercises.

**Expected:** *"35.000 visitors to the repair workshop and the new area for direct reuse."*

A repair workshop was held on September 29, 2024, with monthly workshops planned over the next six months to engage citizens in repair activities and promote reuse. Partnerships with local Repair Cafés have been strengthened, including collecting spare parts and promoting their activities. Status: 11,009 visitors as of August 2, 2024. Learn more about how we've worked with creating better direct reuse in Attachment 10 (Annex 5).

**Expected:** *"5.000 children and youths have been reached by the end of the project period (for education purposes)."*

Educational materials for children and youth have been developed, accompanied by a school campaign that rewards classes using the materials. As of August 2, 2024, 1,536 children have been reached, with the goal of 5,000 expected to be met by the project's end.

**Expected:** *"CO<sub>2</sub>-reductions are expected through increased reuse and repair. Furthermore, decreasing the amount of waste for incineration will reduce CO<sub>2</sub> emissions from combustion even further."*

There is currently no method for calculating CO<sub>2</sub> savings from reuse, so no status can be reported yet.

#### Communication

Key communication outputs include:

- Establishment of "Affaldsklubben" (<https://www.favrskovforsyning.dk/affaldsklubben>)
- Engagement with local media: "[Denmark gets an unfortunate top position: Here, they want to make a difference](#)" | TV2 Østjylland.
- Creation of a Facebook page for local reuse initiatives: [Link](#)
- Photos of events and workshops with citizens (Attachment 11, Annex 5)
- Design suggestions for an area for direct reuse "Anes Oase" (Attachment 12, Annex 5)

## B. Evaluation

This section evaluates progress, successes, and challenges.

#### Outcome Evaluations, Successes, and Lessons Learned

- *Behavior Change Through Redesign:* Redesigning the "Give and Take" area aimed to change citizen behavior, reduce clutter, and protect items. Collaborating with an interior designer inspired by DOKK1 in Aarhus, the area became more appealing.
- *Resources for Reuse:* Despite being self-service, two flex-job staff were hired to maintain order, guide visitors, and save reusable items from containers. A staff training day focused on reuse, with insights shared from Odsherred Municipality.
- *Citizen Engagement:* Several meetings with citizens promoted involvement, but engagement requires time and resources. Collaborations were established with Repair Café Hammel and

FGU Hadsten, which use the workshop as a platform and participated in opening events, e.g., repairing garden tools.

### Challenges

We have also faced several obstacles:

- Delays in constructing the new Hadsten Recycling Centre due to prolonged political decision-making led to testing activities at Hammel instead.
- Lack of a method to calculate CO<sub>2</sub> savings from reuse hindered reporting on some expected results. It is EPA, that collects data considering waste in Denmark. As they still operate with measurement in kilogram, it is a challenge to measure CO<sub>2</sub> savings for a small entity as FAFO. An example of how EPA collects data in kilogram: <https://www2.mst.dk/Udgiv/publikationer/2023/02/978-87-7038-490-2.pdf> **Affaldskortlægning af husholdningsindsamlet affald/** Waste mapping of Household waste.
- High visitor numbers, including from other municipalities and professional scavengers, caused capacity issues.

### **C. Targets and Goals for Phase 2, 2025–2027**

Phase 2 will focus on engaging local actors through increased activity, networking, and collaboration. Communication campaigns will further promote reuse and repair with citizens. FAFO desire to be an active driver of waste reduction.

An area evaluation in spring 2025 will include qualitative interviews and quantitative measurements to assess reuse volumes and identify optimization opportunities.

#### Overview of WP:

- *WP1:* Continues.
- *WP2:* Increased focus on building materials and community engagement in reuse practices. Campaigns and new AI tools will enhance reuse and sorting quality.
- *WP3:* Expand the workshop's role as a key offering for schools, associations, and other stakeholders.
- *WP4:* Ensure 3rd-5th graders continue to access educational materials, with ongoing youth-focused tours.
- *WP5:* Train project leaders in engagement and implement a sustainability policy.

### **D. After Life**

Post-CEBW, we will continue to move waste up the hierarchy toward prevention and reuse:

- Optimized reuse initiatives and repair workshops will persist in Hammel and Hvorslev, extending to the new Øst / EAST facility in 2027.
- Recycling centers will become hubs for community engagement, empowering citizens, schools, and associations to drive the green transition.
- A reuse network will streamline waste flow between charitable organizations and businesses prioritizing reuse over disposal.

- Staff are now well-trained to advise on waste prevention and reuse, acting as ambassadors for citizen behavior change.
- Children will remain central to our efforts, with continued educational opportunities fostering awareness among future consumers.
- Experiences will be shared across relevant networks to benefit others from our results.

### **Action C7.3: More direct reuse, repair, and upcycling of materials from recycling centers**

Beneficiary responsible for implementation: NOMI4S (NOMI4S)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2025

#### **Purpose of action**

The purpose of the action is to increase reuse and improve waste prevention for citizens, businesses and public institutions in the less densely populated areas of Central and West Jutland (area of NOMI4S). The aim is to redesign and establish a new and more circular resource and reuse center, as well as upgrading existing centers, which ensures more direct reuse, reparation and upcycling of materials. The following sections outline the activities and results of the action in Phase 1.

#### **PM unit's (CDR) overall assessment of action**

The PM unit finds it promising that this action has been able to showcase both to build areas for direct reuse and show the importance of reskilling/ new skills of the work force, addressing the new goals and the new functions. As part of this action NOMI4S - covering 4 municipalities - has established an area of over 1,500 m<sup>2</sup> dedicated to direct reuse, which was completed on October 1, 2024. The area includes a large archway hall of approximately 300 m<sup>2</sup> and a covered space for building materials of about 400 m<sup>2</sup>.

The PM unit finds it encouraging that NOMI4S has hired two staff members with special qualifications in understanding and communicating with the public. Extensive training on-site has provided them with significant insight into the suitability of materials for reuse.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C7.3 Timetable**

Phase	Phase 1						Phase 2						Phase 3			
Year	2022		2023		2024		2025		2026		2027		2028		2029	
WP	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
<b>C7.3</b>																
WP1																
WP2																
WP3																
WP4																
WP5																

## Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1, appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
<b>WP2 Companies and public institutions</b>
<ol style="list-style-type: none"> <li>1. Mapping of the potential receivers of waste materials for reuse in the four municipalities (focus on SMEs/startups), thereby supporting circular business models.</li> <li>2. Conduct interviews to uncover the needs of companies and public institutions to uncover opportunities and constraints for cooperation on reuse; gather information meetings.</li> <li>3. Upgrade and communicate the tender platform to increase the number of reused materials. Company and public institution targeted communication will be developed to create awareness on the tendering of reusable materials.</li> </ol>
<b>WP3 Citizen targeted activities</b>
<ol style="list-style-type: none"> <li>1. Examine the needs of citizens concerning demand and preferred schedule. A citizen questionnaire is accompanied by qualitative interviews to uncover wishes and needs among citizens.</li> <li>2. Develop an 'activity catalogue' to show how and where it is possible to implement repair of e.g., textiles, bikes and electronics. Local facilitators to provide the activities are mapped and agreements are made.</li> <li>3. Establish a development centre (SKK). Communication and roll out at the development centre at SKK recycling centre, areas are chosen for the citizen-targeted activities. A variety of communication actions will be initiated to create awareness of the opportunity to participate in workshops, repair cafés, etc.</li> </ol>
<b>WP4 Design of recycling centers</b>
<ol style="list-style-type: none"> <li>1. Creating the optimal development centre To create the optimal development centre for waste prevention at Skive recycling centre a series of trials on design, signage and nudging actions will be conducted. Focus will be on interventions that can inspire citizens and companies to deliver effects for reuse instead of recycling, other recovery or landfill.</li> <li>2. Designing a development centre Based on activity 1, a design sketch for the development centre at Skive recycling centre is made. Hereafter tender material is completed, and bids are obtained from 2-3 companies. The best bid is chosen, and the building process is initiated.</li> <li>3. Adaptation and upscaling Experience and knowledge on nudging actions and design of the development centre will be adapted to the local context at the remaining 11 recycling centres. The extend of the implementation will be adapted to fit the size and geographical location of the recycling centres. The actual physical implementation of development centres is scoped out of this project, as it requires additional investments beyond the LIFE IP budget.</li> </ol>
<b>WP5 Evaluation and knowledge sharing</b>
<ol style="list-style-type: none"> <li>1. Project evaluation The initiated actions are evaluated and compared to expected results to document the effectiveness. The result will be concrete recommendations and optimization tools that Nomi4s can apply in development work going forward.</li> <li>2. Knowledge sharing Based on the project, two articles will be written and shared with relevant networks such as DAKOFA or</li> </ol>

subject specific magazines. Furthermore, a seminar will be held for relevant municipalities and waste companies within LIPE IF to ensure that experience on development of recycling centres is shared.

## Deliverables and Milestones

Name of the Deliverables	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Catalogue of activities, workshops and information initiatives	WP3	30.06.2025	Delayed	31.12.2025	-
Educational material for schools, firms, and educational institutions	WP3	31.12.2024	Delayed	31.12.2025	-
Sustainability policy	WP5	31.12.2024	Delayed	31.12.2025	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Test of new unattended recycling area performed	WP4	31.12.2024	Delayed	30.06.2025	-
Open workshop to the public	WP3	31.12.2023	Delayed	31.12.2025	-
Measurement of total quantity moved up in the waste hierarchy	WP5	31.12.2024	Delayed	31.12.2025	-
Finished concepts for schools and institutions	WP3	31.12.2024	Delayed	31.12.2025	-
Developed sustainability policy applicable to all recycling sites.	WP5	30.06.2025	Not started	-	-

## Explanation for delays in Deliverables and Milestones (if any)

The delays are primarily due to the activity of establishing a new reuse center/ development center for building materials in connection with an existing recycling station in Skive Municipality. This has proven to be more complex than expected due to the processing of building permits in the municipality, the tendering for the construction of a covered area, and delays in the construction process to more specialized areas.

These specialized areas have involved presenting a new type of task to the employees specifically a more service-oriented role. Simultaneously, we have been trying to establish an environment where

staff from the recycling department and those from the reuse department can collaborate effectively despite their differing primary responsibilities.

Additionally, there has been a necessary interface with the already established Material Recycling Station, which provides recycling materials to schools, and with the NGO that accepts usable products, necessitating the development of a meaningful organizational structure for this collaboration.

Due to these challenges, all deliverables and most milestones have been delayed. However, we are on track to meet the desired new deadlines with several efforts already underway:

*Deliverables:*

- *Catalogue of activities, workshops, and information initiatives:* Two reuse advisors have been hired, and their experiences will be documented for inclusion in a future activity catalogue. Insights from local fairs will also contribute to the catalogue, set for completion by the end of 2025.
- *Educational material for schools, firms, and institutions:* Preliminary material has been developed. The next step is tailoring content specifically for each target group.
- *Sustainability policy:* Currently under development and expected to be finalized by the end of 2025.

*Milestones:*

- *Test of new unattended recycling area performed:* A preliminary four-week test of an unattended recycling area showed the site became disorganized, so we've decided to staff the area during opening hours. Further tests are needed to understand citizen behaviors and patterns and organize accordingly.
- *Open workshop to the public:* We have been holding workshops at different local fairs as well as an on-site workshop on 7 December.
- *Measurement of total quantity moved up in the waste hierarchy:* As of December 31<sup>st</sup> 2024, 42 tonnes of reusable materials have been collected and elevated in the waste hierarchy.
- *Finished concepts for schools and institutions:* A clear concept for schools is underway, with approximately one order per day for materials from schools in Skive Municipality. Stocked items are distributed immediately, while other materials are collected as needed.

**A. Expected and achieved results**

Correlation between expected and achieved results

**Expected:** *"An increase in reuse at Skive recycling centre of approx. 375 tonnes, which equals roughly 15 kg per user out of the total waste amount."*

At the end of December 2024 tonnes of building materials, furniture, and other reusable materials have been collected. Based on current estimates, the target of 375 tonnes by 2029 is expected to be achieved as early as 2025.

**Expected:** *"Establishment of one new resource and reuse centre for direct reuse, repair, and upcycling at Skive recycling centre as well as various upgrades on the remaining 11 recycling centres within the area of Nomi4s."*

NOMI4S has established a 1,500 m<sup>2</sup> area for direct reuse, completed on October 1<sup>st</sup> 2024. The site includes a 300 m<sup>2</sup> arch hall and a 400 m<sup>2</sup> covered area for building materials. Two reuse advisors have

been employed to increase the collection of building materials for direct reuse. Their tasks include trailer inspections for potential reusable materials and educating citizens on suitable reuse practices. Both advisors have undergone training to enhance communication skills and possess extensive knowledge of material suitability for reuse.



*Part of the outdoor reuse area on a day before opening hours*



*The sign contains information to the citizens. It addresses the new possibility, that they can put and take wood planks, windows, doors, sanitary fixtures, building materials, tiles, furniture and similar items*



*The department for furniture*

Small items are collected for both citizens and schools/institutions. The arch hall is divided, with two-thirds allocated to schools/institutions and one-third to citizens, who can collect items for free.

On six of the remaining 11 recycling centers, containers for direct reuse have already been installed. By the end of 2025, similar containers will be placed at the remaining five centers. A part-time employee has been hired to maintain the containers' appearance, ensuring they remain inviting to users.

**Expected:** *"A new model for tendering of reuse materials for businesses will be developed and communicated via business networks, subject-specific magazines, home pages and social media."*

To simplify operations, we created a publicly accessible Facebook page to facilitate the redistribution of surplus materials that would otherwise occupy valuable storage space or be discarded. We concluded that a formal tender model would be unnecessarily complex, and the chosen approach is expected to yield greater impact.

**Expected:** *"90% of the collected materials will be reused, repaired or redistributed to a minimum of 50 companies and 85% of the municipal and educational institutions within the four owner municipalities."*

We expect the 90% target will be met, but still data is to be produced. Amongst others by:

- The ability to measure the exact amount of reused materials is amongst others, connected to C5 and the new waste data reporting system (ADS), developed by EPA. The aim of C5 is to build an extension to the ADS system, that focusses on reuse. But the system is not ready yet.
- The data from the new Give and Take area in Skive are registered on a daily basis, the scheme is showed below. The areas are textile, books, DVD, glass and mirrors, plastic, PVC, electronics, tree, glass fiber, insulation, metal, concrete, bricks, sanitation and windows and doors. An example is shown below, the data will feed into the system to be build by EPA.
- The NGOs are picking up useful products for sale in containers placed at the recycling centres and has a sales area attended at the upcycling station in Kastrup. The store is a part of Folkekirkens Nødhjælp/The DanChurchAid. The store has had increasing sales of reused items, in 2024 it had a sales record with a sale of 2100000 kr/281.316 Euros.
- The Reuse Warehouse has a strong collaboration with public institutions and they work with schools in Holstebro and Skive in order to increase awareness, better use and reuse. Last year, 4500 guests attended the lectures and showcases.
- In 2024 the Reuse Warehouse delivered 90 tons of materials to be reused in schools and institutions, and the number of users has grown from 58 in 2020, to 958 in 2024, covering the four municipalities in Nomi4s' area.
- During 2024 Give and Take areas have been added to other reuse centers in the context of Nomi4s, data will be registered from 2025.

**Expected:** “8-10 citizen targeted activities will be developed and chosen per year based on user satisfaction of a minimum of 200 users.”

NOMI4S has participated in Christmas fairs and plans to expand involvement in similar events to engage a broader audience, promote reuse, and highlight the benefits of sharing materials. The target of reaching 200 citizens has been achieved. The Green Innovation Week has more than 4,000 visitors.

List of activities in 2024:

- Crab Festival – August 31<sup>st</sup> – September 1<sup>st</sup> 2024 in Lemvig (<https://www.skaldyrskysterne.dk/event/krabbefestival>)
- GIW fair – September 26<sup>th</sup> 2024 in Skive ([2024 nomi4s - Green Innovation Makers](#))
- Housing and Lifestyle fair – September 28<sup>th</sup> – 29<sup>th</sup> 2024 in Holstebro ([Udstiller detaljer – Boligdage](#))
- Rødding Apple Festival – October 12<sup>th</sup> – 13<sup>th</sup> 2024 in Spøttrup ([Rødding Æblefestival | Danmarks største vidensfestival om æbler og cider](#))
- Build event – the future of building, October 15<sup>th</sup> 2024 in Holstebro ([Fremitidensbyggeri | Erhvervsforum Holstebro](#))
- Christmas fair – Inner Wheel Club, December 16<sup>th</sup>-17<sup>th</sup> 2024 in Skive ([Skive – Inner Wheel Danmark](#))
- Green innovation Week 13<sup>th</sup> to 15<sup>th</sup> of September 2024.

The work on citizen targeted activities continues in 2025, and the goal of a total of 8-10 events will be reached before the end of 2025.

**Expected:** “Increased public awareness of the potential for direct reuse.”

Public awareness is addressed through reuse advisors at recycling centres, information campaigns, and participation in fairs.

**Expected:** “10 new circular businesses in the local private sector.”

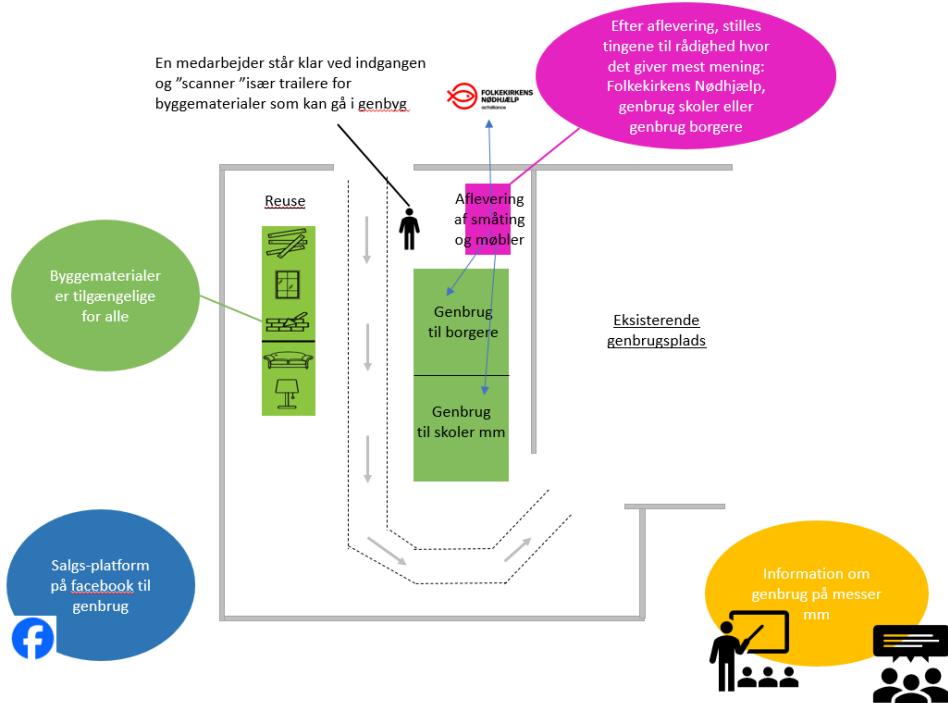
Efforts to collaborate with Jewa and BOMI for reuse material distribution faced challenges. Jewa went bankrupt, and cooperation with BOMI regarding books ceased after 1-2 years. However, a new partnership has been established with a wine merchant who uses shredded paper from discarded books as packing material. BOMI is a part of Skive Municipality and offers protected employment, resource development, workshop activation and various projects.

The work done so far has resulted in one company with a CVR number, and hopefully a more coordinated work between BOMI and the MGL will lead to more companies. Still, this is an area that needs a lot of attention to succeed.

### Communication

Communication outcomes tied to phase 1 activities include:

- A radio segment on P4 Vest covering the opening of the reuse area in Struer.
- Coverage of the opening event on 7 December 2024.



Map of the new 1,500 m<sup>2</sup> area for direct reuse.

### B. Evaluation

This paragraph presents the progression, successes, and obstacles of the action.

#### Progress, Outcome Evaluations, Successes, and Learnings

The action experienced delays due to prolonged permit approvals, site preparation, and environmental clearances. Activities only commenced on October 1<sup>st</sup> 2024, resulting in a short testing period.

The new reuse approach required cultural adjustments among staff, who were initially resistant to changing established procedures regarding material reuse from containers.

Challenges

Collaborations with Jewa and Bomi encountered obstacles, with Jewa's bankruptcy and the end of the Bomi partnership highlighting the difficulty of establishing and maintaining business partnerships for reuse.

**C. Targets and Goals for Phase 2, 2025-2027**

Phase 1 did not proceed quite as planned both due to the delays mentioned above and the difficulties with involvement of private companies. Therefore, most of the WP's will continue to evolve in phase 2 with ongoing improvements based on experiences, needs, and opportunities.

**D. After Life**

The organizational framework established for Action 7.3 is expected to be sustained and replicated at other recycling centres.

### **Action C7.4: Waste prevention in households**

Beneficiary responsible for implementation: Renosyd (RENO)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2025

#### **Purpose of action**

The purpose of the action is to reduce citizens' waste through increased awareness, behavioural change, and new waste practices. The primary focus is to reduce residual waste, food waste, garden waste, and small/large combustible waste from recycling centres while increasing the amount of waste that is reused. By raising awareness and showcasing examples of how individual behaviour directly impacts waste generation and prevention, C7.4 empowers citizens to adopt more sustainable habits and reduce their waste footprint.

The following sections outline the activities and results of the action in Phase 1.

#### **PM unit's (CDR) overall assessment of action**

The PM Unit finds it remarkable that the action initiative "More Nature – Less Waste" has obtained results with multisided outcomes. The initiative addresses garden and park waste by transforming it to brushwood fences. The work done has created new types of cooperation between waste management organizations and institutions, teachers, citizens and children. The brushwood fences enable less garden and park waste at the recycling centres, more biodiversity and most of all cooperation and learning abilities at location.

The brushwood fence solution has already been replicated in other municipalities in Denmark, such as Samsø and Syddjurs Municipalities. The practical implementation of the multisided results has been a sought-after topic at conferences, both in Denmark and within the framework of the Nordic Council and EU, for example The rise of naturebased solutions and the momentum of CBD in COP15 in Brussels.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C7.4 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C7.4								
WP1								
WP2								
WP3								

WP4														
WP5														

### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
<b>WP 2 Consciousness and behavioural change in households</b>
<ol style="list-style-type: none"> <li>1. Perform qualitative anthropological study on waste production in selected households to gain an in-depth understanding of underlying motivations and barriers to consuming less and producing less waste.</li> <li>2. Do small-scale trials involving selected households (process design, measuring waste, cataloguing &amp; sharing lessons with citizens in the operational area of RENO).</li> <li>3. Large-scale surveys.</li> <li>4. Conduct waste analysis to monitor the findings of the household research trials.</li> <li>5. Execute communication actions and behavioural campaigns based on research trials conducted by RENO and municipalities.</li> <li>6. Make individual waste data available for all citizens in the area of RENO.</li> </ol>
<b>WP 3 Consciousness and behavioural change at recycling centres</b>
<ol style="list-style-type: none"> <li>1. Make preparatory qualitative study of employees, leaders and consumers of recycling centres</li> <li>2. Carry out nudging campaigns and communicative actions at recycling centres.</li> <li>3. Develop educational process with employees aimed at waste prevention and prolonging the lifetime of repairable goods.</li> <li>4. Develop, test and evaluate trials on direct reuse, including repair initiatives.</li> <li>5. Develop, test and evaluate trials on reducing small and large combustible waste amounts at the recycling centres.</li> </ol>
<b>WP4 Children and young adults as ambassadors for waste prevention</b>
<ol style="list-style-type: none"> <li>1. Make preparatory qualitative study of children, students, teachers and parents at selected schools.</li> <li>2. Develop communication and activities that will contribute to making children/students into waste ambassadors.</li> <li>3. Carry through trials of nudging and behavioural design at the chosen schools to influence the waste behaviour and attitude towards waste prevention of children/students</li> <li>4. Do analyses of waste production at specific schools within the area of RENO.</li> </ol>
<b>WP5 Further development and scaling up</b>
<ol style="list-style-type: none"> <li>1. Development of targeted means to influence waste behaviour (e.g., minimising waste from other streams such as plastic/packaging, electronic equipment etc.)</li> <li>2. Development of technical means to support a change in waste behaviour and citizen empowerment.</li> <li>3. Broadening and scaling up the project activities to larger geographical areas in DK.</li> </ol>

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
Educational programme for employees at recycling centres	WP3	31.12.2024	Completed	31.12.2024	YES
Descriptive catalogue on communication campaigns and actions in households and at recycling centres	WP2	31.12.2024	Completed	31.12.2024	YES
Descriptive catalogue on communication and behavioural campaigns for children.	WP4	31.12.2024	Completed	31.12.2024	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
Study, trials, surveys and waste analysis in households carried out	WP2	31.12.2024	Achieved	31.12.2024	N/A
Study and concept for trials at recycling centres finished	WP3	31.12.2024	Achieved	31.12.2024	N/A
Study, nudging trials, waste analysis and campaigns at schools carried out	WP4	31.12.2024	Achieved	31.12.2024	N/A
Further development and scaling-up of the Phase 1 results and a search for opportunities to apply for external funding	WP5	31.12.2025	On track	-	-

### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

RENO, the municipal waste management company for Skanderborg and Odder municipalities, is responsible for the activities in the action. The activities in C7.4 were divided into five work packages, with a primary focus on WP1-4 guiding the efforts and outcomes in Phase 1. The expected results have largely been achieved.

**Expected:** “The goal for activity WP2-4 is to reduce the total waste amount in the area of RENO by 1% each year in Phase 1: 2022-2024 with the total waste production of 78.000 tonnes in 2020 as a baseline.”

Results show a 1,8% annual reduction, with waste amounting to 71.376 tonnes) in 2024. Significant contributors include reduced combustible waste from recycling centres of 1015 tonnes and even larger amounts from residual waste collected from households in 2024 compared to baseline in 2020. A large amount of garden waste has also been collected in the total of 2.5 kilometres of brushwood fences – over 70 fences – that have been constructed using garden waste from schools and the local community.

Data is based on the amount of waste collected and delivered to the recycling stations and collected at households in the RENO area of operation. All waste fractions are weighed. Typically, the weighing is done by containers that have built-in weight sensors that register the waste. The data collected is reported to the Danish Environmental Protection Agency, aggregated and analyzed contributing to monitor the development in Denmark.

**Expected:** “CO<sub>2</sub> reductions (which will be monitored and quantified when the project starts).”

Brushwood fences sequestered approximately 2,500 tonnes of CO<sub>2</sub> in 2022-2023 by preventing the rapid decomposition of garden waste, which would otherwise release emissions through traditional composting.

**Expected:** “Documented behavioural change measured via new household waste patterns and at recycling centres.”

A reduction of almost 11,000 tonnes of waste between 2020-2024 reflects significant changes in waste habits. The campaign “More Nature – Less Waste” engaged 15,000 citizens, including 7,000 schoolchildren.

**Expected:** “25% of the citizens will follow and interact with their waste data made available to them via RENO’s platform.”

Efforts to make citizens’ individual waste data available began in Q3 2024, with results expected in 2025.

**Expected:** “All employees at recycling centres have received training to inform and engage in a dialogue on waste prevention with citizens.”

Twenty employees at recycling centres in Skanderborg and Odder have received training in waste prevention. A more comprehensive program for all employees is planned for 2025. Renos has been very active in order to build up a training programme fitting the needs of employees as a part of the overall educational training programs and platforms developed to give each employee 40 hours of training each year to acquire new skills. The essence of the training programme will be used as a part of the course offered by CEBW.

**Expected:** “A 10% yearly increase in direct reuse and a yearly 1% reduction in combustible waste.”

Reuse volumes increased by 18% to 746 tonnes from 2020-2024, averaging 3,6% annually, while combustible waste from recycling centres decreased from 2020-baseline by 20,6% to 3,9 tonnes in 2024, averaging approximately 4,1% annually.

**Expected:** “Children in all schools within RENO area receive targeted communication and small number of local schools will participate in a course on waste prevention.”

25 out of 27 schools established brushwood fences used for garden waste by both the schools and surrounding communities and a total of 7,000 students were engaged. You can view the location of all brushwood fences here: [kvashegn-kort-grafisk.pdf](#). RENO collaborated with selected schools in developing educational materials on waste prevention for all schools. The materials and insights from Renos has been used in other municipalities amongst others Skive.

### Communication

The action also produced several important communication outputs tied to activities and results in Phase 1.

#### *Activity: More Nature – Less Waste*

- Article, Circular Economy Beyond Waste, 29.03.2023: [Renosyd inspirerer Europa med kvashegn](#)
- News, Brancheforeningen Cirkulær, 24.05.2023: [renosyd-vinder-verdensmaalspris](#)
- Article, Danmarks Radio, 13.09.2023: [Affaldsselskab-deler-gratis-kvashegn-ud-og-reducerer-bunken-af-affald-paa](#)
- Article, Circular Economy Beyond Waste, 13.03.2024: [Danmarks højeste kvashegn - del af CEBW projekt](#)
- Evaluation of “More Nature – Less Waste” from Center for Borgerdialog (The Centre for Citizen dialogue) (Not financed through CEBW), april 2024: [Samskabelse-af-naturbaserede-af-faldsloesninger.pdf](#)
- Article, Ugebladet Skanderborg, Local newspaper in the Municipality of Skanderborg, 28.05.2024: [Ugebladet Skanderborg - Undervisningsmateriale](#)
- RENO’s homepage: [Kvashegn - renosyd](#)

#### *Activity: From Combustible to “Residual After Sorting”*

- RENO Facebook, 23.06.2022: [Opslag på Facebook om "rest efter sorterering"](#)
- Article, Ugebladet Skanderborg, 05.05.2023: [Lokalavis "rest efter sorterering"](#)
- Article, TV2 Østjylland, 27.04.2023: [TV Østjylland Slut med småt brændbart](#)

### **B. Evaluation**

This paragraph presents the progression, successes, and obstacles of the action.

The activities conducted have largely delivered the expected results, with steady progress throughout the action.

*More Nature – Less Waste (WP-2, WP-4):* Through “More Nature – Less Waste,” RENO achieved significant results in reducing garden waste and CO<sub>2</sub> emissions. The establishment of brushwood fences, in collaboration with communities and schools, not only decreased waste but also promoted local biodiversity by creating habitats for wildlife. The brushwood fences in Renos area are expected to accommodate 4,500m<sup>3</sup> of brushwood over the course of two years, and each cubic meter of the hedge can bind 400 kg of CO<sub>2</sub> (Source: Per Gundersen – Researcher in Forests, Nature, and Biomass

at the University of Copenhagen (KU). The fences under C7.4 are now 2500 meters long, and every year more materials are added to the existing fences.

This initiative marks a shift toward greater citizen engagement in waste prevention, fostering ownership and commitment to environmental efforts. Educational materials developed as part of the action engaged students in practical activities, helping them understand complex issues like resource scarcity and waste management.

*From Combustible to Residual After Sorting (WP-3):* In 2023, RENO restructured waste management at recycling centers by replacing “small and large combustible” fractions with “Residual After Sorting.” This aimed to prevent recyclable waste from being incinerated. Public awareness campaigns and targeted guidance by recycling staff significantly improved sorting. The campaigns have both taken place at the news site of Renos, at the facebook site and in the local newspapers, such as Midtjylland's Avis.

A pilot project at Ry Værdipark (a recycling station in the city of Ry named Ry Valuepark) was conducted in 2022 outside of LIFE IP in preparation for Action C7.4. It focused on quantitative and qualitative investigations of the waste fraction "Small Combustible Waste. The Pilot demonstrated that better guidance and targeted information could change citizens' behavior, paving the way for broader implementation.

*Repair Café Odder (WP-3):* The collaboration between RENO and Repair Café Odder promotes repair over disposal, reducing resource consumption and waste. The café, staffed by volunteers, operates in Værdicentralen's (a recycling station in the city of Skanderborg named The Value Central) facilities twice a month, helping citizens repair their belongings.

#### C. Targets and goals for Phase 2, 2025-2027

The main activities of this action have delivered strong results in Phase 1. In 2025, the focus will primarily be on WP-5: Development and Scaling. The aim is to build on the positive outcomes achieved so far and includes the following activities:

1. Development of methods to influence waste behavior (e.g., targeting additional waste types).
2. Development of technical solutions to support behavioral changes.
3. Expansion of the action to larger geographical areas in Denmark.

Activity 3 has already exceeded expectations, with the widespread implementation of brushwood fences through the "More Nature – Less Waste" initiative. Activities 1 and 2 will concentrate on developing a digital platform, enabling citizens to monitor their waste data and receive data-driven feedback to promote better sorting and waste reduction. This work began in 2024 and will continue into 2025, with the goal of 25% citizen engagement with the platform. RENO is also exploring options for external funding to support further development of the platform.

With the conclusion of Phase 1 in 2024, RENO will step back from its role as a facilitator for constructing new brushwood fences. However, the collaborative approaches developed will be further disseminated in subsequent phases of the CEBW initiative.

#### D. After Life

The activities carried out and the results achieved in Action C7.4 hold significant potential for further dissemination and replication, much of which has already been realized. This is particularly true for the co-creation model used in establishing brushwood fences, initiatives to reduce combustible waste

at recycling centers, and new partnerships with stakeholders such as the Repair Café, local citizens, and educational institutions.

### **Action C7.5: REuseLAB Bornholm - a scalable socio-economic model for local reuse and repair**

Beneficiary responsible for implementation: Bornholms Regionskommune (BRK)

Other beneficiaries participating: FGU Bornholm (FGUB), Aalborg University (AAU)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2025

#### **Purpose of action**

The purpose of the action is to test, demonstrate and scale a local organisational model and a joint reuse and repair platform. This will promote direct reuse and waste prevention as well as help young people with physical or mental needs to enter the education system and/or labour market. This is done by bringing together voluntary organisations, educational institutions and companies in a joint partnership, testing and adapting the model. In the following paragraph the activities and results from phase 1 are presented.

Due to the departure of partner Møbelfabrikken (MFB) from CE Beyond Waste, minor adjustments were made to the action description as part of Amendment No. 1.

#### **PM unit's (CDR) overall assessment of action**

This action has had a slow start due to several challenges such as the complex and dual nature of the goals (Read more under Challenges). However, the action has since gained momentum. It has become clear how much the success of this action depends on a well-functioning cross-organizational logistics system and the establishment of a seamless flow between the links in the chain. The PM unit assesses that the organizations involved in C7.5 have now established a stable setup and that BRK's recent hiring of a dedicated project manager, in particular, is expected to significantly accelerate progress in the activities.

With the time extension, we are confident that C7.5 will achieve its goal with a strong and well-tested model for reuse and repair that is suitable for replication.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C7.5 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C7.5</b>								
WP1								
WP2								
WP3								

WP4															
WP5															

### Explanation for timetable delays (if any)

The timetable delays are closely linked to delays in Deliverables and Milestones, as outlined in the section "Explanation for delays in Deliverables and Milestones (if any)" below.

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3 (cf. WP5).
<ol style="list-style-type: none"> <li>1. Establish the project group and a thematic working group under the IP Advisory Board (cf. C1) and devise project plans.</li> <li>2. Develop a communication plan (local, national), including a common narrative and selling points.</li> <li>3. Hold Kick-off workshop for the project group.</li> <li>4. Hold Kick-off workshop with emphasis on "the local green heroes" initiative and establish REuseLAB Bornholm as the focal point for the local reuse community.</li> <li>5. Hold Report to LIFE IP and support partners.</li> </ol>
WP 2: Mapping and analysis of needs for infrastructure development
<ol style="list-style-type: none"> <li>1. Map all relevant actors and create a recruitment basis for the repair shops.</li> <li>2. Identify product groups suitable for repair and reuse.</li> <li>3. Carry out Logistics analysis.</li> <li>4. Establish a system for registration and documentation that quantifies the environmental effects of the Affaldplus tool (FUTURE project) and make it available to producers/consumers.</li> </ol>
WP3 Prototype development and testing
<ol style="list-style-type: none"> <li>1. Training course for young people from FGU on reuse &amp; repair.</li> <li>2. Workshops with volunteers, local associations and citizens.</li> <li>3. Develop designs/prototypes at workshops involving designers and local artisans.</li> <li>4. Test the actual production of designs involving FGU students, volunteers and associations.</li> <li>5. On-going data registration of reusable effects and effect measurement (kilo reuse, assess CO2 footprint).</li> </ol>
WP4 Commercialization
<ol style="list-style-type: none"> <li>1. Sales and market analysis</li> <li>2. Establish cooperation between second-hand shops and voluntary organizations</li> </ol>
WP5 Replication
<ol style="list-style-type: none"> <li>1. Dissemination, tours and citizen &amp; tourist access to the "working workshop"</li> </ol>

<ol style="list-style-type: none"> <li>2. Map organisation models (socio-economic enterprises, public-private partnerships) assess business case, job creation and job creation</li> <li>3. Elaborate a local funding strategy and funding activities</li> <li>4. Develop a strategy/how-to-do guide on the scalability of the concept locally and nationally, involving the Advisory Board working group.</li> </ol>
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### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Overall note with product analysis, logistics analysis and player analysis	WP2	31.12.2024	Delayed	31.12.2025	-
Concept for teaching courses at FGU that create new products	WP3	31.12.2024	Delayed	31.12.2025	-
System for registering resources that are moved from waste to becoming a reusable product	WP3	31.12.2024	Delayed	31.12.2025	-
Model for the Danish version of Belgian De Kringwinkel	WP5	31.12.2024	Delayed	31.12.2025	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Start-up local recycling community and recruitment of volunteer partners	WP3	31.12.2024	Delayed	31.12.2025	-
Analyses completed, Development and commissioning of system/method for registration, Completed joint workshops and courses at FGU	WP2	31.12.2024	Delayed	31.12.2025	-
Establish collaboration with second-hand shops / create sales channels	WP4	31.12.2024	Delayed	31.12.2025	-
Decision on an organizational model	WP5	31.12.2024	Delayed	31.12.2025	-

### Explanation for delays in Deliverables and Milestones (if any)

Due to varying circumstances and obstacles the final results of the deliverables and milestones have had to be postponed.

*Deliverables:*

- *Overall note with product analysis, logistics analysis, and player analysis:* The early exit of a coordinating business partner, Møbelfabrikken, caused disruptions in logistics and partnerships. More time is required to restructure collaboration between BRK, FGUB, and AAU, and to collect comprehensive data on product flow and player involvement.
- *Concept for teaching courses at FGU:* Initial promising progress has been made by FGUB, but additional time is needed to fully incorporate educational components related to reuse and repair processes and integrate collaboration with other parties such as private company SA-Service.
- *System for registering resources that are moved from waste to becoming a reusable product:* AAU requires more time to conduct thorough research and testing of the system, particularly gathering data on product types, repairs, and CO<sub>2</sub> reductions.
- *Model for the Danish version of Belgian De Kringwinkel (thrift shops that put the environment and social employment center stage):* Delays in finalizing the Danish adaptation of the De Kringwinkel model due to further input required from local and national advisory boards. The development of the model further depends on integrating data from the registration system and AAU's extended research on the business model's socio-economic impact.

*Milestones:*

- *Start-up local recycling community and recruitment of volunteer partners:* More time is needed to establish a strong network of volunteer partners and ensure their engagement in reuse and repair activities.
- *Completed analyses, development of registration system, joint workshops:* AAU requires extended time to complete analyses and gather key data on repair processes and environmental impacts to finalize the system.
- *Establish collaboration with second-hand shops / create sales channels:* More time is required to build strong collaborations with second-hand shops and develop effective sales channels for the reused products.
- *Decision on organizational model:* The organizational model will be finalized after incorporating AAU's extended research on the reuse business model and its socio-economic impacts.

**A. Expected and achieved results**

The correlation between expected and achieved results

(The expected results have been abbreviated)

**Expected:** “Testing and demonstration of the local organizational model and platform for reuse and repair will reduce the amount of waste from the selected product areas through increased reuse and repair.”

To develop a local organizational model, we have decided to focus our efforts on reuse and repair of household appliances since Bornholm Municipality is an island with little means to transport these

appliances for reuse elsewhere. Therefore, this case is very appropriate for our context, but the model is not limited to only these types of items in terms of replication elsewhere.

The collection of appliances from residents takes place through a container placed at a centrally located recycling station and the students of FGU Bornholm inspect the incoming items.

BRK is collaborating with FGU Bornholm which is an educational institution that equips young people on Bornholm professionally, personally and socially to complete a youth education or get a good start in the labor market. Many of these students have had difficulties going through the traditional educational system and thus, they need and gain additional support at FGU.

A schema and documentation have been developed for the students to use when they review and repair household appliances. Afterwards, collaborations have been made with local businesses amongst other SA-Service in Nexø that buy and review the work of the students and make additional necessary repairs before the appliance can be resold and reused.

Ongoing work focuses on identifying the most relevant data typologies related to the repair of household appliances as well as knowledge about the division of repair tasks between the young people at FGU and the small businesses that will carry out more advanced repairs.

While the development of a business model has been initiated, it is not yet completed.

The goal of establishing a local demonstration model that incorporates a social approach, an educational aspect, resource-saving measures, and opportunities for small businesses has mostly been achieved. The organizational model will be further developed in phase 2.



Special containers set up for collecting household appliances to be repaired at FGU.

**Expected:** “It is expected that C7.5 will help 15 young people from Bornholm municipality into the educational system and job market [...] and serve as a source of inspiration for the green transition of Bornholm [...]. C7.5 will thus contribute to reaching the Life IP aim of increasing the awareness of the benefits of circular consumption by 70%.”

From FGU Bornholm, around 20 young people have been involved in the action. Educational materials have been developed for repair processes, including content on sustainability, global resources, and energy labeling. Additionally, there are estimates of the resource savings achieved when a product is repaired, for instance a washing machine contains approximately 72 kilogram of different materials, and you save 227 kilogram of CO<sub>2</sub> on each machine when repaired and also resources etc. The estimates are based on data from EPA, Aalborg University Copenhagen and Circular, an interest organization for Danish recycling companies. The educational material was developed in collaboration between FGU Bornholm, the appliance company SA-Service, and BOFA, Bornholm's waste management company (part of BRK).

Beyond the environmental goals, it is essential to build the young people's self-esteem and skill sets in order to improve their chances of future employment.

**Expected:** *"With an expectation that the model with concept tools can be replicated nationally, in the longer run, C7.5 can increase reuse and repair of the selected product areas as well as boost employment among vulnerable young people. It is expected that 5-7 municipalities will replicate C7.5."*

The above expectation is linked to results that will not be present until later stages of the action. However, an Advisory Board has been established with the aim of raising awareness of the environmental benefits of extending product lifetimes, especially in terms of CO<sub>2</sub> emissions. The board includes the relevant stakeholders necessary to deliver a business model that is sustainable both on Bornholm and scalable across other municipalities in Denmark. The board held its first meeting in the fall of 2023 and received strong support for the action.

In addition to scaling the model to other municipalities, there is also interest in expanding it within the FGU network and among local businesses and actors in the waste sector.

#### Communication

The action has gained visibility in the media with coverage highlighting the efforts to repair household appliances and the educational opportunities provided to young people on Bornholm. Links to relevant articles:

- <https://pro.ing.dk/wastetech/artikel/containerpremiere-paa-bornholm-haarde-hvidevarer-skal-hjaelpe-unge-til-uddannelse>
- <https://tv2bornholm.dk/artikel/hos-bofa-faar-haarde-hvidevarer-lov-at-leve-videre>
- <https://tidende.dk/miljoe/samarbejde-skal-give-brugte-hvidevarer-nyt-liv/141794>

#### **B. Evaluation**

In evaluating the activities carried out in phase 1 several successes and key learning points have emerged.

#### Progress, results, successes and learnings

Despite some challenges the action has progressed and gained valuable insights.

BRK has hired a project manager, which has strengthened the leadership and coordination aspects of the action during the later stages. The educational courses and materials have been successfully developed, providing young participants with valuable skills and hands-on experience, fostering a sense of accomplishment.

Moreover, a logistics system has been established, and SA-Service in Nexø has been engaged to support the repair process. These achievements set a solid foundation for the action's continuation and expansion.

Establishing an action across organizations that are not used to collaborating has proven to be challenging and requires new approaches to cooperation, leadership, and organization. Building strong relationships between diverse partners, including waste management companies, educational institutions, and small businesses, takes time and careful coordination.

### Challenges

One of the main challenges has been the need to develop cross-organizational logistics systems between the Regional Municipality of Bornholm (BRK) through its waste company BOFA, the educational institution FGU Bornholm, and local businesses. Additionally, there has been the need for agreement on the criteria that determine whether a product should be repaired to extend its life or be recycled.

The dual purpose of the action - extending the lifespan of products through repair and providing opportunities for young people facing challenges—has added complexity to the action

In the early stages, there was some turbulence due to the exit of a smaller partner, Møbelfabrikken (MFB), which was originally intended to play a coordinating role with the businesses involved. As a result, the original task distribution had to be reconsidered, with FGU Bornholm assuming a greater role in connecting with businesses and taking responsibility for approving the students' work. FGU also had to provide the facilities and tools for the repair activities undertaken by the young people.

### **C. Targets and Goals for Phase 2 (2025-2027)**

In Phase 2, the focus will be on strengthening the connections between the actors in the value chain to ensure that their individual activities contribute to a coherent, integrated system.

Additionally, we aim to enhance the linkage between practical actions and methodological development across different levels (horizontally). The new project leadership, Advisory Board, and [De Grønne Helte](#) (A youth-oriented project aimed at securing labour for the green transition) will support these efforts to ensure successful implementation. The aim is also to present the model to the federation of FGU's in DK.

### **D. After Life**

The initiatives from this action are expected to continue within BRK/BOFA and among the network of partners on Bornholm. The established repair and reuse processes, along with the educational components at FGU Bornholm, are likely to be maintained and further integrated into local sustainability efforts. Additionally, there is potential for expanding these practices to other regions and sectors.

### 6.3.3 Waste recycling pillar

The recycling pillar contributes to O2 and O3 of CE Beyond Waste and consists of 10 actions within different technical areas of expertise. The actions in the pillar contributes by demonstrating, implementing and upscaling means for high-value and closed-loop recycling of textile flows from households and the public sector (C8), developing and testing the use of circular procurement to recycle household plastics in closed resource loops (C9), developing a best-practice model to support circular construction and demolition through public-private partnerships (C10.1), developing an IT-based material screening tool for construction materials that combines expert knowledge with practical contractor insights (C10.2), developing and demonstrating a replicable material flow solution for food cartons, targeting both collection, preparation for recycling and reuse of materials in new products (C11), examining and testing ways of increasing reuse of electronic and electrical equipment through user engagement, collection, assessment, sorting, storage, safe-keeping, logistics and management, as well as through designing a regulatory framework conducive to more reuse (C12), improving management of residual biomass streams to develop resources for agricultural purposes (C13), developing a generic model for upcycling commercial waste through facilitating symbiotic collaborations between handlers of business waste and producers of building materials (C14.1), making use of industrial waste in a partnership with entrepreneurs and knowledge institutions, paving the way for new CEBMs and start-ups (C14.2) and by providing businesses and municipalities with the competences, knowledge, and concrete tools to support the implementation of circular practices in businesses (C14.3).

Since the recycling pillar stretches so widely across technical areas, it is challenging to sum up the overall progress across the pillar. Half of the actions are progressing well and are reaching the expected deliverables and milestones (C8, C10.2, C13, C14.1, C14.3) and the other half are experiencing different challenges that have delayed their work and activities (C9, C10.1, C11, C12, C14.2). The challenges are explained and considered in depth in the corresponding sections for the actions. Despite facing challenges, the recycling pillar is progressing within the possible scope and delayed actions expect to meet the new proposed deadlines.

Actions C9, C11 and C12 are working with particularly challenging areas such as household plastics (C9), food packaging (C11) and electronic and electrical equipment (C12). However, they have engaged in preparatory activities such as conducting relevant analyses (C9, C11) and mobilizing and engaging relevant stakeholders (C9, C11, C12).

Action C8 and C13 have achieved the expected results with C8 analyzing, developing and testing textile designs for future procurement tenders and C13 engaging stakeholders through market dialogue, developing preliminary models and demonstrating different techniques for residual biomass streams.

In terms of recycling of construction materials and components C10 has had good results. Even though C10.1 has experienced challenges, they have created a viable, hands-on guide to more circularity in the build environment with input from stakeholders across the value-chain. Also, C10.2 have created the three main components (BRK Data Sheet, CO<sub>2</sub> Calculator and Circular Processes in Construction – Example Collection) of a Circular Materials Depeche tool that describes qualities, embedded CO<sub>2</sub>, as well as options for dismantling, intermediate storage and recycling construction materials.

Finally, the part of the recycling pillar that focusses on supporting and being a driving force of circularity in cooperations and businesses (C14) is doing well, even though C14.2 has not been able meet all the proposed deadlines. The C14 actions have targeted both existing and new potential businesses.

Action C14.3 has developed three hands-on tools to support the circular transition of existing businesses which are being tested and implemented by municipality professionals in close dialogue with cooperations. Action C14.1 and C14.2 are aiming to create and sustain new circular business models. So far, 5 prototypes for new IRC business cases have been created (C14.1) as well as a process model and course called ReVolver designed to support innovative and circular entrepreneurship (C14.2). Also, action C14.2 has also been instrumental in the creation of a physical location, Slagteriet, where entrepreneurs can work, innovate and collaborate on ideas and business models.

A key learning across most actions in the pillar has been the need to move the waste even higher in the waste hierarchy to reuse or repair rather than merely attempting to recycle components and materials. This, of course, creates new challenges but also opportunities for innovation and collaboration. The next step for the pillar is to pursue these insights and do further testing, development and implementation of their tools, models and processes.

### **Action C8: High-value recycling of non-reusable textiles from the public sector and households**

Beneficiary responsible for implementation: Gate21 (GATE21)

Other beneficiaries participating: The capital Region of Denmark (CR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2026

#### **Purpose of action**

The purpose of the action is to demonstrate, implement and upscale means for high-value and closed-loop recycling of textile flows from households and the public sector. The aim is to move consumption of textiles higher up in the waste hierarchy from the straight to the incineration plant to a more circular utilization. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

The PM unit finds the work and results very promising. What started with the goals of avoiding incineration of textile and more high value recycling, as mentioned above, transformed to an initiative that also addressing how to prevent waste. Throughout, the action has effectively structured tests and achieved actionable outcomes through test design with three pilot projects, that have examined lifespan and user comfort. The results have then been transformed these to recommendations for procurement, that in a concrete way makes it easier for both public and private buyers.

The pilots have involved a wide range of collaborators from both the public and the private sector which makes the outcome tested and viable. The results will be used beyond the Health Care System of Capital Region of Denmark, due to an ambitious cooperation between procurement departments from all regions in Denmark, and the connection to the European [Health Care Without Harm](#).

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C8 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C8</b>								
<b>WP1</b>								
<b>WP2</b>								
<b>WP3</b>								

#### **Explanation for timetable delays (if any)**

n/a

<b>WP1 Management, communication, monitoring, replication</b>					
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.					
<ol style="list-style-type: none"> <li>1. Manage partner meetings.</li> <li>2. Communication, communication plan and internal and external communication.</li> <li>3. Stakeholder meetings/labs.</li> <li>4. Reporting to LIFE IP and assistance to partners.</li> <li>5. Setting up appropriate monitoring indicators to monitor the impact of the project.</li> </ol>					
<b>WP2 Kick-off, involvement of stakeholders and best-practice case study</b>					
<ol style="list-style-type: none"> <li>1. Develop project plans (activities, responsibilities, deadlines)</li> <li>2. Benchmarking of best practices in circular textile interventions showcasing best practice cases in the value chain, i.e., circular procurement/design, collection, sorting and high-value recycling of textile waste from the public sector and households (desk research, interviews with stakeholders).</li> <li>3. Kick-off workshops for partners and stakeholders (qualifying best practices).</li> </ol>					
<b>WP3 Scaling via public procurement</b>					
<ol style="list-style-type: none"> <li>1. Analyse the potential and develop the framework for innovation procurement and public-private innovation partnerships within textile procurement (case studies and interviews).</li> <li>2. Develop procurement criteria for improved closed-loop recycled fibers, remade textiles, waste handling and high-value recycling (end of life).</li> <li>3. Conduct a market dialogue with suppliers focusing on the next step for closing the loops of textiles.</li> <li>4. Carry out pilot projects in high-value recycling, including testing and demonstrating new remade solutions and fibre-to-fibre recycled textiles 1:1 at hospital and industry laundry and test different business cases for innovative tenders/contracts that will ensure an improvement in recyclability and longevity.</li> <li>5. Carry out study trips and network meetings for procurers and stakeholders visiting state-of-the-art sorting and recycling technologies in neighboring countries and DK with a focus on improved matching between waste handling and the existing sorting and recycling technologies.</li> </ol>					

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Best practice Case study on circular textile interventions	WP2	31.12.2022	Completed	31.12.2022	YES

Report from the pilot projects on fiber-to-fiber recycling (focusing on business cases, organization, logistics, environmental impact and scaling potential)	WP3	30.04.2025	On track	-	-
Procurement criteria for end-of-life handling of public textiles	WP3	30.04.2025	On track	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Pilot projects selected	WP2	30.06.2022	Achieved	30.06.2022	N/A
First network meeting in the procurer network held	WP3	31.12.2022	Achieved	31.12.2022	N/A
Pilot projects selected	WP3	31.12.2022	Achieved	31.12.2022	N/A

#### Explanation for delays in Deliverables and Milestones (if any)

N/A

##### A. Expected and achieved results

###### The correlation between expected and achieved results

**Expected:** “C8 will showcase and implement measures for moving textile (waste) management further up in the waste hierarchy, from incineration to recycling and from low-value recycling to high-value recycling.”

We expected to showcase and implement measures for moving textile (waste) management further up in the waste hierarchy, from incineration to recycling and from low-value recycling to high-value recycling. But during phase 1, the action has evolved from a narrow focus on high-value recycling to a holistic approach encompassing the entire waste hierarchy, including circular utilization through prevention, extended lifespan, reuse, and recycling.

This development is based on early analyses which reveal that the most significant environmental gains stem from reducing procurement (e.g., through consolidating assortments) and extending textile lifespan (e.g., repair procedures and lowering discard thresholds). Furthermore, preliminary market dialogue revealed that, instead of (only) supplying the textile market with additional fabrics for recycling, a much more effective approach would be to also demand products made of recycled material in a daily hospital operation. This means achieving circularity, where 1) textiles remain in the loop until fully utilized, minimizing the necessity for recycling into new textiles, and 2) managing the large amounts of textile waste that could re-enter the loop through increased demand for recycled fibers.

It has been a very crucial part of the action, and the primary project organization, that members of the group were anchored at the Department of Green and Innovative Procurement or the Unit for Climate and Environment, and the work done could be a part of Grøn2030, which is a sustainability program for all hospitals in the Copenhagen area/CR to be found here: <https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/groen-omstilling-af-hospitalerne/groen2030-hvad-er-det/Sider/default.aspx/> [Capital Region of Denmark takes a big step forward to a greener future](https://www.regionh.dk/til-fagfolk/Klima-og-miljoe/groen-omstilling-af-hospitalerne/groen2030-hvad-er-det/Sider/default.aspx/) The anchoring has given easy access to tests and implementation of results.

Based on the analyses and findings, two key initiatives were developed and implemented in CR:

1. *Development and execution of test designs:* These provide a solid foundation for substituting textiles with more environmentally friendly alternatives and selecting measures for circular utilization. Three pilot projects examined alternative textiles for environmental impacts, technical durability, and user comfort, complemented by studies of their actual lifespan.

These are:

- Greener Fabrics: Evaluating the environmental impact of alternate and circular fabrics as well as their durability and drying times.
- Extended Lifespan: Measuring the actual service life of textiles and identifying factors influencing early disposal.
- Comfortable Selection: Engaging users through surveys and interviews to assess daily wearability and comfort.

Pilot projects that tested these designs have been completed.

2. *Implementation of results via procurement requirements and improvements to infrastructure:* Recommendations for future procurements and logistics aim to anchor circular consumption practices within the CR and influence other public and private buyers.

An overview of the key results:

- Environmental Impact: The recycled and circular fabrics tested can reduce CO<sub>2</sub> emissions and water consumption compared to conventional cotton or cotton-polyester blends.
- Durability: Textile lifespan is a critical factor in reducing environmental impact. Lyocell-polyester blends and some of the polyester fabrics demonstrated higher durability during laboratory and field tests.
- User-Centric Design: Incorporating user feedback into textile design, such as ergonomic adjustments and better sizing options, was essential to balancing sustainability with staff comfort and functionality. The findings emphasize the importance of a holistic approach that integrates greener materials, extended product lifespans, and user-driven design improvements. By implementing these strategies, the Capital Region can reduce textile-related emissions, promote circularity, and achieve its sustainability objectives while ensuring quality and satisfaction in hospital operations.

**Expected:** “The pilot projects and the circular procurement are expected to lead to a 50% CO<sub>2</sub>- reduction from textiles in CR’s public textile flow.”

Test results and recommendations for green procurement requirements have been presented to decision-makers in CR. The region plans to implement these requirements in upcoming tenders, starting in Phase 2, with a target of reducing total CO<sub>2</sub> emissions from textile procurement by 50%. The actual impact will be assessed in Phase 2.

**Expected:** “The pilot projects are expected to be scaled via the network among procurers.”

Activities and preliminary results from the pilot projects have been disseminated through procurement networks. Final test results and recommendations will be published at the beginning of Phase 2, creating opportunities for more procurers to adopt ambitious green requirements in future tenders.

**Expected:** “C8 aims to ensure that at least 30 businesses, 40 municipalities and 2 regions are frontrunners in demonstrating how to roll out CE in practice.”

Test results and identified green procurement requirements have been shared via online meetings, network gatherings, and webinars, engaging 37 businesses, 15 municipalities, and 4 regions. This has laid the foundation for more procurers to become green frontrunners, though the full impact will emerge later. Knowledge sharing and scaling efforts will continue into Phase 2.

### Communication

The action has also produced several communication outputs linked to activities and results in Phase 1. Learn more here:

- CR's website: [Circular Economy Beyond Waste](#)
- Gate 21's website: [CEBW Project](#)
- June 6, 2023: [Network Meeting on Future Circular Textile Procurement](#)
- March 27, 2024: [LinkedIn Post](#)
- October 9, 2024: [LinkedIn Post](#)

### **B. Evaluation**

This paragraph presents the progression, successes, and obstacles of the action.

Successes:

- Adoption of a 50% CO<sub>2</sub> reduction target for textile and workwear procurement in CR's upcoming tenders.
- Creation of a data-driven foundation for selecting greener textiles, which has been integrated into procurement decision-making alongside price and delivery reliability.
- Testing of 21 uniform components and over 4,000 garments with 300 employees across 21 hospital departments in the CR.
- Collaboration with the regional laundry to map actual textile lifespans and identify further reduction opportunities.
- Implementation of scanning technology at the regional laundry to extend textile lifespan and improve employee working conditions.
- Development of a report detailing the pilot project process and test results to support scaling and dissemination.
- Integration of learnings and procurement requirements into existing networks of procurers.

Learnings:

- The greatest environmental impact comes from reducing procurement itself and extending textile lifespan. Prompting this shift from focusing solely on high-value recycling to exploring the full potential of the waste hierarchy.

While we have achieved great results our work has not been without challenges:

- Textile-related work is complex, with many influencing factors, requiring substantial effort to derive actionable results.
- Supply chain reliability, environmental impact, and technical durability remain barriers to adopting recycled fibers.
- Tests and insights from this action are valuable to other public procurers unable to initiate similar projects independently.

### C. Targets and Goals for Phase 2, 2025-2027

The action's Phase 2 objectives include:

1. Publication of tenders in CR which incorporate green procurement requirements.
2. Publication of pilot project reports and recommendations for greener procurement strategies targeting other buyers.
3. Ongoing dissemination of results and scaling efforts, focusing on waste reduction and extending textile lifespan through internal and external networks and communication platforms.

### D. After Life

The initiatives will continue through:

- CR's efforts to adopt greener textiles and implement/monitor the impact of lifespan-extending initiatives.
- Gate 21's work to scale test results, methods, and green procurement strategies via value chain collaborations, network activities, and new projects.
- Dissemination of results and learnings to a broader audience to accelerate market transformation

### **Action C9: Maturing the Circular Economy Market for Plastics**

Beneficiary responsible for implementation: Randers Kommune (RK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2023

Actual/anticipated end date for action specific activities 31.12.2027

#### **Purpose of action**

The purpose of the action is to develop and test the use of circular procurement to recycle household plastics in closed resource loops and to develop industrial symbioses between a number of companies. Focus is to draw up calls for tenders to be used in procurement and to develop business models and sustainable supply chains.

Due to changes in national legislation that has hindered the implementation of the original action C9, PX, QL, TK, MK, VK withdrew as partners from the action. C9 was redefined, and Randers Kommune (RK) continued as sole partner and action lead. (Amendment no1).

In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

C9 is, alongside C6.1, the action in CE beyond Waste that focuses solemnly on plastic. Plastic is an extremely challenging material to recycle, as it requires a large volume, high quality, and supply chain reliability. Therefore, C9 is a highly ambitious action as it also aims to develop viable business models in closed, local loops. As it will be explained further down, developing circular business models on plastic has been challenging due to problems with sourcing sufficient quantities of uniform plastic. Related to this, the PM unit views it positively that efforts are being directed towards obtaining more plastic sources from a broader range of businesses.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C9 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C9</b>								
WP1								
WP2								
WP3								
WP4								
WP5								
WP6								

WP7															
WP8															

### Explanation for timetable delays (if any)

When initially planning the new action, the Project Management Team of C9 were somewhat optimistic about the timeline and underestimated the process of working on and approving Amendment No. 1, which has contributed to the delays. Additionally, the delays were exacerbated by challenges in engaging businesses and difficulties in identifying which plastic fractions to focus on.

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
WP2 Possible closed resource loops
<ul style="list-style-type: none"> <li>Interested companies (including the Plastic Forum in Randers) participate in an innovative development process to identify the opportunities for the reuse and/or recycling of plastic waste delivered by the citizens at the local recycling centres. Between three and five meetings are held with the invited companies. The input from the companies on expected potential for reuse / recycling is used to select the most relevant plastic fractions. Ten fractions are expected to be selected.</li> <li>There will be a focus on the Identification of opportunities for reuse and/or recycling that support the development of closed resource loops with a low climate impact.</li> <li>Identification of key plastic waste fractions with a high potential for reuse/recycling.</li> <li>Identification of relevant circular economy concepts.</li> <li>Analysis of potentials for closed resource loop reuse or recycling of key plastic fractions in the marked including the potential in introduction of socioeconomic companies in the supply chain.</li> </ul>
Development of the criteria to be used in the procurement.
WP3 Call for tender
<ul style="list-style-type: none"> <li>Based on the identified closed resource loops / circular reuse Randers municipality and the Waste company will develop calls for tenders with criteria needed to promote closed resource loops of at least five different outdated plastic products/waste fractions delivered at the recycling centres.</li> <li>The criteria will include the concept, needed stakeholders and preconditions for the resource loops to be implemented including amount of resource needed, design of supply chain, need for storage capacity and needed marketplace.</li> <li>The invited companies from work package 2 are asked to evaluate the criteria and their input are used to draw up the final criteria for the call for tenders. The identified criteria will be divided into demands and award criteria to mature the market.</li> </ul>
WP4 Implementation and recommendations
<ul style="list-style-type: none"> <li>Five calls for tenders are implemented and based on the outcome of these calls the recommendations are presented to the partnership in Circular Economy Beyond Waste, local governments and the CCRI- fellowship, Central Denmark Region is a part of.</li> <li>Final recommendations to local governments on innovative public procurement of household plastic waste are drawn up and presented at minimum 2 European wide conferences.</li> </ul>

WP5 Identification of plastic waste generating companies
<ul style="list-style-type: none"> <li>Identification of plastic waste generated at 40 companies generating sizable amount of waste and mapping of the existing waste management system and the disposal of the plastic waste. The identification and mapping will be based on the existing knowledge of the companies in the environmental department. Between two and four meetings are held with the invited companies.</li> <li>A special focus will be put on building and construction companies, where the potential for reuse/recycling of plastic waste is found to be significant (Documented at environmental inspections and projects run by "WE BUILD DENMARK") as well as shops.</li> </ul>
WP6 Possible closed resource loops
<ul style="list-style-type: none"> <li>The Identification of opportunities for reuse and/or recycling that support the development of closed resource loops with a low climate impact.</li> <li>Identification of key plastic waste fractions with a high potential for reuse/recycling.</li> <li>Identification of relevant circular economy concepts.</li> <li>Analysis of potentials for closed resource loop of key plastic fractions among the participating companies including the potential in the introduction of socioeconomic companies in the supply chain.</li> <li>Identification of at least ten potential resource loops with a low climate impact between the plastic processing companies and the plastic waste generating companies promoting industrial symbiosis.</li> <li>The potential resource loops identified includes the circular economy concept, needed stakeholders and preconditions for the resource loops to be implemented including amount of resource needed, need for storage capacity, design of supply chain and needed marketplace.</li> </ul>
WP7 Implementation of sustainable business plans
<ul style="list-style-type: none"> <li>At least five different plastic waste fractions delivered by the waste generating companies will be included in the sustainable business plans.</li> <li>The invited companies from work package 2 are asked to participate in SWOT analysis of the identified sustainable business plans in relation to a broader marked entrance</li> <li>Their inputs are used to draw up the final business plans together with the companies involved ensuring industrial symbiosis reusing/recycling plastic between companies.</li> <li>Then the five sustainable business plans are developed and implementation has begun by the companies based on the identified potential resource loops.</li> <li>Recommendations to local governments on how to promote the development of business plans for industrial symbiosis are drawn up and presented at minimum 2 European wide conferences linking the recommendations to the Packaging directive.</li> </ul>
WP8 Integration in the business promotion activities and the procurement of the waste company
<ul style="list-style-type: none"> <li>Based on the obtained experiences from the 2 main activities the results will be integrated into the ongoing Climate service offered to all companies situated in the municipality of Randers as well as future procurement processes of the Waste company.</li> <li>The results will be documented in relation to the success in promoting the fulfilment of the EU packaging directive.</li> </ul>

## Deliverables and Milestones



Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Five calls for tenders	WP4	01.12.2024	Delayed	01.12.2025	-
Recommendation report to local governments on innovative public procurement promoting circular economy and closed resource loops.	WP4	01.05.2025	Delayed	01.01.2026	-
Ten potential resource loops with a low climate impact between the plastic processing companies and the plastic waste generating companies are identified.	WP2	30.09.2024	Delayed	01.11.2025	-
Five sustainable business plans are developed, and the implementation has begun by the companies based on the identified potential resource loops.	WP7	01.06.2025	Delayed	01.09.2025	-
Recommendations to local governments on how to promote the development of business plans for industrial symbiosis (urban mining) are drawn up and presented at minimum 2 European wide conferences linking the recommendations to the Packaging directive.	WP7	01.06.2025	Delayed	01.01.2026	-
Five new business plans for new resource loops are developed	WP7	31.12.2024	Delayed	01.01.2026	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
First call for tender	WP3	01.06.2024	Delayed	01.06.2025	-
Final offer from company received related to the last call for tender (nr. 5)	WP4	01.03.2025	Delayed	01.12.2025	-
Mapping of potential waste generating companies	WP5	01.09.2023	Achieved	01.06.2024	-

Five different outdated plastic fractions are identified as a new resource	WP6	01.12.2023	Achieved	01.09.2024	-
Ten different potential resource loops are identified and described	WP6	01.09.2024	Delayed	01.11.2025	-

### Explanation for delays in Deliverables and Milestones (if any)

The explanations for delays in Deliverables and Milestones are similar to those under the Timetable.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “Recommendations for waste companies and local governments on how to use innovative public procurement to promote circular closed resource loops as well as how to promote industrial symbiosis of plastic / urban mining of plastic as an integrated part of their business development activities.”

Recommendations for waste companies and authorities regarding innovative procurement and industrial symbiosis are not yet finalized, as we are still gathering insights and experience. Through funding from action A2 (and a Deliverable under A2), Randers Municipality has conducted a mapping of the material flow of plastic waste from businesses in the Central Denmark Region. The analysis, made by external consultancy company COWI, aimed to provide a credible basis for a subsequent investigation into potential local closed loops based on residual plastic or waste plastic from companies in the Central Jutland Region.

The purpose of the analysis was to identify sources of plastic waste that would be relevant as secondary plastic raw materials for businesses in the Plastforum Randers, in connection with identifying closed local loops in Randers and the Central Denmark Region. COWI contacted 78 plastic-generating companies in the Central Denmark Region, but only 21 participated. Many businesses lacked awareness of their plastic waste or were unwilling to join initiatives to reduce waste. While the analysis did not yield the desired results, the available data is being matched with company requirements to identify further potential collaborations. Additional plastic sources from other businesses are also being sought.

**Expected:** “Five calls for tenders are implemented.”

We are on track to develop potential tenders for implementation. The tenders will be launched once closed resource loops have been identified, and business models have been tested. In collaboration with the participating companies, RK will develop tender materials with the necessary criteria to promote at least five plastic fractions of particular value to businesses and suitable for inclusion in the closed loops established during the action. Fractions under consideration are: Jugs, crates, pipes, buckets/containers, wheel covers, flower pots, and plastic pallets.

**Expected:** “10 to 15 companies are participating in a dialog to develop closed resource loops in which their products and production residues are included.”

17 companies have been engaged so far, including plastic waste generators, recyclers, and manufacturers incorporating recycled plastics into production. The engaged companies are for example Berry Superfos, PharmaTech and Hornbæk Plastindustri (plastic waste generators) and Dansk Affaldsminimering, Makeen Energy and Redivivus Polymers (recyclers).

The companies are participating in an innovative process focused on creating circular value chains to increase the use of recycled plastics. Both group meetings and individual consultations have been conducted. This process is expected to lead to the identification of 10 potential resource loops, five of which are anticipated to result in concrete business models.

**Expected:** *“Five new sustainable and circular business models are developed and implementation has begun as well as new and secure sustainable supply chains.”*

In order to establish five business models, we conducted interviews with the engaged companies that could potentially use recycled plastics in production. These interviews gathered input regarding their requirements for types, quantities, forms, and purity of plastics. Concurrently, the types and volumes of plastic waste from participating production companies and municipal recycling centres in the Central Denmark Region were mapped. The findings are visualized using the model below (Figure 1), allowing us and the companies to identify and develop potential loops. However, due to insufficient volumes of waste plastics, finalizing circular business models remains very difficult and therefore, we’re haven’t been able to achieve these yet.

**Figure 1: Resource Loop Visualization Model**

*Translation, from top:*

Which products? What can we set in motion?

Deliver plastic to the recycling terminal; residual products and "waste" - Products from businesses are collected.

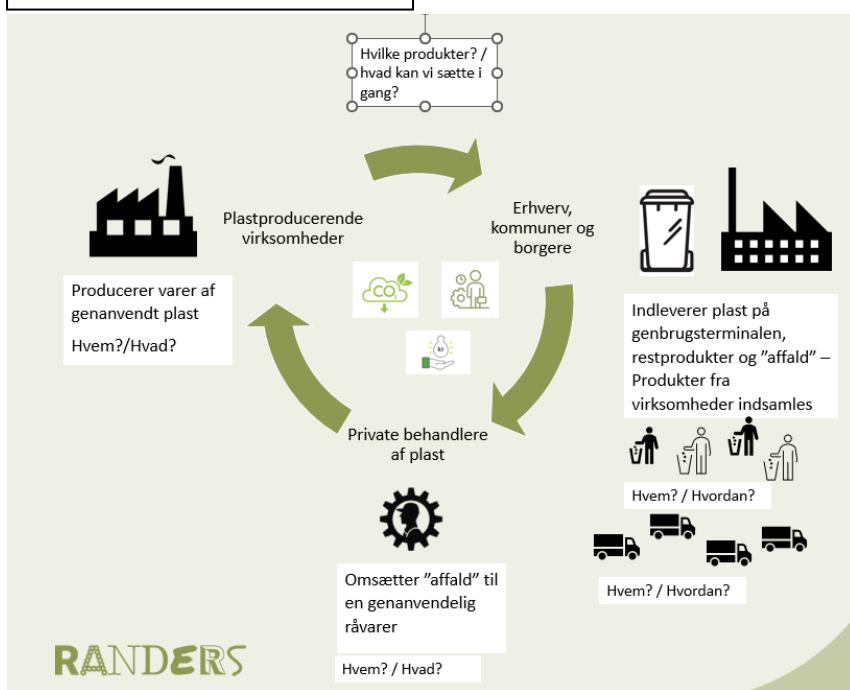
Who? How?

Converts "waste" into a recyclable raw material. Who/What?

Produces goods from recycled plastic. Who?/What?

*Inner circle:*  
Business, municipalities and citizens

Private processors of plastic



*The model has been applied in collaboration with companies.*

Work on establishing circular business models is ongoing but not yet finalized. Currently, 9–10 potential loops have been identified, with specific plastic fractions (e.g., containers, crates, buckets) sourced from agriculture, plant nurseries, and cemeteries.

RK has initiated an internal collaboration to explore the establishment of a social enterprise responsible for collecting and managing plastics from generating businesses.

## B. Evaluation

This section evaluates the progress, successes, and challenges of the action.

#### Progress, Results, Successes, and Lessons Learned

Good progress has been made, despite challenges that have affected some of the expected outcomes for Phase 1.

Efforts have focused on building trust among companies to foster collaboration, including organizing multiple meetings and establishing clear ground rules for future partnerships.

#### Challenges

General Challenges in Plastic Recycling:

- Three key barriers in plastic recycling are volume, quality, and supply chain reliability.
- Companies identified additional obstacles, such as regulatory constraints, supply chain uncertainties, and a lack of trust between businesses.

Plastic Volumes and Collaboration with Waste-Generating Companies:

- The limited volume of plastics from participating companies and municipal recycling centers necessitated the analysis done by COWI (mentioned under expected results and a Deliverable under A2). COWI an international consultancy company) contacted 78 plastic-generating companies in the Central Denmark Region, and only 21 participated. Combined with the fact that many businesses lacked awareness of their plastic waste or were unwilling to join initiatives to reduce waste, this dependency on willing contributors poses a challenge for the action.
- While the analysis did not yield the desired results, the available data is being matched with company requirements to identify further potential collaborations. Additional plastic sources from other businesses are also being sought.
- Some companies expressed interest in the action but raised concerns about strict rules and standards for purity and traceability for plastics used in food and pharmaceutical industries.

Innovative Business Models:

- No existing business models currently support the collection of small, clean plastic quantities. The project team is working on developing sustainable business models for such cases, potentially by establishing local collection points to consolidate volumes.

#### **C. Targets and Goals for Phase 2, 2025–2027**

In Phase 2, we will further develop circular loops with participating companies and create tailored business plans for each actor.

RK will launch five tenders and formulate recommendations for waste companies and local authorities on how innovative public procurement can promote circular resource loops. These recommendations will also include strategies for fostering industrial symbiosis and urban mining of plastics as part of their business development.

#### **D. After Life**

Knowledge and results from the action are expected to be sustained by participating companies. Additionally, RK plans to explore resource loops for materials other than plastics, such as wood, metals, or similar, after the action concludes.



### **ACTION C10: Construction and Demolition**

C10 contributes to O1 and O2 of CE Beyond Waste by developing a best-practice model to support circular construction and demolition through public-private partnerships (C10.1), and by testing the feasibility of a Material Depeche digital tool for material screening integrated with a digital platform (C10.2). The actions focus on transforming construction and demolition waste into secondary resources for reuse or recycling. They are closely linked in developing and demonstrating instruments which will make it possible to identify valuable resources (materials and components) in existing buildings, aid the correct separation and treatment of the materials and components on-site and addressing the legal barriers which the PPPs are facing when they want to take on circular demolition or construction.

C10 serves the APCE with particular attention to CH1 Section 1.1 Visions, targets and indicators; CH3 Section 3.3 Resource efficient businesses; CH4 More and better recycling; and CH6 Section 6.1 Material consumption in the construction industry, Section 6.2 Building design and construction, Section 6.3 Renovation and maintenance of the building stock and Section 6.4 Better management of construction waste.

C10 demonstrates European added value by contributing to WFD, CEAP and to the EURW strategy, as the actors seek to decarbonise the building sector as well as to promote circularity in construction/demolition. Furthermore, the action effectively supports the objectives of the European Innovation Partnership on Raw Materials.

### **Action C10.1: From waste to value – towards a model for municipal involvement in circular construction**

Beneficiary responsible for implementation: Horsens Kommune (HOK)

Other beneficiaries participating: Silkeborg Kommune (SIK), Silkeborg Genbrug og Affald (SIGA), Aarhus Kommune (AK).

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of Action C10.1 is to promote circular construction in the participating municipalities by increasing the reuse of building materials and strengthening collaboration between the municipality and the business sector. This is achieved through the creation of circular networks, testing of physical prototypes, and adjustment of municipal procedures to support the circular economy. The following sections describe the action's activities and results in Phase 1.

#### **PM unit's (CDR) overall assessment of action**

The PM unit finds that the three participating municipalities, Horsens (HoK), Aarhus (AK), and Silkeborg (SIK)—among the largest cities in Denmark—have made a viable and hands-on guide to more circularity in the construction environment, that is very easy to use in practise. The guide is built on nine collaborative workshops engaging all stakeholders in the value chain from tender processes, demolition, reused materials and reused building. Incorporating stakeholders across the value chain are done in order to enhance circularity. An environmental advisor has also been involved. Beside the ability to elaborate on examples from practise and test them up upon legalisation and business case, the work done has also contributed with prototypes for gentle waste handling to enable high-value recycling.

The efforts undertaken have not only generated new knowledge within the organizations but have also fostered new networks and heightened awareness of the circular economy across the three municipalities.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C10.1 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C10.1</b>								
<b>WP1</b>								

WP2													
WP3													
WP4													
WP5													
WP6													

### Explanation for timetable delays (if any)

This action has been delayed due to changing project managers in 2022, furthermore some organizational changes in Horsens Municipality have delayed the action. In order to have sufficient time to test the prototypes, the finishing of WP5 will have to be moved to the end of 2025.

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3. This includes 1) mapping the baseline for construction waste at construction sites in the three municipalities and 2) benchmarking best practices in the EU and other Danish municipalities to transfer experiences from countries at the forefront of circular construction.
WP2 Network facilitation and development of the model
The local municipal business councils will be involved to help facilitate the engagement of construction companies into networks where the public-private circular construction and demolition model is discussed and developed. The network activities aim – through regular meetings – to connect public and private actors, while simultaneously identifying solutions and building capacity on methods to preserve the materials in the building mass by designing buildings for disassembly, separating the materials as Lego bricks and preparing them for reuse. In close collaboration, a prototype for a circular construction/demolition model is developed in the network. The model will be developed based on the input from business combined with municipal in-house experiences.
WP3 Testing of prototypes
Once the prototype model is developed, it is demonstrated directly at the construction sites, recycling stations, and in the administrations in HOK, SIK and AK. The prototype is based on a model which pays attention to e.g., easing the process of separating and sorting building materials for reuse as well as improved infrastructure and facilities for sorting materials at recycling centres.
WP4 Identifying and solving legal/administrative barriers
Identifying legal barriers for circular construction/demolition in public administration. Identifying better design of public procurement tenders of sustainable and circular building materials such as Total Cost of Ownership (TCO). The partners will strive to ensure alignment with the EU GPP criteria when identifying better design of public procurement tenders.
WP5 Development and test of measuring methods
A standardised method for measuring the amounts of construction and demolition waste delivered for direct reuse at the recycling centres will be developed. Currently, a similar model exists for measuring the amounts of reuse items from household waste delivered at recycling centres. As construction and demolition waste weighs more than household waste, it requires a different treatment and has a different CO2 footprint, meaning that existing models cannot be applied. By developing a standardised measuring method, it will be easier to assess economic and environmental benefits from circular solutions, thus making it possible to justify them to the construction industry.
WP6 Replication and dissemination
The model is replicated to other Danish municipalities through the Danish professional network Videncenter for Cirkulær Økonomi i Byggeriet.

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
1 presentation on a method for measuring of construction and demolitions waste delivered for direct reuse at the recycling centres including calculations showing the increased amounts in the three municipalities.	WP5	30.06.2024	Delayed	01.10.2025	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Circular networks have been created and gathered annually.	WP2	30.06.2024	Achieved	30.06.2024	N/A
Physical prototypes have been developed and tested	WP3	01.11.2023	Delayed	01.10.2025	-
Amendments of internal procedures have been developed and tested.	WP4	01.12.2023	Delayed	01.10.2025	-
A method for measuring of construction and demolition waste delivered for direct reuse has been developed and tested.	WP5	01.06.2024	Delayed	01.10.2025	-
A best-practice model for municipal involvement in circular construction has been developed and shared with other municipalities.	WP6	31.12.2024	Delayed	01.10.2025	-

### Explanation for delays in Deliverables and Milestones (if any)

#### Deliverables:

- *Presentation on a method for measuring of construction and demolitions waste delivered for direct reuse at the recycling centres including calculations showing the increased amounts in*

*the three municipalities:* The deliverable has been delayed due to changing project managers in 2022. Furthermore, organizational changes in HOK have delayed the action. To have sufficient time to test the prototypes the deadline will have to be moved to the end of 2025. The deliverable is on track with the new deadline.

#### Milestones:

The progress in the work with milestones has been delayed also due to changing project manager three times in 2022, furthermore some organizational changes in Horsens Municipality. Besides the delay caused by this the work is proceeding as expected.

- *Circular networks have been created and gathered annually:* Nine network meetings were held across municipalities to support circular construction, resulting in actionable guidance ([link](#)).
- *Physical prototypes have been developed and tested:* We are in the process of developing physical infrastructure which can aid the industry in sorting and handling reusable materials both on construction sites and in recycling centres. To promote reuse, a citizen workshop was held. There's a rising interest from private citizens but professional uptake remains limited due to challenges like missing CE marking.
- *Amendments of internal procedures have been developed and tested:* The participating municipalities wish to promote circular use of materials through inclusion of circularity in procurement guidelines. Pilot projects are underway in Silkeborg and Aarhus.
- *A method for measuring construction and demolition waste delivered for direct reuse has been developed and tested:* Pilot projects for weighing and registering reused materials will conclude in 2025.
- *A best-practice model for municipal involvement in circular construction has been developed and shared with other municipalities:* Ongoing development and dissemination.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “It is expected that the amount of construction and demolition waste delivered at the recycling centres in the three municipalities will increase by approx. 500 tonnes. Thus, the potential for direct reuse is increased significantly.”

The total amount of building waste produced has been relatively stable from 2022 to 2024, but there is an increase in building waste handled in at the recycling centres that goes to direct reuse. In HOK, the amount has increased by 88% (from 66 to 124 tons) primarily due to increased reuse of bricks.

**Expected:** “Increase recycling rate of construction materials (method to be developed)” // “Increase recycling rate of demolition waste to high-value purposes (method to be developed)”

A study trip in October 2024 highlighted opportunities for direct material reuse through visits to companies like Gamle Mursten ([Forside - Gamle Mursten](#)) and Nordsten ([nord-sten.dk](#)).

Pilot testing of selective demolition practices during a school demolition in Silkeborg identified bricks, ceiling tiles, and windows as key resources for reuse.

Furthermore, prototypes for gentle waste handling have been developed to enable high-value reuse. This includes racks for quality building materials to make access easier for both citizens and businesses—both when dropping off and collecting materials. The prototypes were installed at recycling centers in Silkeborg Municipality in 2024. Recycling center staff report significant interest among users in the new physical prototypes for direct reuse and an increase in the quantity of materials is expected in spring 2025. The quantities have not yet been assessed, but a measurement method is being developed. Additionally, sales data is used to assess whether the flow of building materials is increasing.

**Expected:** *"Create 70 new jobs"*

While selective demolition and circular initiatives create opportunities for job growth, we estimate that achieving 70 new jobs through this action alone seems unrealistic. Some job creation is anticipated, but at this point in time it is difficult to set a target.

**Expected:** *"Save CO<sub>2</sub>, water, raw materials (method to be developed)"*

A catalog of material-specific savings for CO<sub>2</sub>, water, and raw materials is under development. This tool will quantify the environmental benefits of reuse during the action.

**Expected:** *"Ambition to involve citizens from Jobcentre."*

Following new Danish legislation (L898/2022 §49.b, municipalities are no longer allowed to sort waste materials. This change disrupted plans to engage marginalized citizens in sorting tasks, a measure intended to reduce costs through partnerships with job centres. The §49. b says that the municipal council may not participate in activities related to the treatment of waste suitable for material recovery, cf. however, paragraph 2, rules issued pursuant to paragraph 3, § 49 c, paragraph 1, and § 49 g, paragraph 1.

Paragraph 2. The municipal council may participate in activities related to water and sewage supply activities, treatment of waste produced on islands without fixed bridges, and treatment of soil that is waste. Paragraph 3. The Minister of Climate, Energy and Utilities may establish rules regarding the municipal council's participation, including conditions and terms for participation, in activities related to

1) the transfer of waste covered by a municipal waste scheme; 2) preparation for recycling of waste collected at recycling centres in the municipality; 3) treatment of garden waste collected at recycling centres in the municipality; 4) treatment of waste produced by the municipality's own institutions and enterprises, and 5) material recovery in connection with municipal construction and infrastructure projects.

Due to point 5 and the fact that we no longer are allowed to sort to material recovery we are no longer able to provide job possibilities for marginalized citizens redirecting timber waste from bridge construction for reuse through social enterprises.

**Expected:** *"Scale-up and replication of circular model in min. 10 other municipalities via Videncenter for Cirkulær Økonomi i Byggeriet and DAKOFA."*

The circular model has been developed and disseminated to key actors in the construction value chain. It is available online and shared at conferences like a big release conference in Aarhus with

representatives from the whole value chain, Building Green, a national yearly event and CEBW's End of Phase 1 Conference.

The guide aims to expand municipalities' scope, mindset, and approach regarding circular solutions in construction. It is directed at all areas of the municipality, including both building authorities and developers, and seeks to contribute to a shared understanding of the municipality's role and opportunities within circular construction

The guide includes both well-known barriers from the construction industry as well as the identified trends from networking meetings. Based on this, the guide presents a series of recommendations and calls to action for municipalities that hopefully can promote circularity in future municipal construction projects.

The guide can be read and downloaded below.

<https://transition.nu/cases/aarhus-kommune-silkeborg-kommune-horsens-kommune/>

### Communication

Key communications outputs from Phase 1 include articles published on circular initiatives, available at:

- [Transition Case](#)
- <https://www.spreaker.com/episode/kommuner-kan-fremme-genbrug-af-byggematerialer--56991580>

### **B. Evaluation**

Evaluation of Phase 1 activities revealed several successes and key learning points.

The action experienced delays due to two changes in project management, which meant time was spent on training new project managers and slowed down the initial progress during 2022, but since then since then, it has progressed as expected.

The following summarizes collaboration efforts and their varying success rates:

- *Internal Collaboration:* Partnerships among project partners worked well. However, establishing cross-sectional collaboration across CE Beyond Waste proved challenging, despite evident synergies. This was mainly due to shift of project manager at C10.2 as well due to two maternity leaves.
- *Network Meetings:* These meetings provided valuable input from stakeholders across the circular construction value chain, including small and large enterprises. They fostered new collaborations, such as between Silkeborg Municipality's departments. Nine network meetings were held, three in each municipality.
- *External Collaborations:* Key partnerships included:
  - Dialogue with Sermersooq Municipality, Greenland, regarding the guide for circular construction.
  - Technical consultation with the Danish Technological Institute ([Teknologisk Institut](#)) on challenges related to reusing materials in new constructions.

- Activities at "Skraldival" (a festival in Silkeborg focused on waste minimization, reuse, and recycling - [Skraldival | Silkeborg Bibliotekerne](#)) that raised public awareness about sustainable building materials.
- A collaboration between Swiss international group, SIGA ([Vapour control layers, tapes, adhesives & sealants | SIGA](#)) and "Brugte Mursten" (Used Bricks - [Brugte Mursten](#)) to clean and reuse bricks for new construction projects.



Launch of the building guide and rounding off the network meetings.

### C. Targets and Goals for Phase 2 (2025-2027)

Most activities will continue in Phase 2. Key priorities include:

- *Completion of Prototypes*: The material-recycling trolleys developed in Phase 1 will be tested at SIGA and further refined based on the results.
- *Procurement Paradigm Testing*: The selective demolition procurement paradigm will be tested during the demolition of a school in Silkeborg. We aim to ensure that outcomes are widely shared.
- *CO<sub>2</sub> Benefits*: A report quantifying CO<sub>2</sub> savings from reusing building materials will be prepared.
- *Final Report*: A comprehensive report summarizing key findings will be produced, serving as a guide for other municipalities.
- *Dissemination*: The circular construction guide and selective demolition procurement material will be shared through network meetings, conferences, and direct outreach.

### D. After Life

Post-action, a strong focus on circular economy in municipal construction will remain. Key efforts will include implementing the procurement framework and circular construction guide in Silkeborg, Aarhus, and Horsens municipalities. Additionally, efforts will continue to expand recycled building material markets and sustain critical network meetings on circular economy topics.

## Action C10.2: The Circular Material Depeche – a system for identification and dissemination of valuable materials from construction and demolition

Beneficiary responsible for implementation: Københavns Kommune (KK)

Other beneficiaries participating: Bornholms Regionskommune (BRK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2024

The main activities of this action were scheduled to be finalised in Phase 1, and this has been fulfilled.

### **Purpose of action**

The purpose of this action is to increase the recycling of building materials and components by developing an IT-based material screening tool that combines expert knowledge with practical contractor insights. This tool identifies materials and components in existing buildings suitable for reuse and evaluates opportunities for incorporating second-hand materials into renovation projects. The action aim to streamline the transfer of materials from one project to another. Below, the activities and results from Phase 1 are outlined.

### **PM unit's (CDR) overall assessment of action**

Action C10.2 has, despite multiple changes in the project manager position, successfully completed the work packages and deliverables within the framework of Phase 1. A range of easily understandable and accessible digital tools have been developed, with the CØ2 Calculator, in particular, proving to be highly useful within KK. The tools provide means to calculate the economic and environmental savings associated with reusing building materials.

The PM Unit estimate that the tools have potential to facilitate the work of both civil servants and construction advisors in other municipalities and is thus, expected to be replicable.

### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### C10.2 Timetable

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C10.2</b>								
WP1								
WP2								
WP3								
WP4								

## Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>	
<p>Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.</p> <p>A project management team is established with participants from KK, BRK and HVID to carry out over-all planning and coordination, monitor progress, compile results and secure project progress.</p> <p>Reporting is done in concord with the continuous documentation established in the project work packages.</p>	
<b>WP2 Development and test of a digital tool for material screening</b>	
<p>The materials screening tool is developed in a co-design process, which involves industry actors through the activities:</p> <ol style="list-style-type: none"> <li>1. Development of an expert-based background paper that describes the challenges with reuse of 15-20 typical building-components that are valuable for an SME contractor. The description will include challenges related to the assessment of quality, e.g., load-bearing capacity, expected lifetime, content of poisonous or problematic compounds, describe typical facts about selective dismantling in relation to the materials as well as possibilities for direct reuse and possibilities related to replacing other materials.</li> <li>2. Workshop where challenges and possibilities from actual reuse attempts with the 15-20 chosen materials are identified and described by the practitioners within the field. The replicator group will assemble the participants: DM&amp;E, Dansk Håndværk, Knowledge Center for Circular Economy in the building sector (VCØB), Affald Plus, Slagelse, GK, Ressource City Næstved.</li> <li>3. Workshops in KK and BRK to develop a design concept for The Material Depeche tool - with particular focus on a user-oriented interface for practitioners. Describe and assess User Journeys based on characterisation of materials and components. Alternative output/user interfaces will be described and chosen in relation to level of maturity and how they can be executed.</li> <li>4. Development of prototype which synthesise characterisations from activity 1 and 2 with previously developed knowledge on materials and embedded CO<sub>2</sub>, and validation of The Circular Material Depeche with an interface mock-up and database.</li> </ol>	
<b>WP3 Integration with digital platform and concept for physical storage</b>	
<p>The IT-based material screening tool is integrated with a digital material-platform and a concept for physical storage through the activities:</p> <ol style="list-style-type: none"> <li>1. Identification of a suitable existing digital material platforms like <a href="http://www.bygcirkulaert.dk">www.bygcirkulaert.dk</a> and coding of The Circular Material Depeche into a web-based interface for the digital materials platform.</li> <li>2. Developing a concept for integration of a physical storage with the digital platform: Identify experiences and requirements of physical material storage facilities and describe possible judicial and governance models for physical material storage facilities as well as possible affiliations to regulatory approval.</li> </ol>	
<b>WP4 Dissemination and embedding</b>	
<p>Dissemination takes place in collaboration with the knowledge partners, DH and DM&amp;E, who contribute by mediating contact to construction firms. The work package contains following activities:</p> <ol style="list-style-type: none"> <li>1. Continuous dialogue with the future users in developing the tool and preparing SME test-users for testing and implementing the tool in practice. This will happen through local dialogue meetings on</li> </ol>	

Bornholm and/or Hvidovre in collaboration with Green Building Network Bornholm and the project replicator group.
2. Replicator group activities. There will be four meetings within the replicator group, focused on sharing results and challenges.
3. Testing the tool on concrete cases, in which each fraction is tracked from dismantling to repurposing.
4. The tool is handed over to a central non-profit actor of the circular building industry that is relevant for contractor SMEs. This central actor will be identified as the project progresses, possibly among the participants of the replicator group.
5. The experiences gained throughout the project will be shared with Danish EPA and other relevant authorities in advance of the forthcoming national requirements for standardized plans for dismantling.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Specification of concept of The Circular Materials Depeche	WP2	01.04.2023	Completed	13.03.2023	YES
Web-based digital version of The Circular Materials Depeche	WP3	31.12.2023	Completed	31.12.2023	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Expert report	WP2	15.08.2022	Achieved	15.08.2022	N/A
Industry workshop and concept design workshop	WP2	01.12.2022	Achieved	01.12.2022	N/A
Prototype of Materials Depeche	WP2	01.04.2023	Achieved	01.04.2023	N/A
Digital integration of Materials Depeche	WP3	01.06.2023	Achieved	01.06.2023	N/A
Concept for physical storage	WP3	01.09.2023	Achieved	01.09.2023	N/A
Final project report	WP4	31.12.2023	Achieved	31.12.2023	N/A

### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

### The correlation between expected and achieved results

**Expected:** “The Circular Materials Depeche tool describes qualities, embedded CO<sub>2</sub>, as well as options for dismantling, intermediate storage and recycling for approx. 20 materials/components.”

Three key components were developed:

1. *BRK Data Sheet (included in Deliverable):* Web-based digital version of The Circular Materials Depeche): A web-based digital tool designed to document the reuse and recycling of building materials with an emphasis on traceability and safe handling. It also calculates CO<sub>2</sub> savings from material reuse. Developed specifically for contractors involved in demolition projects, it was tested in collaboration with BRK and its contractor partners.

The tool can be accessed here: [BRK Datablad Dokumentation for genbrug eller genanvendelse af byggematerialer](https://www.brk.dk/dokumentation-for-genbrug-eller-genanvendelse-af-byggematerialer)

2. *CØ2 Calculator (included in Deliverable):* Web-based digital version of The Circular Materials Depeche): A web-based material screening and dialogue tool that promotes early reuse and recycling of three specific building materials: clay tiles, glass, and bricks. It provides calculations of both economic and environmental savings associated with reusing these materials. Targeted at technical advisors, contractors, and SMEs in building renovation.

The tool can be accessed here: [CØ2 Beregner digitalt værktøj til materiale screening \(bygningsfornyelse og byrum\) 2024](https://www.brk.dk/c02-beregner-digitalt-værktøj-til-materiale-screening-(bygningsfornyelse-og-byrum)-2024)

3. *Circular Processes in Construction – Example Collection:* An analysis exploring the establishment of a physical material storage facility for reused building materials. Based on insights from four demolition projects and five renovation projects, this analysis maps barriers and provides concrete recommendations to advance circular construction processes. The example collection is Attachment 12.

The quality and embedded CO<sub>2</sub> of reused materials are addressed in both the CØ2 Calculator and the BRK Data Sheet. Insights into dismantling, material storage, and recycling data for approximately 20 materials/components are captured through these tools and the example collection.

**Expected:** “The Circular Material Depeche tool combined with an existing digital material platform will result in 68.000 tonnes of CDW being reused or recycled within the IP project timeframe, equivalent to 137.000 tonnes CO<sub>2</sub> reduction.”

A valid measurement of whether this goal has been met is yet to be conducted. While desirable, it is uncertain if such measurement will be possible within the IP project timeframe.

**Expected:** “The physical intermediate storage facility will process 34.000 tonnes of CDW for reuse or recycling.”

The plan to establish a temporary physical material storage facility (material bank) on Bornholm in collaboration with BRK was not realized due to several factors:

- *Volume and Business Model Challenges:* There was an insufficient volume of building materials to support a scalable, sustainable business model. Additionally, Bornholm's existing culture of material exchange complicated efforts to market reused materials competitively with new materials.
- *Risk of Market Distortion:* It was deemed more appropriate to explore a swapping station model, possibly integrated with recycling centres, rather than a traditional material bank.
- *Market Development:* Concurrently, several private companies entered the market, reducing the need for a publicly funded material bank.

## B. Evaluation

Evaluation of Phase 1 activities revealed several successes and key learning points. Barriers and recommendations were identified based on interviews with Construction Technical Advisors conducted by KK as part of the action.

Key findings include:

- *Lack of Knowledge and Experience:* Many advisors have limited familiarity with reused materials. However, demonstration projects and sharing of experiences can build credibility with clients.  
*Recommendation:* Prioritize knowledge-sharing and provide tangible examples of successful solutions.
- *Inconsistent Quality and Lack of Standardization:* Reused materials often lack standardized data on properties such as fire resistance and strength. The industry's focus on maintenance-free materials therefore makes reuse less attractive.  
*Recommendation:* Document total economic costs of maintenance versus replacement, and plan for phased implementation.
- *Economic Challenges:* Reused materials are often more expensive than new ones, increasing project costs.  
*Recommendation:* Consider introducing sustainability premiums or offering circularity as an add-on service.
- *Lack of Accountability for Durability:* Clients demand guarantees for the lifespan of reused materials.  
*Recommendation:* Require testing and certification of materials and include circularity requirements in contracts.
- *Capacity Challenges:* Limited capacity exists for renovating and building with reused materials.  
*Recommendation:* Engage in early dialogue with clients and contractors to align expectations and improve understanding of reuse opportunities.

The above-mentioned barriers and recommendations have, to the extent possible, been considered in the preparation of the BRK Datasheet and CØ2 Calculator.

Using the CØ2 Calculator in case projects provided the following insights:

- Construction Technical Advisors found it simple, free, and effective for visualizing CO<sub>2</sub> savings and reuse potential.
- It inspired advisors to identify new reuse opportunities in projects.
- Municipal roles as catalysts for circular solutions were highlighted, especially when the provided tools and the municipal support can lower barriers for private actors.

The CØ2 Calculator is now integrated into municipal practices in KK, including renovation and noise reduction funds. It is used early in projects to identify reuse potential. Communication efforts are ongoing to ensure broader adoption.

#### **C. Targets and goals for Phase 2, 2025-2027**

The main activities of C10.2 were completed in Phase 1. In Phase 2, partners will engage in dissemination activities and joint initiatives coordinated by the coordinating beneficiary.

#### **D. After Life**

The results and experiences will continue to inform partners' ongoing practices and initiatives in the field. Efforts are underway to disseminate the findings and promote the tool's use.

### **Action C11: A circular future for composite materials for food and beverages**

Beneficiary responsible for implementation: Bornholms Regionskommune (BRK)

Other beneficiaries participating: Fredensborg Kommune (FK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of the action is to increase recycling of composite food cartons by developing and demonstrating a replicable material flow solution, targeting both collection, preparation for recycling and reuse of materials in new products. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

It is the overall assessment of the PM units that this action addresses one of the most significant challenges in the circular economy: making food and beverage packaging suitable for reuse or material recycling while simultaneously ensuring that both functionality and food hygiene requirements are maintained. Furthermore, the widespread use of composite materials complicates true material recycling.

A mass flow analysis has provided insights into the types and quantities of materials arriving in Bornholm, which, due to its size, serves as an exemplary testing station. This tool also enables producers to monitor their waste output, thereby stimulating the practical implementation of producer responsibility for packaging from December 31, 2024.

Study trips to recycling operators both domestically and internationally have provided concrete insights into what can be processed with existing technologies, as well as the challenges related to material compositions and technologies for sorting and processing.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C11 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C11</b>								
<b>WP1</b>								
<b>WP2</b>								
<b>WP3</b>								

WP4																			
WP5																			

### Explanation for delays in timetable (if any)

The action has encountered barriers affecting progress. One major challenge is waste separation, particularly extracting plastic from food and beverage cartons, as material mixing complicates collection. BRK is exploring a small-scale pilot with ProUnit Frames on Bornholm to test their delamination solution for multilayer packaging. However, regulatory uncertainties around Denmark's Extended Producer Responsibility (EPR) rules have created financial bottlenecks, slowing innovation scaling. Another challenge is Technological Scalability: While promising solutions—like milk dispensers and multilayer recycling—are under consideration, logistical, economic, and regulatory hurdles limit their expansion. Therefore, a postponement of WP's 2,3 and 4 is desirable.

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
<b>WP2 Analysing the value chain</b>
<p>1. Conduct a state-of-play analysis of the value chain (production, use and treatment) for food and beverage cartons to create the necessary knowledge base. The analysis will gather state-of-the-art knowledge, e.g. from the Danish EPA, Zero Waste Europe and the industry association ACE as well as knowledge from study visits to recycling plants in Europe, interviews with value chain actors, etc. Data will be analysed and visualised using a Material Flow Analysis (MFA) approach. The analysis will include adjacent fractions such as chips and coffee packaging, where feasible.</p> <p>The results will form a state-of-play report containing:</p> <ul style="list-style-type: none"> <li>• Experiences from municipalities and (municipal) waste companies about waste collection equipment for food and beverage carton waste from households.</li> <li>• Experiences from municipalities and sorting and recycling facilities about food and beverage carton waste mixed with plastic and metals.</li> <li>• Existing and forthcoming distribution channels for food and beverage carton waste in Denmark and/or the EU.</li> <li>• Visualised mass flow analysis (MFA) or sankey-diagrams.</li> <li>• Assessment of optimal distribution channels with respect to best high value recycling possibilities.</li> </ul>
<b>WP3 Collaboration on developing solutions across the value chain</b>
WP3 hosts innovative development processes involving:
<ol style="list-style-type: none"> <li>1. Develop methodology inspired by best practice experience with AUH material flows project.</li> <li>2. Carry out an innovation camp with value chain stakeholders in CDR and CR.</li> <li>3. Follow-up co-development of circular system and design solutions from the executed innovation camp.</li> <li>4. Elaborate a synthesis report on exploration study on circular system and design solutions based on co-development with value chain actors.</li> </ol>
<b>WP4 Demonstrate a scalable recycling solution</b>

Development and demonstration of pilot:

1. Prepare a pilot, including pre-selection of localities sensitisation campaigns and dialogue with citizens and housing associations, collection equipment, etc.
2. Set-up a pilot recycling solution or model for 6 months for treatment of targeted 50 tonnes of food and beverage cartons waste.
3. Assess output material suitability for high-value recycling of at least 50%.

**WP5 Cross-cutting communication and dissemination**

1. To obtain separated waste fractions in a high quality, WP4 will engage in dialogue with a test group of citizens on composites and multi-layer packaging waste and develop a specific waste separation campaign targeting schools and citizens.
2. To ensure replication, BRK will arrange dissemination workshops intended for municipal and waste management companies, potentially using both physical visits at demonstration sites, webinars and an online platform for distribution of report material. This outreach to all Danish municipalities will be further secured through social media activities.

**Deliverables and Milestones**

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Synthesis of experiences from the pilot, e.g. level of source-separated food and beverage carton waste quality from households, identification of non-carton composites and multi-layer materials, operational assessment of recycling solution or model.	WP3	31.12.2024	Delayed	01.07.2026	-
Replication guide	WP5	31.12.2024	Delayed	01.07.2026	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
State-of-play analyses completed	WP2	31.10.2022	Achieved	31.10.2022	N/A
Innovative development processes with value chain actors completed	WP3	31.12.2023	Achieved	31.12.2023	N/A

Development and demonstration of pilot completed	WP4	31.12.2024	Delayed	31.12.2025	-
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### Explanation for delays in Deliverables and Milestones (if any)

Explanations for delays in Deliverables and Milestones align with those outlined under Timetables.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “A replicable material flow solution targeting both collection, preparation for recycling and actual reuse of materials in new products.”

**Expected:** “Demonstrated pilot recycling solution or model achieving processing of an amount equivalent to min. 10% of Bornholm’s and Fredensborg’s food and beverage carton waste for 6 months (approximately 50 tonnes) reaching high value material recycling above 50%.”

**Expected:** “Waste incineration phased out as treatment option for Bornholm and Fredensborg’s food and beverage carton waste, i.e., reduction of the incineration pathway by 100%.”

**Expected:** “20 municipalities have joined the replication workshops.”

While Phase 1 primarily involved preparatory activities, significant progress was made toward the actions expected results:

- *Collaboration and Knowledge Exchange:* Partnerships with municipalities and international actors were strengthened through field visits to facilities such as Ribe Flaskecentral, Damifo, Skjern Paper, and ALBA Recycling in Germany. These visits provided insights into advanced sorting and recycling technologies. Ribe Flaskecentral for instance, provided insight into advanced material sorting technologies, including NIR scanners for separating soft plastic and multilayer composite materials.
- *Innovation Workshop:* A workshop at BRK - BOFA (Bornholms Waste Management Company - part of BRK) brought together stakeholders from the value chain like Espersen Fisk A/S and Øllingegaard to explore circular solutions for multilayer packaging, including solvent-based delamination by ProUnit Frames. This workshop emphasized the challenges related to circularity of composite packaging, such as Pro- Unit Frames’ solevent based delamination.
- *Cross-Project Synergies:* Links with EU projects like RELOOPED and REDOL enabled collaboration with actors such as COOP Denmark (larger supermarket retailers) and ITENE (Spanish Research Centre dealing with packaging), to explore multilayer delamination technologies, with promising leads from Fych Technology, advancing multilayer packaging recycling technologies.
- There has also been *cooperation with action C14.3*, including ongoing discussions with Sct. Clemens Andelsmejeri (cooperative dairy) to enhance waste sorting practices and circularity improvements. Additionally, a study on reusable take-away packaging systems is in progress, with consultancy support from RAW Relations (external consultant).
- *Engagement with Industry leaders:* Ongoing consultations with Tetra Pak (packaging supplier - [Tetra Pak processing and packaging solutions for food and beverages | Tetra Pak Global](#)) has been maintained to stay updated on multilayer packing solutions, there has also been contin-

uous dialogue with sector organizations like Dakofa (Denmark's Competence Center for Circular Transition) emphasized the challenges and potential solutions for composite material recycling. Furthermore, continuous work with these organizations and others as Cirkulær (The Industry Association for Municipalities and Municipal Waste Companies) has contributed to the action's broader dissemination and stakeholder engagement strategy.

These efforts have laid the groundwork for future pilot projects and innovative recycling models, aligning with the expected goals of scalable waste management solutions.

### Communication

Phase 1 included several dissemination activities:

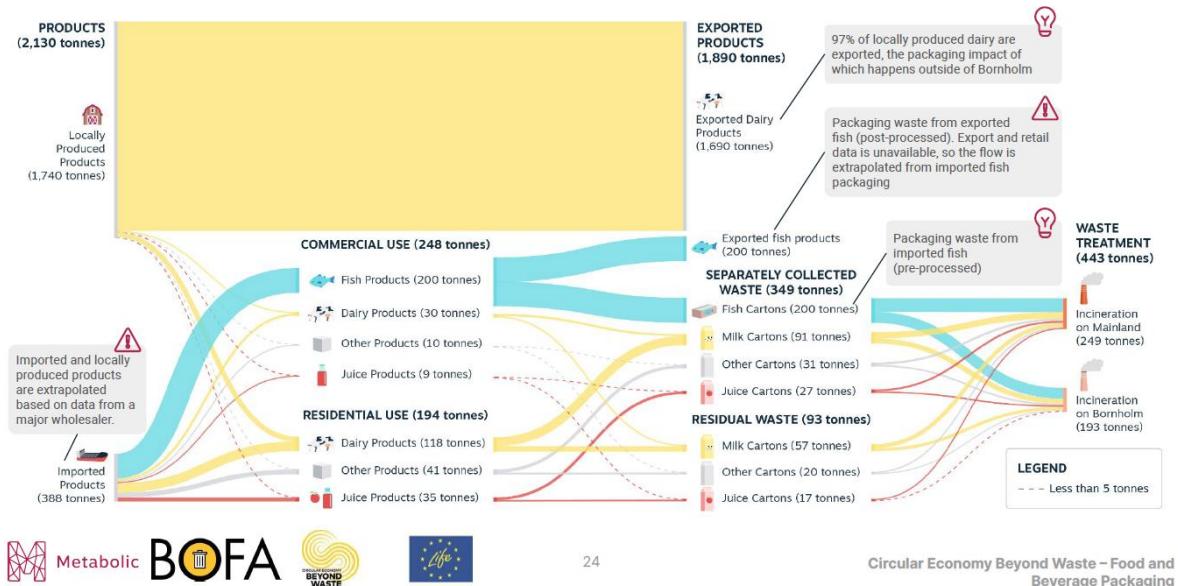
- Articles on CEBW's website highlighted workshops and potential chemical recycling solutions for food and beverage cartons:
  - <https://www.cebeyondwaste.eu/presse-og-nyheder/nyheder/flerlagsemballage---hvordan-far-vi-knakket-noden/>
  - <https://www.cebeyondwaste.eu/presse-og-nyheder/nyheder/hab-for-mere-genanvendelse-af-malkekartonter/>
- A feature in *WasteTech* titled *Affaldslaboratoriet i Østersøen* referenced C11 activities: <https://pro.ing.dk/wastetech/artikel/affaldslaboratoriet-i-oestersoeen>
- A scientific paper, *Unlocking Circular Solutions: Exploring Multilayer Packaging in Sustainable Waste Management*, was published in the *Journal of Solid Waste Technology and Management*: <https://www.ingentaconnect.com/content/jswt/jswt/2024/00000050/00000001/art00007>
- Episodes of the CEBW podcast discussed Bornholm's role in circular economy innovations and multilayer packaging challenges: <https://www.cebeyondwaste.eu/viden/podcast/>

### **B. Evaluation**

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged:

- *Material Flow Analysis (MFA)*: Conducted with project partners, MFA traced waste streams and identified recycling bottlenecks. Stakeholder workshops transformed these insights into actionable strategies, highlighting challenges like material separation and the scalability of delamination technologies.
- *Scalability Challenges*: Uncertainty around Denmark's Extended Producer Responsibility (EPR) framework has hindered large-scale implementation of technologies like chemical delamination. This delay emphasizes the need for stable regulatory environments to drive investment.
- *Collaboration and Insights*: Cross-project collaborations (e.g., C14.3) explored the financial viability of reusable packaging systems, identifying significant barriers such as high upfront costs for SMEs. These findings inform future strategies for waste reduction and circular solutions.

## Bornholm's F&B packaging flow



A Material Flow Analysis was produced to identify recycling bottlenecks.

### C. Targets and Goals for Phase 2 (2025-2027)

Phase 2 requires recalibration due to changes in framework conditions, financial constraints and Frederensborg Municipality's withdrawal:

- Revised Goals:* The original target of processing 50 tonnes of waste will need to be adjusted. Efforts will focus on smaller-scale, cost-effective solutions.
- Inner-Loop Strategies:* Increased emphasis on waste reduction at the source, such as implementing milk dispenser systems, offers a scalable alternative to single-use packaging. Such solutions align with the broader goals of circularity while being more adaptable to current financial and regulatory constraints.

### D. After Life

Despite adjustments, Action C11 has established a foundation for long-term impact. Key innovations, including inner-loop solutions and ProUnit Frames' delamination technology, will continue to influence waste management practices.

BRK-BOFA's Projects Unit remains committed to advancing these initiatives, ensuring alignment with EU circular economy goals and supporting the adoption of scalable solutions across regions.

### **Action C12: Reduce E-waste and Create Jobs by Product Life Extension of Large Household Appliances**

Beneficiary responsible for implementation: Favrskov Affald (FAFO)

Other beneficiaries participating: Aalborg Kommune (AAK), Central Denmark region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of the action is to prevent electronic and electrical equipment transforming into e-waste by thoroughly examining and testing ways of increasing reuse through user engagement, collection, assessment, sorting, storage, safe-keeping, logistics and management, as well as through designing a regulatory framework conducive which enables more reuse. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

C12 has activities throughout the entire duration of the IP project. In Phase 1, the focus has been on preparatory actions that lay the foundation for successfully creating usable prototypes and blueprints for electronics reuse. Efforts have been directed towards establishing collaborations with industry organizations, recycling stations, and other key stakeholders necessary to achieve the expected results.

The PM unit considers this thorough approach to be sensible, as success depends on cooperation and goodwill across the entire value chain in order to change current practices in E-waste management. We expect to see concrete actions implemented and tested in the next phase.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C12 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C12</b>								
WP1								
WP2								
WP3								
WP4								

#### **Explanation for timetable delays (if any)**

n/a

<b>WP1 Management, communication, monitoring, replication</b>					
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3. CDR facilitates two seminars addressing the dissemination of blueprints on a national level.					
<b>WP2 Testing of prototypes</b>					
<ol style="list-style-type: none"> <li>1. Mobilise the activity beneficiaries' experiment teams and formation of a subject matter expert reference group (drafted from the group of additional agents).</li> <li>2. Develop and present the initial experiment design and tests for the reference group including revisions and test finalisation.</li> <li>3. Execute the experiments.</li> <li>4. Draft and present results and lessons learned for the reference group.</li> <li>5. Development and presentation of design and tests, revisions, test finalisation, experiment execution, presentation of results and lessons learned.</li> </ol>					
<b>WP3 Development of the blueprint</b>					
<ol style="list-style-type: none"> <li>1. Each experiment team drafts a reuse blueprint for each experiment undertaken considering the context, the approach, costs, results and impacts, lessons learned, etc.</li> <li>2. Each experiment team presents the re-use blueprint to the reference group to validate the re-use blueprint, noting the inputs of the reference group and making revisions as necessary.</li> <li>3. Each experiment team will submit a final re-use blueprint to be implemented.</li> </ol>					
<b>WP4 Implementation and dissemination</b>					
<ol style="list-style-type: none"> <li>1. The activity beneficiary teams will implement the blueprint across their respective resort areas.</li> <li>2. The experiment teams will along with the PM unit draft a plan for the dissemination of the re-use blueprints</li> </ol>					

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/ Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
1 blueprint proposal per experiment team (3 total)	WP3	01.06.2028	On track	-	-
1 dissemination plan to reuse blueprints on a national level	WP4	31.12.2029	Not started	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Mobilisation of reference group and experiment teams	WP2	01.04.2024	Delayed	31.12.2025	-
Experiment design	WP2	31.12.2024	Delayed	31.12.2025	-
Experiment revision	WP2	01.04.2025	Delayed	31.12.2025	-
Experiment evaluation	WP2	01.06.2026	Not started	-	-
Final re-use blueprint submission	WP3	01.12.2027	Not started	-	-
Blueprint implementation in activity beneficiary resorts	WP3	01.12.2029	Not started	-	-
Blueprint dissemination on a national level by the CDR	WP4	01.12.2029	Not started	-	-

#### Explanation for delays in Deliverables and Milestones (if any)

Regarding the milestones expected in Phase 1, progress has been made in regard to reuse. However, our prevention and repair efforts have been held up and thus, three milestones have been delayed:

- *Mobilization of reference groups and experiment teams:* Efforts have focused on reuse, where partnerships with Elretur ([Elretur håndterer jeres producentansvar for elektronik](#) - Denmark's largest producer responsibility organization) and Ragn-Sells/ERP (a leading player in waste management in Scandinavia) have been established, forming a reference group. In regard to prevention and repair efforts, concrete reference groups have not yet been formed, as their final scopes remain undefined. Ongoing changes in the action's structure, including new legislation, have delayed progress. Legislation prohibiting municipal entities from handling, repairing, or selling LHAs and other electronics poses significant challenges. Limited rights to handle and transport items from recycling centers and dependency on shifting collective schemes further complicate progress. Due to the change in legislation, several ideas and experiments initially considered have been abandoned, leaving uncertainty about the final content of these efforts. An internal workshop is scheduled for December 2024 to clarify the focus of prevention and repair efforts, with group formation planned for Q1 and Q2 of 2025. Upcoming workshops will thus define these efforts and enable milestone achievement.
- *Experiment design:* An experimental design for reuse has been developed in collaboration with Elretur and Ragn-Sells/ERP. Work on experimental designs for prevention and repair efforts has not yet begun due to the ongoing definition of the action's scope.
- *Experiment revision:* An experimental design for reuse has been developed in collaboration with Elretur and Ragn-Sells/ERP. Work on experimental designs for prevention and repair efforts has not yet begun due to the ongoing definition of the action's scope.

## A. Expected and achieved results

### The correlation between expected and achieved results

**Expected:** "Increased reuse measured in units and weight: At full scale, up to 27.000 LHA units of 1.500 tonnes can be reused annually. The pilot tests undertaken in AAK and KK have indicated reuse rates of 10-20% of discarded units. Based on the e-waste generated and collected at CDR collection points (estimated 7.500 tonnes LHA per year) and the share of potential reuse the expected CO<sub>2</sub>e reduction can be estimated."

**Expected:** "Reduced pollution (CO<sub>2</sub>e): 6.100 tonnes CO<sub>2</sub>e reductions. Life-cycle analysis of reuse of LHA conducted by AAU's Centre for Environmental Assessment has estimated a CO<sub>2</sub>e reduction of 227 kg CO<sub>2</sub>e on average per unit. Based on the e-waste generated in CDR collection points (estimated 7.500 tonnes LHA per year) and the share of potential re-use the expected CO<sub>2</sub>e reduction can be estimated."

**Expected:** "Local employment: 40 (full-time employment). Based on the pilot tests in KK and AAK employment effect (1 FTE per 700 units) and the e-waste generated in CDR (estimated 7.500 tonnes LHA per year), the share of potential re-use of the expected employment effect can be estimated."

**Expected:** "Local growth: 70 million DKK annually at full scale. Based on the pilot tests in KK and AAK growth effect (2.700 kr. per unit) and the e-waste generated in CDR collection points (estimated 7.500 tonnes LHA per year), the share of potential re-use the expected growth can be estimated."

In terms of the expected results, the main activities in the action so far have been of preparatory nature, which means that no measurements in relation to the expected results have yet been made. The expected results are running along with the deliverables, which are from 2028 and on.

Therefore, it doesn't make sense to rapport on the achievements in regard to the expected results yet. So instead, we will provide insight into the activities so far.

The activities in Phase 1 have focused on creating the framework to reduce electronic waste, increase repair rates, and promote reuse. We have developed three action tracks to support the action lead in achieving results. These tracks will serve as the foundation for activities in subsequent phases:

- Track 1: Prevention
- Track 2: Repair
- Track 3: Reuse

So far, the main focus has been on establishing collaborations with relevant partners within the three tracks. Trials and activities have not yet commenced, and there are no measurable results to report.

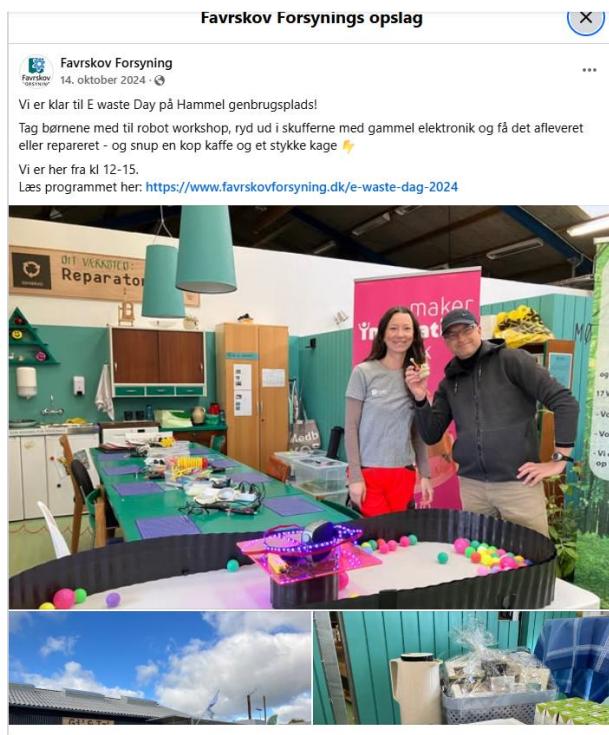
**Track 1 Prevention:** Prevention was not a priority in Phase 1 due to delays caused by unclear national legislation (same as above) and Elretur's launch of two first-treatment facilities for large household appliances (LHAs). This track aims to develop campaigns on extending product lifespans and waste prevention, in collaboration with Tænk ([Forbrugerrådet Tænk - test, juridisk rådgivning og forbrugerpolitik](#)) and Samvirke ([Kontakt os | Samvirke](#)) (both are consumer organizations). Experimental designs have not yet been developed as collaborations have not commenced. We also plan to collect data from Tracks 2 and 3 for dissemination.

*Track 2: Repair:* In Track 2, we focused on establishing collaboration with Applia ([Om APPLiA Danmark - Applia Danmark](#) - Industry association for household appliances and small electrical household devices) to explore barriers preventing citizens from repairing their electronics. We are developing an experimental design and have explored the feasibility of creating an online repair guide inspired by London Repairs ([London Repairs - Find a reliable repair business in London](#)), whom we have visited to learn about their work and organization. Challenges include identifying a host and operator for the platform and assessing the actual need for such a guide.

*Track 3 Reuse:* Track 3 focuses on increasing the reuse of large household appliances (LHAs) from recycling centres. We have worked on forming a partnership with Elretur and developed an experimental design for various trials. This collaboration is expected to deliver results related to LHA repair and CO<sub>2</sub> emissions reduction.

### Communication

We organized an event day on October 14<sup>th</sup> 2024, in conjunction with International E-Waste Day. Citizens were informed about repair and product lifespan extension and could safely dispose of old electronics at the recycling centre. From [Favrskov's facebook](#):



Our concept of an online repair guide has been included in the [political recommendations of CDR](#) to reduce electronic consumption.

### **B. Evaluation**

This paragraph presents the progression, successes, and obstacles of the action.

### Successes

- Held a successful event day on October 14<sup>th</sup> 2024 in collaboration with action C7.2, aligned with International E-Waste Day, to raise citizens awareness about repair and safe disposal of electronics.
- Secured discussion of an online repair guide within the Regional Council of CDR.
- Developed three tracks in collaboration with all stakeholders in C12, despite this being a supplement to the original action plan.
- Continued dialogue with politician Samira Nawaz from Danish parliament about raising the issue at the national level.
- Participated in PM Unit-planned study tours, webinars, and seminars that have proven beneficial.
- Completed a baseline report for work on LHAs at recycling centres. We have this report, but at this time, it's confidential.
- Maintained dialogue with Aalborg University regarding an online platform for citizens.

### Challenges

The action has faced challenges related to partnerships, legislation, and organizational and structural issues.

- Collaboration with Elretur and Applia has been difficult, as their focus is often on profit and servicing their members, limiting our influence. Despite Elretur's collective nature, it primarily aims to promote a green profile, while Applia has a stronger profit focus, creating misalignment with our goals. Nonetheless, a contract with Elretur has been signed, and dialogue with Applia continues. Partnerships with ERP and Ragn-Sells on electronic waste are also underway.
- Legislation prohibiting municipal entities from handling, repairing, or selling LHAs and other electronics poses significant challenges. Limited rights to handle and transport items from recycling centers and dependency on shifting collective schemes further complicate progress. Work on recycling centers is expected to begin in late 2024.
- Defining specific action content has been difficult due to reliance on collective schemes. Additionally, organizational differences between FF and AAK hinder day-to-day collaboration, and the role of CDR in the action remains unclear.

### **C. Goals and objectives for Phase 2, 2025–2027**

In Phase 2, we will focus on advancing partnerships to implement concrete actions at recycling centres, including packaging guides, theft prevention, and general handling improvements.

Collaboration with Applia will also be strengthened, and Track 1 campaigns will be initiated.

*Track 1: Promoting LHA lifespan extension initiatives:* We will launch campaigns based on data from Tracks 2 and 3 to increase citizen awareness of repair and maintenance. The goal is to collaborate with partners and execute at least one large-scale campaign.

*Track 2: Overcoming barriers to higher repair rates:* Collaboration with Applia will continue, with efforts to translate Phase 1 findings into actionable strategies to address repair barriers and share these insights with policymakers.

*Track 3: Maximizing reuse potential at recycling centers:* We will test Elretur's packaging guide and involve recycling staff. Additionally, a theft prevention trial will be conducted at one recycling center,

alongside adjustments to LHA handling. Objectives include evaluating test methods and initiating partnerships with ERP and Ragn-Sells on theft prevention.

#### **D. After Life**

Collaboration with Elretur should continue because the collaboration can help promote reuse opportunities instead of recycling. Improvements to LHA handling and packaging at recycling centers should also be sustained if feasible. Similarly, theft prevention initiatives should be expanded. Effective campaign materials should be reused and potentially further developed for ongoing application.

### **Action C13: Biomass – How to Keep Biological Materials in Valuable Flows**

Beneficiary responsible for implementation: Samsø Kommune (SAK)

Other beneficiaries participating: Randers Kommune (RK), AFLD (AFLD), Kredsløb Genbrug (AVA)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of this action is to develop better products and increase value on environmental, climate and socioeconomic parameters via improved management of biomass flows. C13 focuses on circular and sustainable management of residual biomass streams to develop resources for agricultural purposes. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

Addressing park and residual biomass flows and converting them into valuable materials—such as fertilizers for agriculture or compost for energy—has been met with strong commitment from the involved partners." SAK addressing source separated domestic waste into soil, and sewage sludge into energy and biochar. AFLD, RK and AVA have focused on composting and making better processes, business models, technologies and tenders.

Because the area addresses both citizens as well as quality of the biomass delivered from household and garden waste, tenders involving the private sector and the environmental issues, have been challenging. But by addressing the market through dialogues, technical knowledge about composting model and emissions, and systematically enlightened pros et contras of different models, the PM Unit expects that the models will translate into real life results during the next phases. One specific area seems to be of great importance but difficult to solve, namely the volume of assessable biomass on a small island like Samsø (SAK), but SAK are working to develop a viable solution.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C13 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C13</b>								
WP1								
WP2								
WP3								
WP4								

WP5													
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### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
<b>WP2 Source separated organic domestic waste</b>
<p>1. Pre-examination (2022-2023):</p> <p>An analysis of options for the treatment of source-separated organic domestic waste will show possibilities and technologies for building a local treatment plant. Furthermore, local sales possibilities will be examined, and the cycle of food production and consumption will be covered. The results and knowledge gained from the activity will be shared during a conference.</p> <p>2. Establishing a circular food partnership (2023-2024): A stakeholder analysis will shape the establishment of a circular food partnership with a focus on soil-to-soil. The results and knowledge gained from the activity will be shared during a conference.</p> <p>3. Tendering of treatment of source-separated domestic organic waste (2025-2026): Based on knowledge gained, an innovative tender will be developed. The tender will require development cooperation on the treatment of domestic organic waste.</p>
<b>WP3 Garden/park waste</b>
<p>The aim is to develop new ways of treating garden/park waste to reduce GHG from current windrow composting by a minimum 20%. The work package consists of four activities of which RK is responsible for activity 1, 2 and 3 and AFLD is responsible for activity 4.</p> <p>1. Pre-examination via EU market dialogue (2022-2023):</p> <p>Mature and innovative treatment technologies are explored through a market dialogue with business actors to support RK in qualifying their upcoming tender. This includes coherence on deliverables, conditions, market and technology, including possibilities for the local sale of treated garden/park waste.</p> <p>2. Tendering for garden/park waste treatment (2023-2024):</p> <p>The tender will consist of requirements that cannot be met by available technologies on the market, thus new business partnerships will be formed. The tender can be carried out as a negotiated tender or innovation partnership. However, final decisions on the type of tender will be based on the market dialogue in activity 1.</p> <p>3. Clarification phase (2024-2027):</p> <p>A clarification phase is needed for the supplier to investigate the treatment of the garden/park waste in relation to the tender deliverables and conditions.</p> <p>4. Test and demonstration (2022-2027):</p> <p>AFLD will test new methods for composting garden/park waste in Fasterholt and Tarm, including potential solutions for biomass refinery. The tests will focus on the following technologies:</p> <ul style="list-style-type: none"> <li>a. Drying of garden/park waste for the production of wood chip</li> <li>b. Certification of garden/park waste for energy purposes</li> <li>c. Conversion of residual garden/park biomass to soil improvement products</li> <li>d. Trials of mixing e.g., road-side grass cuttings into the composting process</li> </ul>

e. The gained knowledge can be used by RK in tendering processes
<b>WP4 Sewage sludge for energy and biochar</b>
SAK is responsible for the test and trials of new methods to treat sewage sludge. Sewage sludge is a residual biomass flow that can cause substantial environmental challenges when treated and recycled.
1. Analysis of local/national market options for biochar and its impact on GHG balances and climate credits (2022): Experience on pyrolysis from other municipalities and countries will be collected to assess the potential for cross-over possibilities between garden/park waste and domestic organic waste to enhance pyrolysis efficiency.
2. Workshop discussion to inspire new use of sewage sludge (2024).
3. Test and trials on pyrolysis treatment of mineralised sewage sludge to produce biogas and biochar suitable for carbon storage (2022-2024): A plant is in the design phase, and the activity will conduct trials on enhancing the pyrolysis energy content by mixing in other residual biomass flows e.g., straw or domestic organic waste.
4. Demo of the effect of biochar in agricultural soil.
<b>WP5 Communication, tendering and commercialising</b>
1. Communicate the results on domestic biowaste, garden/park waste and sewage sludge management on a biomass conference/workshop.
2. Continue trials on potential solutions in AFLD and decide on future tender in RK.
3. Analysis and assessment of further refinery of biochar and pyrolysis gasses (SAK).
4. Integrated analysis of more circular management of sewage sludge, domestic biowaste and garden/park waste both organisationally and technically in an island community (SAK).

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Memo/knowledge status on impacts of biochar	WP4	31.12.2022	Completed	01.08.2022	YES
Article on sewage sludge pyrolysis	WP4	31.12.2023	Completed	30.12.2023	YES
Tendering of organic domestic waste	WP2	30.06.2026	On track	-	-
Photos and video demonstrations of the tested composting methods (A)	WP3	31.12.2024	Completed	31.12.2024	YES
Photos and video demonstrations of the tested composting methods (B)	WP3	31.12.2027	On track	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Demonstration of innovative composting techniques	WP3	31.12.2023	Achieved	31.12.2023	N/A
Demonstrations of pyrolysis of sewage sludge	WP4	30.06.2024	Achieved	30.06.2024	N/A
Demonstration of biochar in agricultural soil	WP4	31.12.2024	Achieved	31.12.2024	N/A
Tender – publishing tender – sale of garden/park waste	WP3	31.12.2024	Achieved	31.12.2024	N/A
Innovative tender/development process for organic domestic waste	WP2	30.06.2026	Not started	-	-
CEBMs for the three residual biomass flows	WP5	31.12.2028	Not started	-	-

#### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

To clarify results, we have structured the outcomes around the three main focus areas of C13:

- Area 1: Biomass from Household Waste managed primarily by AVA
- Area 2: Garden and Park Waste (HPA) managed primarily by RK and AFLD
- Area 3: Sewage Sludge managed primarily by SAK

##### Area 1: Biomass from household waste

**Expected:** *“Knowledge of optimised use of domestic biowaste in a circular cycle”*

**Expected:** *“Prioritization of treatment options concerning circular value creation and nutrient recycling”*

**Expected:** *“Circular business model and value chains for the three residual biomass flows”* (One of them)

**Expected:** *“Tendering concept on the treatment of domestic biowaste”*

The aim in area 1 of C13 is to ultimately create a tendering of organic domestic waste. As a part of WP2 AVA has analyzed treatment options to enhance the value and quality of household biomass and examined the pros and cons of various methods. Considerations of supply security, quality, and business potential were integral to the analysis to ensure a sustainable business model is developed. While the circular potential of household waste was identified, technological and industrial immaturity hindered scalability.

These analyses also inform the methodological groundwork for tendering processes, including organization and market dialogue.

**Expected:** *“Sharing of results and knowledge gained for improved recirculation of nutritional values”*

Activities related to this expectation will occur in Phases 2 and 3.

#### Area 2: Garden and Park Waste (HPA)

**Expected:** *“Qualified background for the choice of tendering process”*

**Expected:** *“Improved knowledge on technology that complies with the tender requirements which improve circularity”*

**Expected:** *“Knowledge of technologies and methods from a wide array of businesses across the industry”*

**Expected:** *“Improved tendering of garden/park waste”*

The aim of area 2 of C13 is to develop new ways of treating garden/park waste to reduce GHG from current windrow composting. RK aims to influence this development through the creation of an upcoming tender that consist of requirements that cannot be met by available technologies on the market, thus new business partnerships will be formed. Though a circular tendering process for HPA is not yet complete, several activities were conducted to qualify the tender on HPA focusing on the first steps of WP3:

In January 2024, RK hosted a market dialogue with relevant technology providers to explore the current and possible new treatment technologies of HPA. Unfortunately, the market has proved immature, which has challenged RK in moving forward.

Danish Technological Institute (DTU), in collaboration with COWI, a global engineering and consulting business, has been engaged to prepare guidelines to minimize GHG emissions during composting. This has resulted in three reports that have been published on EPA's website. In the first report, measurements of methane and nitrous oxide emissions were conducted at composting facilities and fine material storage at four different locations. The results were compared with previous analyses and background data from Danish Center for Environment and Energy. The findings indicate a lower overall emission of CO2 equivalents when combined with results from the project's market survey (Environmental Project No. 2198). The second and third report describes various alternative methods and technologies for handling garden waste with the aim of increasing CO2 savings. An economic analysis was also conducted to calculate the treatment cost per ton of garden waste.

Report 1: <https://mst.dk/nyheder/2023/marts/nye-rapporter-for-haandtering-af-haveaffald>

Report 2: <https://mst.dk/publikationer/2023/marts/reduktion-af-klimagasser-fra-behandling-af-haveaffald-del-2-emissionsfaktorer-for-behandling-af-haveaffald-i-danmark>

Report 3: <https://mst.dk/publikationer/2023/marts/reduktion-af-klimagasser-fra-behandling-af-haveaffald-del-3-alternative-teknologier-til-behandling-af-haveaffald-i-danmark>

These findings will be integrated into an upcoming EU tender. DTU has received funding from the Danish Environmental Agency (EPA) to support this experimental project.

Parallel to these efforts, AFLD conducted compost content analyses to define tender requirements for private operators. This ensures optimal compost quality and strengthens the upcoming HPA tenders.

RK consulted five potential suppliers in September 2024 to validate experimental descriptions and assess interest for possible tenders. All expressed willingness to explore the DTU's experimental framework in report 2 and 3 further. Based on this, we can assess whether and how a possible tender will result in CO2 savings and higher costs.

**Expected:** *“Knowledge of practical experiences in reducing GHG”*

**Expected:** *“New garden/park waste treatment processes to improve nutrient cycling”*

**Expected:** *“Garden/park waste treatment optimised and tested”*

**Expected:** *“Knowledge of sales opportunities for treated garden/park waste”*

**Expected:** *“Optimized garden/park products sold”*

The work to achieve these results is on-going. AFLD have been working towards optimization and testing of technology treatments to transform garden/park waste to wood chips and compost. Emission-reducing practices, such as varying pile height, turning frequency, and using biocovers, are being tested through six compost piles. This work has been compiled in deliverable 4 “Photos and video demonstrations of the tested composting methods (A)”. The video material can be assessed here:

<https://www.youtube.com/watch?v=7Vt7mcnr544&feature=youtu.be>

Also, through this work, AFLD has obtained certification of the garden/park waste for energy purposes using the wood chips.

Additionally, SAK inaugurated Denmark's longest brushwood fence on Samsø in 2024, creating a closed-loop system for branches and twigs, benefiting local biodiversity.

**Expected:** *“Circular business model and value chains for the three residual biomass flows (here one of them)”*

In RK's dialogue meetings with the market, stakeholders have indicated that solely converting HPA to soil might be outdated. Instead, combining its use as soil improver and bioenergy fuel shows promise. We are incorporating these inputs into the ongoing work with the circular business model of HPA.

**Expected:** *“Sharing knowledge on the tendering process in an innovative project”*

Activities related to this expectation will occur in Phases 2 and 3.

### Area 3: Sewage Sludge

**Expected:** *“New solutions established for domestic biowaste, garden/park waste, and sewage sludge”*

**Expected:** *“Circular business model and value chains for the three residual biomass flows”*

The work in Area 3 of C13 focusses on test and trials of new methods to treat sewage sludge. The aim is especially to explore the feasibility of pyrolyzing sewage sludge. In accordance with WP4 SAK has engaged in:

- Initial efforts focused on a local pyrolysis plant, which proved non-viable due to insufficient energy content on the island (Samsø).
- Subsequent attempts examined co-pyrolysis of sludge, HPA, and wood residues. However, this approach was also deemed economically unfeasible for a smaller municipality such as SAK.

So, since SAK cannot operate a pyrolysis plant due to the financial unviability, private sector collaborations are being explored for future potential. Deliverable 1 “Memo/knowledge status on impacts of biochar” and 2 “Article on sewage sludge pyrolysis” provides an extensive look into technologies for treating residual biomass from households, wastewater and agriculture and the status of our work in SAK.

**Expected:** *“Experience with sewage sludge pyrolysis and biochar used to improve carbon capture”*

Discussions with ComFerm in 2024 examined the feasibility of drum composting without methane or nitrous oxide emissions. ComFerm is a Danish business that has developed a biocirculators, which can create new value from waste biomass by converting it into, for example, fertilizer, compost, clean water or heat. Learn more about ComFerm’s work here: [PowerPoint-præsentation](#)

Funding applications to test and invest in such facilities are underway, with expected clarification by 2025.

**Expected:** *“Implementation of new organisation types for circular biomass treatment”*

**Expected:** *“Partnership on circular residual biomass flows in CDR”*

**Expected:** *“Increased awareness of citizens/stakeholders in relevant areas”*

**Expected:** *“Sharing of gained results and knowledge for the benefit of soil and nutrient recycling”*

**Expected:** *“Business awareness of achievements”*

**Expected:** *“Knowledge of the biochar market communicated to SAK and nationally”*

Activities related to these six expectations will occur in Phases 2 and 3.



*Receiving station for biomass.*

#### Communication

Phase 1 activities yielded limited communication outputs, primarily focused on pyrolysis and Samsø activities:

- Article: "[Biomasse og biogent kulstof - nøgleressourcer i fremtidens cirkulære samfund](#)" (April 2023).
- Article: "[Pilotprojekt: Samsø har slået pæle i til Danmarks højeste kvashegn](#)" (March 2023).

#### **B. Evaluation**

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged.

#### Progress, Successes, and Lessons Learned

- *Collaboration:* We've experienced a strong interdisciplinary cooperation within the C13 working group. However, it requires a lot of hard work and dedication to collaborate across different organizations.
- *Capacity Building Efforts from C1:* Mixed results from cross-sectoral events hosted by the PM Unit; AVA found them less relevant due to project specialization, while RK gained valuable insights that could be used in their work.
- *External Partnerships:* Collaborations with Food & Bio Cluster and DTU enhanced knowledge of pyrolysis and household waste which have provided the partners with a better technical baseline for progressing into the work of Phase 2.

#### Challenges

- *Market Issues:* The market lacks scalability for alternative household waste treatment technologies. AVA is cooperating with three other waste companies and municipalities in regard to household food waste. But, there is very little readiness to innovate beyond composting in HPA treatment and this weakens the ability to achieve the desired results.
- *Organizational and local constraints:* National requirements for sorting into 10 fractions delayed the progress of AVA's work because the new sorting system had to be prioritized within their organization. Also, SAK conducted a transport analysis which showed minimal CO<sub>2</sub> impact when transporting biofractions of the island. This has prompted exploration of localized composting facilities to ensure a feasible circular business model.
- *Legislation:* National laws limit treatment options for household waste by waste companies such as AVA. Also, AFLD's handling of HPA was restricted by recent regulatory changes. However, AFLD have still managed to accomplish the planned activities and continue to optimize composting practices. The national waste regulation governs waste management in Denmark and sets requirements for sorting, storage, and treatment of waste, including organic waste that can be composted.

The Environmental Protection Act establishes the framework for protecting the environment in Denmark, including regulations on waste handling. Compost processing must adhere to environmental standards to minimize pollution and protect soil, water, and air.

### C. Targets and goals for Phase 2, 2025-2027

RK aims to finalize an initial HPA compost tendering by 2024 and conduct household biomass experiments starting in 2025. This will be followed with evaluations and reporting by DTU.

SK will pursue drum composting for localized biomass retention.

AFLD will refine HPA composting processes.

AVA will establish a circular food partnership network with a soil-to-soil approach and prepare for a new household waste tender.

### D. After Life

Although concrete results from Phase 1 are limited, RK's analyses are expected to inform future tenders within the different areas. Incorporating experiments as minimum requirements in tenders may become standard practice where appropriate.

### Action C14: Turning Business Waste into Resources, Jobs and Start-ups

Waste from businesses comes in large quantities and has certain qualities that make it suitable for reuse and for being utilised in the market for secondary raw materials. It must be treated appropriately to avoid downcycling, loss of value and incineration.

C14 contributes to CE Beyond Waste O1 by developing a generic model for upcycling commercial waste through facilitating symbiotic collaborations between handlers of business waste and producers of building materials (C14.1), making use of industrial waste in a partnership with entrepreneurs and knowledge institutions, paving the way for new CEBMs and start-ups (C14.2) and by providing businesses and municipalities with the competences, knowledge, and concrete tools to support the implementation of circular practices in businesses (C14.3). C14 contributes to O2 by a particular focus on the market for secondary raw materials by improving the treatment of business waste and its circulation to avoid down-cycling and incineration. One way is to focus on the demand-side of business waste, often neglected to the benefit of the 'supply-side' of waste', to develop a generic model for the industrialization of recycling waste for production (C14.1). Finally, C14 contributes to O3 by providing input for better governance as a result of the outcomes of C14.1, C14.2, C14.3.

C14 serves the APCE with particular attention to CH1 Section 1.1 Visions, targets and indicators; CH3 Section 3.3 Resource efficient businesses, Section 3.4 Green and TCO procurement, and Section 3.5 Circular business models; CH4 More and better recycling; and CH7 Section 7.2 Solutions across the value chain, design and more knowledge.

C14 demonstrates EU added value by addressing the EU WFD/2018 with particular attention to; (CH2 Article 8, 9 and 11) as well as EU WFD/2018 (CH3, Article 15).

### **Action C14.1: Industrial Recycling for Construction (IRC)**

Beneficiary responsible for implementation: Skive Municipality (SKK)

Other beneficiaries participating: Business Skive (BS)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of the action is to up-scale waste recycling to an industrial level by facilitating symbiotic collaborations between handlers of business waste, on the one hand, and producers of building materials, on the other. The goal is to develop a generic model for industrialization of waste recycling for new production to be applied in other business sectors as well – and facilitate the establishment of these waste transformation industries and the partnerships behind it. In the following paragraph the activities and results from phase 1 are presented.

Amendment No. 1 included a new partner uptake in the action, Business Skive (BS), in order to gain new competences within i.e. business models and value chains. BS will be working with companies and other organisations along the value chains as well as contributing with experience and knowledge about developing business models.

#### **PM unit's (CDR) overall assessment of action**

C14.1 has shown promising results in developing circular business ideas based on the upcycling of commercial waste. The team behind it has excelled by being highly active in the field, networking, and gathering knowledge to identify the best technical and business minded opportunities.

As a result of this, SKK has engaged in dialogue with companies that specializes in automated sorting of construction and demolition waste to possibly establish in GreenLab or other parts of SKK's area. GreenLab is a green and circular industrial park located in Skive that aims to accelerate the green transition of industry through large-scale testing of new technologies, direct connection of industrial production to renewable energy, and mission-driven research. Read more about Greenlab here: <https://www.greenlab.dk/about/>.

Several concrete IRC (industrial recycling for construction) pilots have already been initiated, providing a solid foundation for carrying out the planned pilot tests in Phase 2.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C14.1 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029

WP	I	II												
<b>C14.1</b>														
<b>WP1</b>														
<b>WP2</b>														
<b>WP3</b>														
<b>WP4</b>														

### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
<b>WP2 Innovation</b>
<ol style="list-style-type: none"> <li>1. Establish the IRC reference group; host workshop to frame the IRC field of business.</li> <li>2. Map IRC field of business (carried out by the project group). Includes desktop study of research; field surveys to get an in-depth insight into challenges and solutions; data mining and modelling to estimate business potentials; stakeholder interviews to clarify know-how and competencies needed and available; business analysis to reveal quantitative and qualitative opportunities.</li> <li>3. Hold IRC business workshop; the reference group evaluates the findings of the mapping on basis of which they generate ideas for technical solutions and business models.</li> <li>4. Develop an IRC business prototype, based on the recommendations given by the reference group. Min. 30 prototypes will be presented to the reference group before.</li> <li>5. Hold IRC Focus Workshop; the reference group evaluates the developed business prototypes and selects 5 to be developed into pilot project in phase 2.</li> <li>6. Produce an IRC report.</li> </ol>
<b>WP3 Pilot projects</b>
Facilitate the establishment of pilot project for IRC productions, incl. the partnerships behind and funding of the projects.
<ol style="list-style-type: none"> <li>1. Test of the 5 selected business prototypes on a small pilot scale before taken to full scale.</li> <li>2. The project group facilitates the establishment of 5 pilot projects for the transformation of business waste into building materials. It will include developing the projects, setting up the partnerships behind and seeking public and private funding for them.</li> <li>3. 5 IRC business cases will be formed for subsequent uptake by interested companies and investors.</li> </ol>
<b>WP4 Implementation</b>
<ol style="list-style-type: none"> <li>1. Promotion and uptake of IRC development model in all sectors - incl. facilitating the formation of the consortiums behind full-scale IRC productions.</li> <li>2. The iterative process unfolded in the previous IRC actions represents a model for how to industrialise the recycling of waste to produce building materials.</li> </ol>

3. This IRC model shall be described and visualised graphically to be used as a promotion tool for the uptake of the developed IRC business cases by stakeholders with the competences and capacity to do so and to attract the needed investments to establish full-scale productions.

4. Finally, the IRC model will be transformed into a generic model for the industrialisation of recycling within all sectors – in addition to construction. It will be promoted in relevant national and international business networks and inspire the industrialisation of recycling within a wide range of sectors and productions worldwide.

5. This promotion phase will commence in January 2028 and last till the end of 2029.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/ Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUT-LER
Report on 5 sustainable and feasible IRC business cases	WP2	15.12.2027	Not started	-	-
Generic model for industrialisation of recycling - in writing and graphics.	WP4	31.08.2029	On track	-	-

Name of the Milestone	Related Work Packages	Original/ Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUT-LER
IRC Business workshop held - prototypes selected	WP2	31.10.2023	Achieved	31.10.2023	N/A
IRC Focus workshop held, 5 potential pilot projects outlined	WP2	30.09.2024	Achieved	30.09.2024	N/A
Complete report on IRC potentials, incl. prototypes and pilots	WP2	31.12.2024	Achieved	31.12.2024	N/A
All IRC Pilot projects initiated	WP3	15.12.2027	Not started	-	-
Realisation of IRC Business cases initiated	WP3	31.07.2028	Not started	-	-
Generic model for industrialisation of recycling developed	WP4	31.08.2029	Not started	-	-

### Explanation for the delays in the Deliverables and Milestones (if any)

N/A

## A. Expected and achieved results

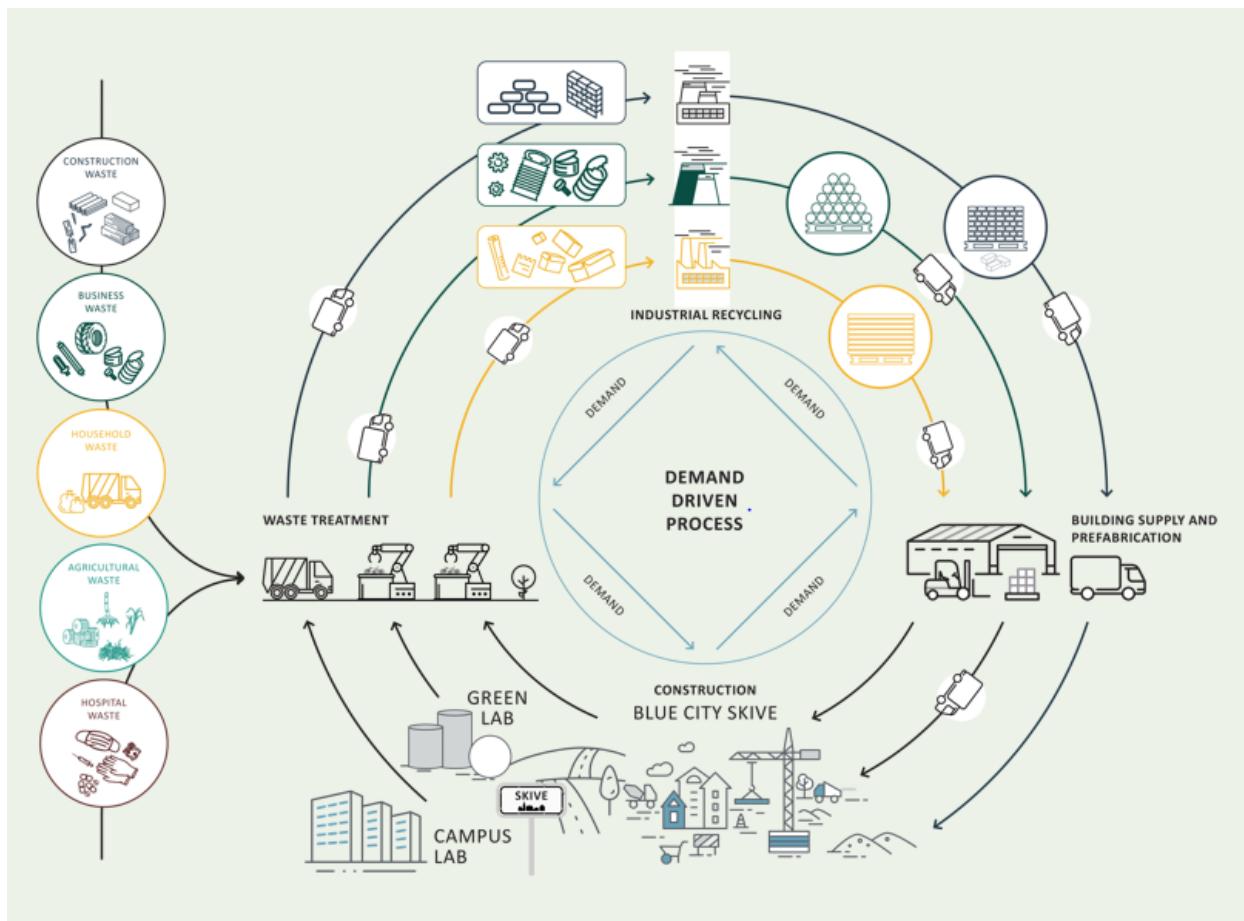
### The correlation between expected and achieved results

**Expected:** "A complete overview of the IRC field of business"

**Expected:** "In-depth insight into the opportunities and challenges"

The industrial recycling for construction (IRC) field of business has been mapped and condensed into five work-in-progress documents concerning: sustainable building materials, sustainable construction, circular product development, business waste and the lack of building materials. The research is based on our work with WP2, which includes desk research and field research at 10+ conferences (i.e. Circular Build Forum - <https://molio.dk/kurser/konferencer/circular-build-forum>) , in 10+ workshops (i.e. Masterclass in absolute sustainabiliy and 100+ company meetings (i.e. a:gain - <https://www.again.dk/>). Several company meetings have taken place at the conferences and have not been registered, but the list of conferences and more formal company meetings can be found in Attachment 13, Annex 5. Continuously, SKK works to identify new opportunities and challenges and incorporate these learnings into our on-going work on sustainable and feasible business cases.

As part of deliverable 2 "Generic model for industrialisation of recycling - in writing and graphics" a proposed generic model has been developed. Supplementary models (demand driven innovation model, take-back business model) have also been developed and tested. The learnings and testing of these and other related models will reiterate the initial generic model.



**Expected:** "Selection of end-products in high demand and with high input of recycled waste fractions"

From the IRC research, we learned that it would be purposeful to focus on not only the end-products, but also other, related solutions spread throughout the value chain. The circular construction market still needs to mature, before it is even possible to deliver high demand, high input products.

Thus, an initial overview of high potential focus areas was created that includes IRC solutions along the whole chain. The identified focus areas were waste sorting technologies, materials from demolitions, waste based industrial symbioses, take-back business modeling, and the production of building materials based on bio waste streams.

**Expected:** *“Overview of potential technical solutions and business options”*

Based on the high potential focus areas, new business options have been generated in an iterative process. It has been a distinct focus in the process to facilitate a flow of knowledge from our research to local and regional initiatives, projects, and companies. This anchoring of knowledge and co-creation is considered crucial in realizing the potential due to network effects.

**Expected:** *“30+ business prototypes for transforming waste into building materials at an industrial scale”*

Business prototypes have been developed, involving SKK, national and local stakeholders, and an informal reference group (management from Energibyen Skive - Energibyen Skive is a team in SKK's Department of Business & Development and Business Skive). However, no workshop has been held, and no formal reference group has been established, since our research revealed that the circular construction industry is immature. Instead, we deal with early-stage industry development and as such, it relies much more on ad hoc groups and workshops, partnerships and networking.

30+ business prototypes have been described in business models of varying degrees of detail because of the iterative nature of business development. Some have been dismissed along the way due to technical issues (e.g. detection of hazardous substances in a continuous production process), others due to legal challenges (e.g. waste regulations), lack of relevant stakeholders (e.g. no appropriate investors) or difficult scaling (e.g. logistics from a demolition site to a reproduction site).

The business cases that are estimated to have a high potential are detailed below.

**Expected:** *“5 IRC business cases with high potential – both environmentally and economically”*

The business prototyping has led to the selection of five IRC business cases showing high potential:

- An automated and digitized sorting plant for business waste, including CDW.
- A brick cleaning machine for unbroken blocks of bricks laid with cement mortar.
- A production incubator for shared production of biowaste based building materials.
- A Waste2Build industrial symbiosis for companies sharing resources and services.
- A recycling factory for used linoleum flooring in a joint operation with producers.

Preliminary business case calculations have been made for the waste sorting plant, the brick cleaning machine, and the recycling factory for used linoleum flooring. We expect the realization of the waste sorting plant to be initiated in early 2025. SKK are currently considering how to spend unused funds to analyze the business cases of the remaining ideas. The findings will also support funding efforts.

**Expected:** *“A platform for upscaling waste recycling to the industrial level is established in phase 1 [https://www.greenlab.dk/about/”](https://www.greenlab.dk/about/)*

While the 5 potential pilots have been synthesized by SKK, the strategic decisions on Waste2Build and Bio2Build have been incorporated in the Growth Partnership of Skive Municipality.

The Growth Partnership of SKK has been prioritized to work on both the Waste2Build and Bio2Build agenda. Read more on the concrete projects here: <https://giw.dk/giw2024/cdc/gc-waste2x-hub/>. The CEBW action has been key in making this strategic decision happen, while also encouraging and ensuring a closer collaboration between relevant, local stakeholders. Both Energibyen Skive and Business Skive now have obtained a strengthened mandate to continue the IRC efforts.

**Expected:** “5 pilot projects established with funding”

As part of deliverable 1 “Report on 5 sustainable and feasible IRC business cases” SKK have an intensified focus on establishing IRC pilot projects with funding to ensure their viability. The waste sorting plant is ready for commercial investments while the remaining projects need to mature via soft and public funding.

For the brick cleaning machine, soft funding worth app. DKK 0.4mn has already been granted from WasteLife (Teknologisk Institut, Industriens Fond), Kickstarterprojekt (MADE), Samarbejdsprojekt (MADE). An application for SMV Digital, testing the use of robotics for cleaning operations, is underway.

Currently, we are actively working on securing funding from a range of sources, including Realdania’s Veje til Biobaseret Byggeri, EU Horizon, Industriens Fond, and Circular Invest.

### Communication

The action has also achieved several communication results in phase 1. The activities in Phase 1 have resulted in varying tools which can and have been used in communicative efforts:

- A model for calculating and evaluation of take-back scenarios, Fixrs Aps
- Presentation for the Business and Labor Market Committee in Skive Municipality
- Presentation for the Technical and Environmental Committee in Skive Municipality
- Presentation for Danske Facilities Management
- Data analysis for automated sorting plants, COWI
- Recycle of Linoleum for a Circular Future, Minor Change Group
- Guide on how to produce new products based on waste, the Danish Technological Institute

The activities and results have also appeared in different media outlets:

- <https://www.cebeyondwaste.eu/presse-og-nyheder/nyheder/minedrift-i-skive/>
- <https://bskive.dk/2023/02/28/fra-affald-til-byggematerialer/>
- <https://rentliv.skive.dk/rent-liv-fortaellinger/fortaellinger-2023/nye-gamle-moebler-til-skive-bibliotek/>

### **B. Evaluation**

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged.

### Progress

The action has progressed timely and so far, yielded success both on the strategic and the operation level.

SKK has focused on facilitating and scaling new circular value chains connecting business waste suppliers with the demand for building materials. Early on, the sorting and environmentally appropriate handling of waste arose as a key activity. Drawing on this experience, SKK worked on identifying stakeholders to establish material recovery facilities. By the end of Phase 1, SKK is in dialogue with a company of this sort. Its automated sorting of Construction and Demolition Waste (CDW) will bring about 10-15 new jobs, and handle 30,000t of waste annually. However, since the deal is not yet sealed, the name of the company must remain confidential.

Two models concerning the transformation of waste into products have been outlined and tested already. Both models, and their testing, will help shape the generic model for industrialization of waste recycling.

1. A demand driven innovation model leveraging AI to generate suitable solutions to technical and commercial challenges. It has been tested on the recycling of used linoleum flooring, leading to a visit to Forbo, the world's largest manufacturer of such products.
2. A take-back calculation model to support decisions on the configuration of take-back in a value chain. Tests have been conducted with e.g. WindowMaster, a supplier of natural ventilation solutions.

#### Result evaluations, successes and learnings

By the end of 2024, there was dialogue about a DKK +30mn waste sorting plant that will enable the match between high volumes of waste and high intake of resources to produce building materials in SKK's area.

IRC has been a significant driver in integrating the waste and biowaste agenda in the Growth Partnership of SKK. Now, Waste2Build and Bio2Build have been prioritized as a strategic path to green growth.

Finally, the action has paved the way for a closer collaboration between local stakeholders working on circular economy. This collaboration might grow into a circular hub based on local strengths and resources.

This action has brought about much organizational and interorganizational learning. Interacting with potential new businesses, ready to locate themselves in SKK's area, has pinpointed the need to work together. There is a need to build the capacity internally at SKK, and SKK also needs to build the capacity to collaborate. This is crucial learning that could be put to good use in a possible, future circular hub.

Throughout the action, we have worked with partners from other CEBW-actions and the CEBW events have helped us network with other municipalities:

- Dialogue with Randers Municipality (C9) regarding waste amounts and data collection.
- Frederiksberg Municipality (C14.3) has provided documents on how to integrate circular economy topics in environmental inspections.
- SKK has promoted the work of Horsens, Aarhus and Silkeborg municipalities (C10.1) on how to deal with circular construction in a municipal setting.

#### **C. Targets and goals for Phase 2, 2025-2027**

By the end of Phase 1, SKK have reached a new understanding of the circular construction industry and been able to initiate the realization of some pilot projects. Accordingly, SKK are ahead of the action plan, and can push harder to accomplish the targets and goals of Phase 2.

Based on learnings from phase 1, SKK will continue to work on creating new partnerships with relevant local/national/international stakeholders in the circular construction industry

The pilots represent different levels of maturity. The automated waste sorting plant is ripe for commercialization and will hopefully be established within the next few years. The brick cleaning machine is being prototyped via funds from clusters and other sources of public funding. Currently, SKK are working on describing the remaining pilot projects and preparing for fundraising from the EU or private funds.

While trying to fund and establish pilots, SKK are also looking for new potential (e.g. an EU Horizon project on developing a municipal circular construction practice).

#### **D. After Life**

By the end of 2029, SKK intends to have established a circular hub in Skive Municipality's area. The hub will most likely coordinate funding, networking and project development activities across the local green development stakeholders. The organization might also offer circular services (e.g. legal) to both public and private entities. SKK finds inspiration in organizations such as Kalundborg Symbiose.

### **Action C14.2: Process model for creating waste based start-ups**

Beneficiary responsible for implementation: Holstebro Kommune (HbK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2025

#### **Purpose of action**

The purpose of the action is to develop start-ups working with products based on surplus resources and/or waste to reduce waste whilst creating new business opportunities. The expected results are therefore driven by the aim to transform waste and surplus materials from existing companies into valuable resources, fostering innovation and sustainability in startup development. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

The action lead has managed to flip a project from a starting point in residues from industrial production to a process where upcoming entrepreneurs develop, and test innovative circular ideas. During Phase 1, C14.2 has developed a process model that enables entrepreneurs to create new and innovative business models based on surplus resources and waste. The process model has been tested through the HbK project Loop Hub, which is a creative development centre for entrepreneurs. The vision has been to create a development process within Loop Hub, where entrepreneurs and businesses can collaborate to find solutions that foster both economic growth and reduced environmental impact.

The PM unit consider the work of this action very promising and innovative in the field of entrepreneurship and material recycling creating waste-based start-ups.

Based on the developed model, C14.2 have created a course named REvolver which has already led to new businesses such as *Paint It Forward Holstebro* ([Paint It Forward](#)) and a collaborative project that upcycles one-use carpets for multiple-use in the construction industry (<https://www.theupcycl.com/cases/upcycling-carpets-for-the-construction-industry>)

C14.2 are collaborating with education units in both HoK and Latvia to test new and exciting ways to use the course in other educational settings. The course is currently being taught to architect students who are tasked to design new and circular uses for an old existing hospital site in HoK.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C14.2 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II

C14.2														
WP1		Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
WP2		Green	Green	Yellow										
WP3			White	Green	Green	Green	Green	Yellow						

### Explanation for timetable delays (if any)

WP's 2 and 3 are postponed due to the fact that challenges in developing the concept of the test course, led to a decision to divide participants into a 3-parted educational program, which will take place spring 2024, autumn 2024, and spring 2025.

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
WP4 and WP5 are followed by a stage, where the experiences from the project are distributed amongst and communicated to relevant stakeholders.
WP2 Development of a process model
<ol style="list-style-type: none"> <li>1. Outline the current landscape of experiences with existing, relevant process models, which can be used as the project's point of departure. The task involves research, which will be carried out as a mix of desk research and dialogue/interviews with relevant experts and clusters of experience from Denmark and abroad.</li> <li>2. List experts with the relevant competencies and experiences based on the findings in task 1 and establishing contact with these experts.</li> <li>3. Facilitate a multi-stakeholder innovation course with the identified experts. This includes a clarification of the assumptions and hypotheses we build upon in the new innovative process.</li> </ol> <p>Simple validation of hypotheses for instance through the method called "prototyping".</p>
WP3 Test and adjustment of the process model
<ol style="list-style-type: none"> <li>1. Screen and engage the 15 companies and 45 entrepreneurs (or youths who have the drive and potential to become entrepreneurs).</li> <li>2. The test course itself. This is where the model is used and where new knowledge is generated. During the test course, support is provided for the entrepreneurs in relation to fundamental elements of developing a business today. This includes, e.g., development of a business case, test and validation of hypotheses, go-to-market strategies, evaluation of progress and establishing the right team.</li> <li>3. Continuous monitoring and evaluation of real progress.</li> <li>4. Feedback loop for the development of new methods for when we experience issues or see new opportunities. This entails continuous learning and adjustments to the process model.</li> </ol>

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
A screening tool for sourcing companies	WP2	15.12.2022	Completed	15.12.2022	YES

A screening tool for sourcing entrepreneurs	WP2	15.12.2022	Completed	15.12.2022	YES
A model for establishing strategic partnerships between start-ups and established companies	WP2	15.12.2022	Completed	15.12.2022	YES
A design and process model for turning waste into new marketable products	WP3	31.12.2024	Delayed	31.12.2025	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <b>If delayed, new deadline</b>	In BUTLER
Mapping, desk-research and validation completed	WP2	11.07.2022	Achieved	11.07.2022	N/A
Version 1 of the process model completed	WP2	15.09.2022	Achieved	15.09.2022	N/A
Screening and agreements with 15 companies	WP3	01.12.2022	Delayed	01.12.25	-
Screening and agreements with potential entrepreneurs	WP3	01.12.2022	Delayed	01.12.25	-
Version 2 of the process model	WP3	01.02.2023	Delayed	30.06.25	-
15 entrepreneurial businesses have been established	WP3	01.12.2024	Delayed	01.12.25	-
Final process model	WP3	31.12.2024	Delayed	31.12.25	-

#### Explanation for delays in Deliverables and Milestones (if any)

The final delivery of the design and process model (Deliverable 4) will be delayed to 31.12.25. This is due to challenges, mentioned under Timetables, in developing the concept of the test course, which meant that three test courses take place spring 2024, autumn 2024, and spring 2025. The delays in Milestones are caused by the same challenges.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** "A process model for developing waste-based start-ups"

In order to develop a viable model, we have done extensive desk-research into circular economy to understand how best to support and guide entrepreneurs. Furthermore, as part of WP2, we have done research on our local area and developed screening tools to search for potential entrepreneurs and companies. These tools are available in deliverables 1 and 2 "A screening tool for sourcing companies" and "A screening tool for sourcing entrepreneurs".

Based on our learning we have adapted our focus. We have expanded the action to include circular business models in general, rather than limiting it to business models based solely on surplus materials

and waste from the production industry. The original focus was too narrow for a city like Holstebro, with its size and population, making it difficult to attract participants. By including circular business models more broadly, we believe the action will create more value, ensuring that we don't simply end up with a product made from waste that has only one additional lifecycle before becoming waste again.

In Phase 1, we have developed our first version of a process model that enables entrepreneurs to create new and innovative business models based on surplus resources and waste.

In this caterpillar figure you get a sense of the process model that we have developed. This process model has been the foundation of the entrepreneurial course REvolver. <https://loophub.dk/ivaerksaetterkurset-revolver/>. The approach to idea development, is emphasizing an approach where the viability of an idea is assessed from multiple levels before implementation. Symbolizing this process with the phases from egg to butterfly illustrates how an idea matures through different stages. The three main perspectives are:

1. The Business Perspective: Here, the economic viability of the idea is assessed through market analysis to understand competition, target audience, and revenue sources.
2. The Human Perspective with focus on how the idea affects people, including user experience and social consequences. Questions such as "How do users interact with our product?" are central. Additionally, it's important to consider whether it is beneficial for the entrepreneur.
3. The Environmental Perspective: In this phase evaluates the idea's impact on the environment, including resource consumption and sustainability.

By incorporating these perspectives, it is ensured that the idea is economically viable, beneficial for people, and environmentally friendly, which leads to more sustainable innovation processes.

We also decided to partner with The Upcycl, a national platform with a wide network of partner companies (primarily production companies), allowing participants to access a much broader selection of surplus materials. This has allowed for more flexibility in business model development, ensuring participants can align their ideas with sustainable practices. Additionally, The Upcycl is in the process of expanding internationally, and there are similar platforms available, providing further flexibility. Learn more about The Upcycl here: [THE UPCYCL | The Future of Business is Circular](https://theupcycl.com/cases/upcycling-carpets-for-the-construction-industry)

**Expected:** "15 SMEs established"

By the end of 2024, we have completed two programs to test and adjust the process model, each with about 15 participants. The participants have begun working on developing circular business models based on skills and passions. The programs have introduced them to the principles of the circular economy and provided practical steps for prototyping and business model development.

One participant is collaborating with The Upcycl. They have developed a business that cleans one-use carpets from showcases, exhibitions and events which are then used by the construction industry as multiple-use carpeting. Traditionally, this industry relies on virgin materials like plastic sheets and new carpets for surface protection. But now the upcycled floor-covering carpets can be repurposed for use in construction which help reduce waste and CO2-emissions from contractors such as the company BYGMA Gruppen A/S. Learn more about the project here: <https://theupcycl.com/cases/upcycling-carpets-for-the-construction-industry>

LOOPHub have created a venue where an idea (the entrepreneur), a network (The Upcycl) and a demand (BYGMA) can meet to create, develop and enhance more circular solutions and businesses.

While we are making progress, establishing 15 new startups remains a challenge, as not all participants have economically viable ideas, and many need more time to refine and develop their concepts.

The ideas need to be refined and further developed into sustainable business models before they can be launched. It is our experience that this process extends beyond the test programs. The entrepreneurs continuously use LOOPHub for knowledge sharing and as testing site to develop their ideas into actual viable businesses.

**Expected:** *"An estimated 10-20% reduction in waste production from the companies participating in the project. This depends on the nature and scope of strategic partnerships between start-ups and production companies."*

The anticipated reduction is a longer-term result. It requires more time for data collection and measurement to fully assess the impact of these new business models on waste reduction. We're working with The Upcycl to collect data.



Two test programs with participants developing circular business models and/or waste-based startups or has been completed. The images are from LOOP Hub's physical space at Slagteriet in Holstebro.

#### Communication:

The action has achieved quite a lot of media coverage so far. Links to some of it:

- <https://erhvervplus.dk/job-og-arbejdsliv/hvad-giver-dig-glaede-jonas-haab-er-det-kunne-vaere-at-blive-ivaerksaetter>
- <https://erhvervplus.dk/job-og-arbejdsliv/67-aarige-per-har-masser-af-ideer-jeg-glemte-vist-at-kigge-paa-daabsattesten-da-jeg-stiftede-firma>
- <https://dagbladet-holstebro-struer.dk/holstebro/67-aarige-per-paa-ivaerksaetterkursus-verden-er-i-forandring-og-det-er-enormt-vigtigt-at-foelge-med>
- <https://zweck.dk/en/cases/loophub/>

Also, several websites have been created which feature and disseminate the results of C14.2:

- <https://loophub.dk/ivaerksaetterkurset-revolver/>
- <https://www.holstebro.dk/loophub>

## B. Evaluation

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged.

### Evaluation of results and Successes

- *Expanded scope:* One of the primary successes in Phase 1 was expanding the actions scope to include circular business models in general, rather than focusing solely on surplus materials from the production industry. This made the program more adaptable and relevant, especially for a municipality like Holstebro.
- *Iterative approach:* The decision to split the test program into three smaller programs rather than one large program proved valuable. This approach allowed us to adjust the process in an iterative manner, improving the participant experience. Additionally, it became easier to recruit participants in smaller groups, and each individual received more focused attention and support which supported better results.
- *Collaboration with ZEAL:* The process model and test programs were developed in collaboration with the consulting firm ZEAL, whose expertise and years of experience have helped improve the model. Their insights helped shape our framework for circular entrepreneurship. Learn more about ZEAL here: [zeal – sustainable strategy – since 1980](#)
- *Physical space at Loop Hub:* A major success was implementing the in a physical space and workspace for entrepreneurs at [Loop Hub](#), located at Slagteriet in Holstebro. Developed by HoK, this space is designed to facilitate entrepreneurial development and includes workshops and a material library from The Upcycl. The physical environment has been highly beneficial in supporting participant engagement and creativity as it can be used in many ways such as knowledge sharing, testing site, networking and educational center.

### Learnings

- *Adaptation of test programs:* The first test program was conducted as a hybrid (virtual and physical) program, but after receiving feedback from participants, we transitioned to fully physical sessions for the second program. Participants felt they benefited more from in-person engagement. We are also in the process of transforming some of the teaching content and exercises into video materials and digital tools for future use, ensuring the sustainability of the entrepreneurship program after CEBW concludes.
- *Circular economy understanding:* Participants benefited from a deeper understanding of circular economy principles. Starting with self-reflection and planetary boundary principles helped them create more meaningful business ideas and connect to the mindset of circular entrepreneurship.

### Challenges

- *Startup establishment:* Establishing 15 fully viable startups has proven challenging, as many participants are still in the early stages of refining their ideas. Building sustainable businesses from scratch takes longer than initially anticipated. We wish to foster start-ups that are sustainable and circular and some ideas are just not ready or meaningful to turn into businesses.
- *Measuring waste reduction:* Measuring the expected 10-20% waste reduction from production companies remains complex but we are collaborating with the Upcycl in an attempt to collect relevant data.

- *Participant recruitment:* Although splitting the test programs into smaller programs helped, recruiting participants has been an ongoing challenge. The decision to divide the programs made it easier to manage, but it remains an area for continued focus.



### C. Targets and goals for Phase 2, 2025-2027

In Phase 2, we will build on the results of Phase 1 with a focus on strengthening our process model to help entrepreneurs develop waste-based start-ups and circular business models.

We aim to:

- Try a different method for our test program for potential entrepreneurs.

We will develop and test at least one new method of our process model in Phase 2. Currently, we have entered a partnership with RIGA University and VIA university to create a course based on the learnings from our test programs. The first new test program is already underway in start 2025. In this program architect students from RIGA and VIA are developing and testing new uses for an old existing hospital site in HoK based on the circular process model designed in C14.2.

- Complete the development of digital tools and educational materials that also can be used post-project to ensure long-lasting impact and accessibility of the methods.
- Monitor impact - regarding the progress of the start-ups established through the test programs and the waste reduction created.

### D. After Life

We believe that the methods we have created could have the potential to make an impact and contribute to the establishment of more start-ups advancing a circular economy. In collaboration with external partners, the test programs might continue in some form as development programs for aspiring entrepreneurs.

We see potential in sharing our experiences with other organizations and municipalities in Denmark and internationally. The digital tools and educational materials can support this knowledge transfer and inspire similar initiatives elsewhere.

### **Action C14.3: Accelerating circular economy within businesses**

Beneficiary responsible for implementation: Frederiksberg Kommune (FbK)

Other beneficiaries participating: Hvidovre Kommune(HVID), Albertslund Kommune (ALBK), Rudersdal Kommune (RUDK), Bornholms Regionskommune (BRK)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2024

The main activities of this action were scheduled to be finalised in Phase 1, and this has been fulfilled.

#### **Purpose of action**

The main purposes of the action are capacity building among companies and municipalities on waste prevention, recycling, and circular economy (CE) in general, as well as the development of accompanying tools and experiences from demonstrations. Ultimately, the action will help reduce waste and increase recycling, thus preventing waste incineration and landfill use. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

This action has created meaningful and hand-on concepts using an iterative and collaborative method that strengthens the tools' accessibility for both municipalities and cooperations. They have succeeded in spite of changing project managers and natural misalignment when different organizations (in this case the five municipal partners) collaborates.

This action is important and timely, especially in light of the [strengthened waste supervision](#) that came into effect on January 1, 2025, following new legislation. The enhanced supervision means that more companies will be subject to both administrative and physical inspections moving forward. Therefore, the developed and easily accessible materials developed in C14.3 is highly relevant and useful since they can strengthen the competencies of both businesses and inspection officers in incorporating circular economy principles.

It is the belief of the PM Unit that the developed concepts and tools have a high potential for replication across Denmark and perhaps also in countries with similar supervision setups. This potential will be further explored in Phase 2 and 3.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C14.3 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II

C14.3														
WP1														
WP2														
WP3														
WP4														

### Explanation for delays in work packages (if any)

The deadline was proposed to be changed to 31-12-2024 because 1 of 3 tools have proven more complex to develop than expected.

Activities
<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3. Results will be shared with the LIFE IP partners and communicated to the Danish waste sector in general.
<b>WP2 Concept for municipalities' dialogue with companies on CE</b>
<ol style="list-style-type: none"> <li>1. Map the municipalities' legal and administrative possibilities for guidance in waste prevention and CE.</li> <li>2. Analyse specific needs of municipal employees for initiating a fruitful dialogue with local businesses about circular practices.</li> <li>3. Develop, test and demonstrate concept and tools through the business-oriented activities of the participating municipalities using a trial-and-error approach and creating a pool of experience.</li> <li>4. Disseminate concept, tools and best practice examples to other municipalities in all of DK. Linked to C1, capacity building and to the upcoming national waste supervision scheme.</li> <li>5. Evaluate the concept and tools and describe lessons learned and results achieved for the purpose of further replication and in order to support adjustment of the concept to local circumstances in replication municipalities.</li> </ol>
<b>WP3 Tools assisting companies in CE activities</b>
<ol style="list-style-type: none"> <li>1. Map existing knowledge and experiences on (overcoming) barriers, tools and guidelines for CE directed towards businesses, especially SMEs.</li> <li>2. Analyse the specific needs for tools to guide and assist the businesses in their transition towards circular practices.</li> <li>3. Develop hands-on tools for businesses and test and demonstrate them in selected representative companies in a trial-and-error process. The tools will include guidelines on separating waste and support identifying potentials for reducing waste.</li> <li>4. Disseminate tools and best practice examples to municipalities, businesses and relevant stakeholders across DK for testing, further adjustments and use. Linked to C1 capacity building and to the upcoming national waste supervision scheme.</li> <li>5. Evaluate the tools and describing lessons learned and results achieved.</li> </ol>
<b>WP4 Cooperation between municipalities, industry and other actors</b>
<ol style="list-style-type: none"> <li>1. Collect general knowledge and data about Danish business waste and the value chain for business waste through desk research and interviews with key actors. Feeding it into WP2 and WP3.</li> <li>2. Establish and support a thematic working group under the IP Advisory Board (cf. C1), in order to ensure that the most important stakeholders are involved and provide input to the processes of development and dissemination in WP3 and WP4.</li> <li>3. Coordinate and align the development processes in all WPs with the upcoming national concept for waste supervision through dialogue with the EPA.</li> </ol>

4. Building knowledge and capacity and creating the foundation for future value chain collaborations in dialogue meetings between other beneficiaries and stakeholders from the business value chain. The involved actors will target both upstream (suppliers and producers) and downstream (waste collectors and recipients) parts of the value chain.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
At least one tool for SMEs on circular practices	WP3	30.06.2024	Completed	31.12.2024	YES
3 written show-cases on businesses preventing waste and how they cooperate with suppliers and/or waste collectors	WP2	30.06.2024	Completed	31.12.2024	YES
3 hands-on and easily accessible tools for municipalities for their dialogue with businesses about circular practices	WP2	30.06.2024	Completed	31.12.2024	YES
A written concept with step-by-step guide for the municipalities' dialogue with businesses about circular practices	MANGER	30.06.2024	Completed	31.12.2024	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
The trial-and-error process of developing, testing and adjusting tools for SMEs on circular practices finalised	WP3	30.06.2024	Achieved	31.12.2024	N/A
The dialogue meetings with actors from the business value chain have been finalised, leading to showcases on businesses in cooperation with suppliers and/or waste collectors	WP4	30.06.2024	Achieved	31.12.2024	N/A
The trial-and-error process of developing, testing and adjusting concept and tools for mu-	WP2	30.06.2024	Achieved	31.12.2024	N/A

nicipalities' dialogue with businesses on circular practices is finalized					
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### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “The main results of the action are the capacity building among companies and municipalities on waste prevention, recycling and CE in general as well as the developed accompanying instruments and the experiences from demonstrations. Ultimately, this will limit the amount of waste and increase the recycling of waste instead of incineration or landfill.

*The action will produce:*

- 3 hands-on and easily accessible tools for municipalities
- 1 step-by-step concept for dialogue between municipalities and companies on CE
- 1-2 or more CE tools for SMEs
- 20 or more SMEs gain further knowledge on how to incorporate CE solutions
- 3 Show-cases on businesses preventing waste and how they cooperate with suppliers and waste collectors”

To establish a solid foundation for the work in the defined areas, initial research was conducted. The research explored legal and administrative options that would identify the best possible overall concepts. The insights gained from this also ensured that the desired simplicity and clarity in the tools were met, making them administratively useful.

Tool development took place through dialogue – creating, testing, and adjusting the tools in collaboration with industry associations, business hubs, over 20 municipalities (many of these are partners in CE Beyond Waste), and other stakeholders. By using this iterative method, we were able to develop concepts with high levels of accessibility and relevance for the users.

In addition to the mentioned actors, the Steering Committee for CEBW, the Danish Environmental Protection Agency (EPA), and industry organizations were involved to strengthen the knowledge base and secure support and use of the concepts.

The developed tools are:

##### A) 3 Practical Tools for Municipalities:

1. Circular Economy Registration Form: A form designed to simplify the process for municipal staff to register circular economy topics discussed with businesses. It also enables other municipal employees to easily follow up on these topics during later visits, ensuring consistency and progress tracking. This form can either stand alone or be integrated into existing municipal inspection forms.

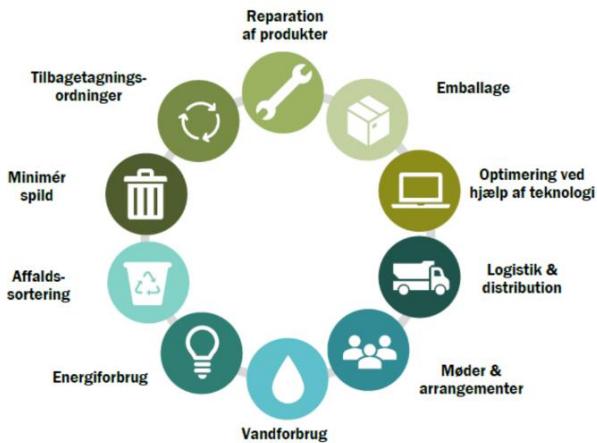
2. Competence Building Tool for Municipalities: A two-part tool designed to break down silos and foster collaboration between municipal departments on business dialogues related to circular economy. The second part guides municipal staff to valuable sources of knowledge on various aspects of CE.
3. The Packaging Compass: This tool is used for dialogue with companies regarding reusable packaging for takeaways. The tool contains information about the takeaway industry, including a division into open, partially open and closed arenas, where various approaches are relevant. The tool also contains a recommended practice, method of documentation, etc., for preparing the municipal employee to take up the dialogue with local companies, as well as with national and global chains, regarding the transition from single-use to reusable packaging for takeaways.

These tools are part of the deliverable “3 hands-on and easily accessible tools for municipalities for their dialogue with businesses about circular practices”.

*B) Step-by-Step Concept for Dialogue Between Municipalities and Businesses on CE:* The project team developed a concept for using topic sheets. These are easily accessible summaries that act as a map of most CE topics, simplifying dialogue between businesses and municipal staff. The concept includes guidelines on how municipal staff can use the topic sheets for business dialogues, and how businesses can use them, even without direct interaction with municipal staff. The step-by-step guide is part of deliverable “A written concept with step-by-step guide for the municipalities’ dialogue with businesses about circular practices”.

*C) 1-2 or More CE Tools for SMEs:* The topic sheets are 10 A4 pages, each covering a different CE theme. The topics are displayed in the figure below and the tool can be accessed in deliverable “At least one tool for SMEs on circular practices”

Each sheet includes questions to guide businesses to think critically about how CE can be applied in their context within the specific topic. The goal is to make the abstract concept of CE practical and understandable. Each sheet also contains examples of initiatives in other companies within the same theme, to inspire businesses to take action. Additionally, the sheets offer contact suggestions for further support, such as regional business hubs or industry associations.



Model in English from top icon (wrench)

- Repair of products
- Packaging
- Optimization through technology
- Logistics and distribution
- Meeting and events with other stakeholders
- Water consumption
- Energy consumption

*The ten topics included in the CE Tool for dialogues with businesses on circular opportunities.*

**D) 20 or More SMEs Gaining Knowledge on CE Solutions:** The five municipalities participating in action C14.3 have engaged over 20 businesses, testing and further developing the topic sheets and CE registration forms.

In-depth interviews and visits to takeaway businesses have also been conducted to develop a tool for dialogue on reusable takeaway packaging. In November 2024 a conference/workshop was held for all segments of the take-away industry, organized by the Danish Society of Engineers (IDA) and supported by several municipalities, beyond those represented in the project group.

**E) 3 Showcases on Waste Prevention and Business Cooperation with Suppliers and Waste Collectors:** The project team made two short videos that can be used as showcases in the dialogue between municipalities and companies.

- One video showing four examples of steps towards increased sustainability in your company: 1) Use your packaging again and again; 2) Demand packaging based on reusable material; 3) Abolish single-use mugs; 4) Make throwing away residual waste more difficult and sorting waste easier.
- The other video shows how one particular sports arena with a cafeteria and many events has phased out entirely single-use packaging for serving food and drinks.

These videos constitute the Deliverable “3 written show-cases on businesses preventing waste and how they cooperate with suppliers and/or waste collectors”

### B. Evaluation

In evaluating the activities carried out in Phase 1 key learning points and challenges have been noted.

#### Collaboration

The action has involved collaboration with the partners in the other C14 actions and municipalities, particularly in the development of the topic sheets. This collaboration has been valuable and positive.

Several team members participated in seminars organized by the PM Unit (C1) on facilitation. These seminars were inspiring and have influenced the way the project team collaborates. The tools learned during these seminars have also been used in internal meetings at Frederiksberg and other municipalities. Additionally, the project team has participated in cross-cutting webinars.

#### Challenges

The main challenges in the action have stemmed from the replacement of the project leader due to job changes, long-term sick leave, and parental leave. This has delayed C14.3 by one year, with completion reached only in late 2024.

Additionally, many project team members have faced pressure from other tasks beyond the execution of C14.3. The project members come from five municipalities, which, on one hand, presents challenges in terms of approach, culture, project prioritization, and mandate, but on the other hand, has ensured that ideas could be continuously tested, and the tools' applicability validated.

New legislation requiring businesses to cover the cost of waste inspections has further complicated the motivation for municipalities to invest time in non-regulatory CE activities, beyond the legal requirements for waste sorting.

Despite these challenges, the action has succeeded in developing highly useful tools for promoting CE in businesses, thanks to extraordinary efforts from certain team members and a clear demand for such tools.

### C. Targets and Goals for Phase 2, 2025-2027

The main activities in action C14.3 have been completed in Phase 1. In Phase 2, we will focus on expanding the use of the tools developed in our action, ensuring they are widely replicated. This will be done by participating in webinars, seminars and network opportunities within and outside CEBW.

### D. After life

It is crucial that the tools we have developed are widely disseminated and continuously improved. We are exploring opportunities with the CEBW project management team to ensure this, including organizing structures beyond the five participating municipalities. The five municipalities in the action group will continue to integrate the tools into their organizations.

### 6.3.4 The supportive pillar

The supportive pillar consists of the supportive actions and contributes to O3 of CE Beyond Waste.

The supportive actions are:

- A2 - Preparatory actions to provide analysis, data and technical studies
- C1 - Capacity Building, Knowledge Creation, Learning and Networking Activities
- C2 - Improving Governance and Enabling the Circular Transition on a Systemic Level
- C3 - Innovation, Efficiency and Scale – Using Digitalisation to Accelerate the Circular Economy
- C4 - Extended Producer Responsibility – Contributing to a more Efficient Product Design, Increased Reuse, Recycling and Collection
- C5 - Circular Database and new Ways of Measuring Waste Reduction

These supportive functions are designed both to ensure the implementation of the C- actions and to ensure that barriers and lack of incentives do not become bottlenecks for implementation.

More specifically the actions A2 and C1-C5 catalyse, facilitate and support the development within and replication of the actions C6-C15.

## **Action A2: Preparatory actions to provide analysis, data and technical studies**

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Other beneficiaries participating: The capital Region of Denmark (CR)

Foreseen start date: 01.01.2022

Actual start date: 01.02.2022

Actual/anticipated end date for action specific activities 31.12.2025

### **Purpose of action**

The purpose of the action is to assist the beneficiaries and partners with preparatory activities such as analyses, data collection, technical studies and benchmarking of best practices. In the following paragraph the activities and results from phase 1 are presented.

### **PM unit's (CDR) overall assessment of action**

During Phase 1, four projects have been granted funding to conduct analyses, which were either based on data collection or the development of methodological approaches to ensure progress in their C actions. C9 Randers Municipality/RK has examined the quantities and quality of local plastic flows; C13 Samsø Municipality/SK has explored the relationship between the amount of available biomass and the business model; C14.1 has developed an analysis and a method to qualify the identification of ideas for a practice that encompasses both the business model and the assessment of the idea's impact; and C15 has, through analysis, uncovered opportunities to introduce reusable cups in public spaces as part of one of the four pilot projects to which the action contributes. The PM unit's assessment of the four preparatory activities has qualified the C actions in terms of foundation, progress, and methodology

In amendment no. 1, an excess budget of 408,928 euros (due to partners leaving CE Beyond Waste, etc.) was allocated to action A2. These funds make it possible to launch new or modified activities in one or more of the other actions at a later stage in the IP implementation period.

### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

### **A2 Timetable**

Phase	Phase 1						Phase 2						Phase 3					
Year	2022		2023		2024		2025		2026		2027		2028		2029			
Action	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
A2																		

### **Explanation for timetable delays (if any)**

Due to the aforementioned funds allocated to the action in Amendment no. 1, the timetable for Action 2 has been postponed until the end of 2029.

<b>WP1: Mapping and prioritizing the needs for preparatory analyses etc.</b>
1. Collect information from the activities in C1 about general needs for preparatory analyses etc.
2. Collect information from the beneficiaries about their needs for preparatory analyses etc. to support their specific actions.
3. Facilitate a discussion specifying, qualifying and prioritizing the needs of beneficiaries.
<b>WP2: Desk research, analyses, technical studies etc.</b>
1. Explore existing data and knowledge in order to find existing material that might cover the beneficiary needs.
2. Conduct analyses etc. supplementing existing data and knowledge, thereby covering general needs of beneficiaries as well as specific needs of selected beneficiaries for them to be able to implement the principles of circularity in their C-actions.
3. Disseminate the results of the preparatory analyses to the beneficiaries and other stakeholders through C1 and E2.1.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	01.09.2023	Completed	31.12.2024	YES
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	15.12.2023	Completed	31.12.2024	YES
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	15.12.2024	Completed	31.12.2024	YES
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	15.12.2025	Completed	31.12.2024	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	01.04.2023	Achieved	15.06.2024	N/A
Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	15.09.2023	Achieved	15.09.2024	N/A

Analyses and desk research on identified needs of data addressing C6-C15	WP1, WP2	15.12.2024	Achieved	31.12.2024	N/A
All analyses shared on platform	WP1, WP2	15.12.2025	On track	31.12.2024	-

#### **Explanation for delays in Deliverables and Milestones (if any)**

Some milestones and deliverables have been delayed during Phase 1. However, all have now been reached and completed. Both the milestone and deliverable due on 15.12.25 were even accomplished by the end of Phase 1. The delay occurred primarily because the process of identifying the needs of the different actions had to be postponed from the beginning of Phase 1 to a later stage. This was necessary as the partners involved needed time to organize themselves and gain momentum before the PM Unit could identify needs and initiate analyses. Each of the four analyses mentioned below in Expected and achieved results has been prepared as an independent deliverable under A2 and thus all Deliverables are completed.

#### **A. Expected and achieved results**

##### The correlation between expected and achieved results

**Expected:** “A2 will ensure, that all C-actions in the IP incorporate and build on existing knowledge, data and best practices – and prevent that any beneficiaries are working with areas that have already been covered by others. Furthermore, A2 will qualify the work done in C6-C15 with new relevant analyses etc. – and inspire beneficiaries as well as stakeholders outside of the IP by disseminating the analyses etc. through C1 and on the online platform CE Beyond Waste (cf. E2.1).”

The work in this action has been strongly connected to the work in action C1, where focus is on capacity building of the entire partnership of the IP project.

C1 has naturally been centered around the challenges of the partners in their work with their own actions. This also means that focus on capacity building efforts (seminars, webinars, study tours and networking activities) have been on how to qualify the partners efforts in their own actions.

By engaging in dialogue with partners, CDR have aimed to find common challenges, where the partners can aid each other with ideas and solutions – also with the aim of avoiding multiple partners working on the same areas in parallel and separated efforts. Whenever CDR or other partners have identified areas of common interest, the aim has been to connect these actors to strengthen the overall development and prevent multiple coverages of areas. Obviously, no one solution is the same in different organizations, and so focus has also been on how to adjust ideas and solutions to different organizations and contexts.

In the work with capacity building activities, CDR has also sought relevant areas for improvement through further analysis using this action A2. Not all of the actions (C6-C15) were in need of analysis and thus four actions were supplemented with analysis using A2. The actions and analyses are:

- C9: An analysis of plastic waste flows in Central Denmark Region with the aim of investigating, whether a significant and steady enough flow of materials could form a base of new businesses. A disappointingly low number of companies were willing to participate. Combined with the fact that many businesses lacked awareness of their plastic waste or were reluctant to engage in waste reduction initiatives, this resulted in the analysis not yielding the desired outcomes. Further details can be found in C9.

- C13: An analysis of biomass addressing supply security, quality, and business opportunities. The analysis revealed a circular potential in household waste but also indicated technological and industrial immaturity.
- C14.1: An analysis on how to develop business models, that enhance a high level of innovation when we work on business development aimed at the reuse of materials. The analysis has been used to develop a tool - Questiation - that can strengthen the work in C14.1, which focuses on industrial recycling of waste and by-products from industry into new materials, including building materials. The work should support WP2 innovation and WP3 pilot projects and be part of the development of WP4's generic model. Through Questiation's designed process with questions and answers, participants gain insights that enable them to see new connections and act more innovatively.
- C14.3: An analysis with the aim of identifying how to encourage the use of reusable F&F packaging in takeaway, and how the municipalities can encourage it. Key takeaways are – The larger the reuse system, the greater the market impact, and consequently, the higher the return rate. Bans or taxes that restrict single-use packaging promote the use of reusable packaging. Furthermore, the analysis gave recommendations to how municipalities can guide restaurants, cafes and similar entities in the direction of more reusable packaging.

Each of the four analyses has been prepared as an independent deliverable under A2 and thus all Deliverables are completed. The analyses have been conducted by external consultants.

### **B. Evaluation**

In evaluating the activities carried out in Phase 1 several successes and key learning points have emerged.

The method of engaging with the partners about what they need in order to accomplish results in their own actions has been highly successful. Not only has it been avoided that two partners have worked on the same areas, but there are also several examples of partners inspiring each other through knowledge sharing in webinars and seminars and networking activities. These examples are seen as some of the great results of this action and action C1 in combination.

It has been the task of the PM Unit to choose which ideas for analyses to fund from the action fund. The selected analyses have been based on different approaches: from analyses that involved mapping and qualitative assessments to establish a justified data foundation, to analyses contributing to methodological development and suggestions for the next steps.

### **C. Targets and goals for Phase 2, 2025-2027**

All deliverables are finished. In Phase 2 it will be a focus for CDR to ensure that results and findings from the analyses funded by this action are utilized both in the other actions and in other relevant contexts. This can be done by establishing communication and networking activities in relevant fora and with relevant beneficiaries.

The PM Unit will further investigate how the aforementioned excess budget allocated to action A2 in Amendment no. 1 can be utilized to launch new or modified activities in one or more of the other actions at a later stage in the IP implementation period.

### **D. After Life**

As mentioned above, The PM Unit will strive to ensure the dissemination of the results, and it is under consideration whether the analysis material for C14.1 can be transformed into an AI guide version.



### **Action C1: Capacity Building, Knowledge Creation, Learning and Network Activities**

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Other beneficiaries participating: The capital Region of Denmark (CR), Gate21 (GATE21)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of this action is to establish the framework for a continuous flow of knowledge, inspiration and development of circular practices and solutions in C4 - C15. In CDR, we facilitate networking and processes directed towards motivating, inspiring, educating and reskilling for circularity at both management, technical and administrative levels mainly in public organizations. In the following paragraph the activities and results from Phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

The PM unit is managing this action independently. As we anticipated and confirmed through a survey of participating partners in the application round, there is indeed a significant need and desire for a platform for collaborative development. This platform is essential for achieving the necessary level of innovation and for creating networks and relationships across the country. We assess that C1 largely fulfils this purpose.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C1 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C1								
WP1								
WP2								
WP3								
WP4								
WP5								

#### **Explanation for timetable delays (if any)**

n/a

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.
WP2 The framework for capacity building
<ol style="list-style-type: none"> <li>1. Strategy integrating networking and capacity building activities in the IP's phases</li> <li>2. Establish a Reference Group</li> <li>3. Establish an Advisory Board</li> </ol>
WP3 Networking and learning across beneficiaries
<ol style="list-style-type: none"> <li>1. Courses about circularity and the APCE and the Local Waste Management Plans</li> <li>2. Activities of mutual learning and inspiration among the beneficiaries e.g., virtual and/or physical study trips</li> <li>3. Three education modules on waste prevention through procurement, re-use and re-cycling</li> </ol>
WP4 Circular economy, commercialisation and value creation
<ol style="list-style-type: none"> <li>1. Introduce commercialisation and value creation in circular solutions</li> <li>2. Showcase real-life examples on how to identify lines and collaborate across departments in-house</li> <li>3. Counselling sessions in action C6-C14 by the PM utilising expert input, inspirational cases and facilitating challenge-based workshops</li> </ol>
WP5 Fostering strategic commitment
<ol style="list-style-type: none"> <li>1. Design and arrange webinars/ workshops for management level using the output from previous WPs</li> </ol>

### WP1 Management, communication, monitoring, replication

*Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phases 2 and 3.*

The management aspect is handled by The PM Unit but has also involved GATE 21 and the Capital Region of Denmark, which have been included in the planning of activities. Throughout phase one, meetings have been held with these stakeholders at least every 14 days. In terms of evaluation, we have chosen the following indicators: the degree of perceived relevance, perceived learning, engagement, and the experience of network formation and building the trust between partners that is essential for learning and not merely knowledge transfer. This part is assessed through an oral evaluation after the completion of the activities, as well as during the visits we have conducted to all actions. During these visits, the work packages were related to the needs of the individual actions, and the

necessity for competencies was identified in order to design the subsequent activities so that the partners could derive optimal benefits from participating. The overarching benchmark is that the many partners are enabled to create progress in their actions, to engage in networking, and to foster advancement and innovation.

## WP2 The framework for capacity building

1. *Strategy integrating networking and capacity building activities in the IP's phases*
2. *Establish a Reference Group*
3. *Establish an Advisory Board*

The overarching strategy is based on the following elements: Phase 1. Ensuring innovation height, progress, and connectivity through inspiration, the ability to engage, and being relevant in the field between actions and WPs. This includes strengthening knowledge about and networks within the ability to execute. Phases 2 and 3 build on the same elements but with an increased focus on achieving results and making methods effective. The work in C1 primarily aims to support the partners' ability to communicate what has been achieved and to open doors for this to happen in the appropriate forums. Reports alone are not sufficient; we aim to create mobilization and acceleration.

Regarding the advisory board and reference group, we have chosen to base our interaction on close collaboration with the various pillars and to draw on the CEBW Steering Committee, which includes the professional groups we would also involve in an advisory board. For this reason, there is a close collaboration with the project leader in the professional domain concerning the content of the steering committee meetings.

## WP3 Networking and learning across beneficiaries

1. *Courses about circularity and the APCE and the Local Waste Management Plans*
2. *Activities of mutual learning and inspiration among the beneficiaries e.g., virtual and/or physical study trips*
3. *Three education modules on waste prevention through procurement, re-use and recycling*

We have transformed the courses into three areas: webinars, seminars, and conferences, as well as in networks with embedded workshops and a training program for recycling centre employees, which is planned in collaboration with three utility companies, with the first edition already overbooked for the initial session and therefore scheduled to be repeated.

Our original idea of directly engaging with the utility companies' local waste plans has been replaced by using these plans as a backdrop for activities and mutual inspiration. We have also decided to conduct a series of webinars to inspire within the three main pillars. Each webinar typically features three speakers, both from the partner group and from selected relatable initiatives outside of it, to ensure mutual learning. These webinars, along with seminars, replace the original concept of educational modules focused on prevention, reuse, and recycling.

This shift was partly based on our understanding that experience-based learning resonates better with the target audience than theoretical knowledge, and partly because many operate in a high-pressure environment where courses can only be applied for and approved approximately every 5-10 years.

Additionally, our activities have included elements on project management and facilitation skills, as it was clear that these areas are prerequisites for the successful execution of the various actions.

#### **WP4 Circular economy, commercialisation and value creation**

1. *Introduce commercialisation and value creation in circular solutions*
2. *Showcase real-life examples on how to identify lines and collaborate across departments in-house*
3. *Counselling sessions in action C6-C14 by the PM utilising expert input, inspirational cases and facilitating challenge-based workshops*

As a result of the changes in legislation within the waste sector and the clear separation between the activities that public and private entities can undertake, our work has increasingly focused on how the public sector can contribute to the circular transition, more than initially anticipated.

In relation to points 1 and 2, we have chosen to cover these areas through the knowledge, calculations, and methods provided by A1, as well as the three activities in C6 and the five activities in C7. This information has been disseminated via webinars and in collaboration with podcasts and articles. Furthermore, it has been communicated through three networks focusing on prevention, reuse, and commercial waste management (C14).

Regarding point 3, we have conducted several training and advisory sessions with local partners. These sessions have targeted professional understanding, legal comprehension, and the ability to facilitate meetings. Additionally, as mentioned, a training program for recycling centre employees will take place in March 2025, which has generated significant interest. The format and content of this program will be repeated.

In relation to the experiences from C15 concerning collaboration with citizens, five pilot projects are currently being implemented, and the rollout of this component will be based on the insights gained from these projects. Point 3, the module on recycling, will be carried out during phase 2, once the experiences from C8 to C14 have been collected into themes. In this phase, we will also address the aspects related to entrepreneurship based on the experiences from C14.4, Loop Hub, HbH, the municipality of Holstebro, regarding her activities and the ReVolver course. Additionally, we will work on the socio-economic aspects with insights from C7.5, C7.4, and C14. WP5 is part of the work to be undertaken in phases 2 and 3."

#### **WP5 Fostering strategic commitment**

*Design an arrange webinars/ workshops for management level using the output from previous WPs*

Is a work to be done in phase 2-3

## Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
A podcast with reflections from the participants on lessons learned from participating in C1 – what has been helpful, what has been superfluous, what is the good advice to the next capacity building phase.	WP1, WP3, WP4	31.12.2025	Completed	31.01.2025	YES

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUTLER
Podcast with lessons learned and the journey of the projects is produced, focus on the need of the participants	WP1, WP3, WP4	31-12-2025	Achieved	31-12-2024	N/A
15 hands-on examples are made as a part of cross learnings between the project, focus on the need of creating knowledge that is usable for others mostly inside the framework of CE beyond Waste	WP1, WP3, WP4	31-12-2025	Ongoing	-	-
Examples and lessons learned are shared on a national level	WP1, WP2, WP5	31-12-2028	Ongoing	-	-

### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

The main results for C1 are to accelerate the implementation and the fulfilment of the project objectives (O1-O3), create synergies and secure long-term sustainability.

**Expected:** *“Build a strong and vivid network across the A1 and C4 - C15 and DK to qualify the concrete activities and to secure outputs such as new methods, processes and ways to cooperate.”*

The focus is building competencies both generally among all project partners and within individual actions. To achieve this most effectively, the following measures have been implemented:

A robust and dynamic network has been established, spanning across A1, C2-C15 and encompassing subgroups addressing common challenges and interests. At a structural level, we have developed an organization that regularly hosts seminars, webinars, and networks with inspiring external partners. C1 has also facilitated parts of the content in study visits to the Netherlands and organized a conference.

Content-wise, C1 has engaged with professional topics such as procurement, reuse, and recycling, highlighted through legislative frameworks, construction, textile guidance, the donut model, circular economy, citizen engagement, and strategies to prevent food waste. Additionally, efforts have been made to enhance facilitating collaborations, build professional insights, and drive progress, focusing on strategic communication, meeting development and execution, behavior change, and the distribution of roles. It is essential to recognize that expertise alone does not establish the necessary foundation for progress and innovation.

**Expected:** *“Communication and replication throughout the whole IP with an increasing focus on external stakeholders in phase three.”*

We are actively working on effectively communicating results and methods to make them accessible and straightforward to use.

CEBW has been active since 2022, during which two conferences, four seminars, and fourteen webinars—open to external participants—have been held, alongside numerous meetings in designated networks focusing on business waste, reuse, and prevention. In 2022, a total of 484 participants attended our events; in 2023, there were 520 participants, and in 2024, attendance increased to 688.

Regarding long-term sustainability, cross-cutting groups have already been established, driven by the actions themselves, with inter-group collaboration as a standardized approach.

C1 periodically collects data on the professional and procedural knowledge needs of partners to ensure the relevance and immediacy of the initiative. Furthermore, many of the consultation sessions with projects serve as a foundation for the selection and framing of content and design.



A hybrid meeting 12.12.2022 between C14-Actions sharing knowledge on business waste

Communication, dissemination and replication are ongoing throughout the entire IP, with an increasing focus on external stakeholders in Phase Three. This task is managed in collaboration with task E, and the main description is to be found under the description of progress in E. The communication strategy targets both internal C-Actions and serves as a medium for engaging third parties.

To date, 14 webinars have been produced, 35 articles written, and 8 podcasts released as part of the series “A Future Without Waste.” For more information, please visit: (<https://www.cebe-yondwaste.eu/> and <http://www.connect.cebeyondwaste.eu>).

**Expected:** “15 hands-on examples of how to use the principles of the CE.”

The activities connected to this result are progressing timely. The examples will be finished in 2025.

### B. Evaluation

This paragraph presents the progression, successes, and learnings of the action.

The work packages have been commented above. In addition to that we will emphasize the following.

From the initial assessment of project leaders and employees' needs, it became evident that we could not solely focus on knowledge of the topics outlined in the work packages, such as Circular Economy, Waste Legislation, and deeper insights into various fractions. The ability to manage projects and facilitate meetings to drive progress emerged as key areas where the majority needed significant development. Most participants transitioned from roles with regulatory responsibilities to becoming innovators and project leaders managing complex development projects, often collaborating across organizations.

It was a considerable success to prioritize these areas during the four seminars held, where instruction was combined with hands-on cases, new methods, and materials. The webinars were designed to provide rapid insights into specific topics while facilitating connections that could lead to new knowledge. They have proven successful, and their open format has already facilitated some dissemination of results.

The approach to the circular economy described in the work packages has been revised due to the impact of the new waste legislation from 2022, which has influenced the conditions for public-private collaboration and hindered public entities from engaging across the entire value chain and in business development. Consequently, our primary focus is now on advancing up the waste hierarchy, emphasizing a desired shift toward increased prevention, as also outlined in the APCE. The overarching goal remains the same: to minimize resource use.

In relation to the execution of C1, we have conducted many more webinars than initially planned, as this mode of communication has garnered substantial interest from both internal CEBW stakeholders and external participants. The intention to build networks and learn from each other has been largely fulfilled.

### C. Targets and goals for Phase 2, 2025-2027.

Phase 2 intends to focus on further developing and consolidating competences through feed-back and dissemination and by inviting stakeholders from outside the partnership, although we must continue to focus on professional elements, challenges within individual actions, and the capacity for project management and facilitation.

#### D. After Life

The aim is to establish a continuous collaboration among employees across municipal waste management companies and the procurement and prevention departments after the IP project concludes, facilitating the swift implementation of methods that promote greater prevention.

## **Action C2: Influencing the Framework Conditions enabling the Circular Transition on a Systemic Basis**

Beneficiary responsible for implementation: The Capital Region of Denmark (CR)

Other beneficiaries participating: Central Denmark Region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2027

### **Purpose of action**

The purpose of the action is to improve governance and enable circular transformation at an institutional level. The action address legal and systemic barriers preventing Denmark's transition to a circular economy. In the following sections, the activities and results of Phase 1 are presented.

### **PM unit's (CDR) overall assessment of action**

It is the assessment of the PM unit that the scope of C2 was very comprehensive with a high abstraction level. To ensure actionable results, the C2 management has conducted interviews with the various C-actions regarding experienced barriers at several C1 events. This, combined with desk research, has led to a greater focus on municipal barriers and the opportunity to thematize them. The themes have been distributed in questionnaire form to all actions in both 2023 and 2024. The questionnaire includes the following topics regarding barriers and constraints: a description of barriers, the type ranging from legislation to behaviour, the barriers impact on the IP project's progress and how the barriers can be removed, and finally comments. The gathered themes will be assessed by an advisory board in 2025 and discussed in focus groups also regarding the recurring themes. The outputs will be used as input for the revision of APCE. In this work, C2 is increasingly aware that one of the experienced barriers, namely legislation, also involves strengthening the ability to fully utilize existing legislation. This was evidenced during the CEBW study tour to Amsterdam, with a visit to CircuLaw-[www.circulaw.nl](http://www.circulaw.nl) - A knowledge platform that helps policymakers, project leaders and purchasers make more and better use of regulations in order to promote the circular economy.

### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C2 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C2</b>								

WP1													
WP2													
WP3													
WP4													
WP5													

#### Explanation for timetable delays (if any)

n/a

<b>WP1 Management, communication, monitoring, replication</b>
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
Through desk research, WP1 will identify political and regulatory barriers hindering a circular transition. To ensure C2 is based on existing knowledge, previous initiatives and analyses mapping regulatory barriers in DK and abroad will be included.
<b>WP2: Systematic collection of barriers and driving forces</b>
<ol style="list-style-type: none"> <li>1. Gather input about barriers (and missing driving forces) from each of the actions C6-C15.</li> <li>2. Create a template for describing each barrier to ensure a manageable process.</li> </ol>
<b>WP3: Mapping of barriers, suggested improvements</b>
<ol style="list-style-type: none"> <li>1. Map all barriers (and lack of driving forces) related to the regulatory framework conditions, based on the input from C6-C15 (cf. WP2).</li> <li>2. Further, develop the mapping through interviews and focus groups or workshops with stakeholders from C6-C15, also discussing possible solutions. The timing of the process will be adjusted to the timing of the individual C-actions.</li> </ol>
<b>WP4: Catalogue of policy initiatives</b>
<ol style="list-style-type: none"> <li>1. Convert the barriers and solutions (cf. WP2 and WP3) to a catalogue of policy initiatives. The Advisory Board working group will help qualify and expand on the proposed solutions as well as proposing a prioritization of the policy initiatives. The identified barriers could be provided to the Political Committee (ref. C1E) to share knowledge and seek advice.</li> </ol>
<b>WP5: Contribution to the next national waste plan and municipal waste plans</b>
<ol style="list-style-type: none"> <li>1. Integrate the policy recommendations into the preparation of the next national waste plan, which is expected to be ready in 2027, as well as the revisions of the municipal waste plans.</li> </ol>

2. Communicate the catalogue of recommendations to the EPA, the Danish Business Authority and other relevant government agencies, as well as KL and other relevant stakeholders related to the municipal waste plans.
3. Involve the Advisory Board (ref. C1E), as the key stakeholders play important roles in the waste sector and will presumably influence the preparations of the next national waste plan as well as future local waste plans.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
List of barriers and missing drivers	WP2, WP3	01.10.2025	On track	-	-
Catalogue of policy initiatives to be used as input to next national waste plan and municipal waste plans	WP4	01.05.2026	Not started	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Action leaders invited to share barriers from the different C-actions and final list of barriers created	WP3	01.10.2025	On track	-	-
Catalogue of policy initiatives created and communicated to relevant public authorities	WP4, WP5	01.05.2026	Not started	-	-

### Explanation for delays in Deliverables and Milestones (if any)

N/A

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** "A comprehensive list of barriers and lack of driving forces related to the regulatory and political framework conditions in DK."

A systematic collection of barriers and challenges in the CEBW actions (WP2.1) has been initiated. All actions received a barrier scheme in July 2023, which they can update as they encounter barriers. A template has been developed to describe each barrier (WP2.2).

In January 2024, we reached out again to assess which barriers were most relevant for them so far. About half of the actions returned completed barrier scheme, and we conducted brief interviews with action leads.

We are continuously reviewing existing barrier mappings and analyses for circular economy and adjusting our focus accordingly. The goal was to have a more defined scope by the end of Phase 1 regarding the types of barriers we will focus on in C2. And we ended up focusing on barriers regarding CE development in Municipalities.

Furthermore, we have been working on understanding the existing waste legislation and framework conditions for CE.

We are in the process of recruiting relevant experts for an advisory board and have already engaged several interested parties.

**Expected:** *"A catalogue of policy initiatives with the potential to address existing barriers. The catalogue will serve as input to the next national waste plan and municipal waste plans."*

The catalogue will be based on themes from the qualitative interview rounds explained in the PM Units assessment. The themes will be discussed in focus groups and revised by an advisory board, that is to be established in the first half of 2025. The themes will be a part of the work areas for the CEBW Political Committee in 2025 and will be feeding into the revision of APCE.

**Expected:** *"C2 is expected to have a major spillover effect to waste prevention and circular waste management."*

The action will begin work on activities and results related to these expectations in Phase 2 and 3. The themes from the questionnaires have been split up into the following themes, that the action will elaborate on in 2025. The themes are:

Overall, the municipal barriers are identified as being related to the following factors:

- Lack of political prioritization and sense of urgency
- Lack of political targets for waste prevention
- Unclear and uncertain framework conditions
- Circular economy is not integrated into municipal tasks across the organization
- Lack of the right knowledge, skills, and experience
- Lack of funds and resources for development and scaling up
- Lack of data and monitoring methods
- Legal and regulatory limitations in existing framework conditions across the organization

The report will be a part of the communication with EPA revisiting the APCE.

### Communication

We will begin external communication activities later in the action.

### **B. Evaluation**

This section evaluates the actions progress, successes, and challenges.

We have carried out relevant activities. However, it has been difficult to gather all the necessary information to form a comprehensive overview of the barriers and challenges for the political level.

To assess barriers at a systemic level the C2 action-description was initially defined very broadly: "C2 will involve stakeholders across all sectors and all value chains...". A key learning from discussions with various CEBW action leads has been the need for a more concrete focus.

Therefore, C2 has been narrowed down to focus on municipal barriers and challenges related to CE. More specifically, it will address barriers regarding scaling and disseminative effects of the results in the CEBW actions.

We will also draw inspiration from the Dutch CircuLaw project, not only identifying barriers but also examining the opportunities for municipalities to work with their CE actions within existing framework conditions – and the barriers hindering this.

The objectives with communicating the catalogue will still be disseminated to the Danish Association of Local Authorities (Kommunernes Landsforening), the EPA, the Danish Ministry of Environment, and Danish industry, as all the mentioned stakeholders are involved in the regulation and implementation of APCE

### **C. Targets and goals for Phase 2, 2025-2027**

In Phase 2, we will continue mapping barriers and monitoring political developments, as well as other parallel mappings and recommendations.

The focus in Phase 2 will be on:

- Establishing the advisory board.
- Qualifying the initial barrier mapping with CEBW action leads and other relevant stakeholders through focus group interviews and workshops. This will contribute to the final list of barriers and missing incentive structures.
- Developing proposals for policy initiatives/changes in framework conditions in collaboration with the advisory board. This will contribute to the final catalogue of recommendations.
- Strategically integrating the policy recommendations into the preparation of the next national waste plan (and local plans) and other relevant political contexts.

### **D. After Life**

C2 focuses on identifying municipalities' opportunities to scale up CE initiatives within existing framework conditions, while also improving the conditions defined in future circular action plans.

Therefore, C2 is expected to both have a direct impact on future initiatives within municipal organizations and their collaborating partners and an impact on decisions made on a national level.

### **Action C3: Innovation, Efficiency and Scale – Using Digitalisation to Accelerate the Circular Economy**

Beneficiary responsible for implementation: The Capital Region of Denmark (CR)

Foreseen start date: 01.07.2023

Actual start date: 01.07.2023 but then put on hold because the original action description no longer made sense (see further elaboration below). We still hope to be able to complete the action in time for the end date, but a rewriting of the action may be necessary.

Actual/anticipated end date for action specific activities 31.12.2027

#### **Purpose of action**

The purpose of the action is to leverage the planned initiatives in other activity workstreams to achieve better impact, more efficient delivery and/or enable innovative solutions through digital and data-based means. In the following paragraph the activities and results from phase 1 are presented.

#### **PM unit's (CDR) overall assessment of action**

CDR are lead on this action, which has not gone according to plan. Even though there is still time within the original timeframe as seen below in the timetable, the technical content will most likely need to be changed. This is addressed more in detail below in the Evaluation. At this point in time, we have not gone further, which is mainly due to the situation regarding the IP project's future, where we are currently exploring the option to change Coordinating Beneficiary, since Central Denmark Region can no longer lead the project. This is also elaborated in 8. Next Phase: Changes/adjustments the Executive summary.

We have made good contacts with relevant external companies that can eventually help us both redesign and facilitate the action, because we see a future of the action with more focus on artificial intelligence (AI) and not just digitalisation. This is due to the rapid developments within AI in recent years, and we see this as an obvious path now that the action needs to be redesigned. It is our assessment, that this will eventually require an amendment.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C3 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C3</b>								
WP1								
WP2								
WP3								
WP4								

### Explanation for timetable delays (if any)

n/a

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.  The results from the work with digitalisation and knowledge creation will be part of the dissemination initiatives. Actions 5, 9, 10.2 and 14.1 will particularly be contributing to this as they have digitalisation internalised in their project areas.  Dissemination will take place 2027 – 2028.
WP2 Capacity Building
<ol style="list-style-type: none"> <li>1. Launch a start-up seminar to build a common baseline of knowledge about the digital possibilities and to start up the partnership of the responsible beneficiaries of the relevant C-actions.</li> <li>2. Secure the general capacity building by providing each action (C7 – C14) the necessary insights into the potential digital solutions addressing a specific area and how to create them.</li> </ol>
WP3 Dissemination
The results from the work with digitalisation and knowledge creation will be a part of the dissemination initiatives. C5, C9, C10.2 and C14.1 will particularly be contributing to this as they explicitly integrate digitalisation in their projects.
WP4 The digital partnership
<ol style="list-style-type: none"> <li>1. Establish a digital partnership across C7 - C14, led by CDR. The digital partnership has four main focus areas: <ul style="list-style-type: none"> <li>- to provide new inspiration</li> <li>- to coordinate solutions</li> <li>- help each other with problems in the format of workshops</li> <li>- to disseminate learnings from the actions to create knowledge</li> </ul> </li> <li>2. Identify regulatory framework not being conducive to digital development addressing C2 (Governance)</li> </ol>

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
A catalogue of digital use cases across all activity work streams as well as digital use cases in directly related subject areas interfacing with the activities	-	31.12.2027	Not started	-	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUTLER
Identification of key themes, involving expert in digitalization and two of main responsible beneficiaries of the C1 – C14	-	31.12.2023	Delayed	31.12.2026	-
Innovation kick-off seminar with relevant beneficiaries and experts	-	30.04.2024	Delayed	31.12.2026	-
A digital Partnership, two facilitated meeting a year in the period 2023- 2027	-	31.12.2027	Not started	-	-
A catalogue showcasing digital and data initiatives and initial identification of possibilities of replication	-	31.12.2027	Not started	-	-

#### Explanation for delays in Deliverables and Milestones (if any)

Two milestones have been delayed, and we propose new deadlines for both. At this point in time these postponements do not require adjustment of the timetable.

Explanation for these delays – and possibly an amendment to the technical content of the original C3 – follow below in the Evaluation.

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** "Digital and databased activities are expected to enhance the performance of other activities as follows:

- Changes in resource flows and innovation in equipment, machinery and facilities design throughout the waste value chain.
- Change(s) in the regulatory framework to enable digital and data-borne solutions supporting circular solutioning.
- Additional re-use of units and volumes of waste (fx 10-20% increased re-use).
- Less pollution (CO<sub>2</sub>e fx additional reduction 20-30%).
- Less resource use (fx 20-30% fewer resources).
- Increased local employment (fx +10% employed).
- Increased local value added (fx +10-20% increase in growth)."

The overall objective in phase 1 has been to establish a partnership to investigate the possibilities of using digitalization to achieve the expected results. The partnership would have consisted of actions C5, C9, C10.2, C14.1 since these already aimed to incorporate digital solutions in phase 1. However, due to varying circumstances the activities in C3 have been postponed. Naturally, this has impacted the ability to achieve results within phase 1. The circumstances are elaborated below in the Evaluation.

##### Deliverables and milestones

Due to the circumstances the activities in C3 have been postponed. Naturally, this has impacted the ability to realize the deliverables and milestones of the action within phase 1. More on the postponement below under Evaluation.

### Communication

Due to varying circumstances the activities in C3 have been postponed. Naturally, this has mitigated the need for communication initiatives in phase 1.

### **B. Evaluation**

In the original action C3, one of the main goals was to establish a partnership between four of the actions in the project – C5, C9, C10.2 and C14.1. All of these actions have gone through changes, and these have had consequences for the implementation of C3:

#### **C5**

EPA's work with the original action C5 turned out to be too ambitious, and hence EPA have now changed their focus from data on materials for recycling to data on reuse. Due to these changes, EPA have not yet had any concrete experiences to put into the partnership in C3.

Copied from Amendment no. 2:

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*The EPA sees the changes as a natural development of this action. The change of the C5 was a necessary step, as this action was an extension to the now defunct CDB and therefore had to be redefined. C5 is now focusing on gathering data on reuse and thereby supporting the Danish Action Plan for Circular Economy (APCE), which aims to reduce material consumption and waste reduction. There are waves of political changes towards climbing the waste hierarchy, and one of the drivers towards this is a greener economy based more on reuse, supported by new business models, with a similar aim.*

*Overall, two changes are made:*

- 1. Shift in focus from data on materials for recycling to focus on data on reuse.*
- 2. Instead of building a new database for material flows, we will incorporate reuse data into the existing Danish National Waste Platform (ADS), which the EPA currently is extending and further developing. The reported data will be used for reporting reuse in accordance with Directive 2008/98/EC, and for assessment of the actions on reuse in the APCE and promote reuse to the public.*

*First, in Denmark data on reuse are lacking, almost non-existent.*

*Second, reuse is a step up in the waste hierarchy, which corresponds with the ambitions in the CE Beyond Waste.*

*A focus on quantitative data on reuse will support a more concrete political dialogue on reuse and potentially pave the way for new legislation in Denmark. This is essential to lower the consumption of resources and promote a circular economy.*

*Third, the deliverables of the redefined project are much more defined and tangible than the deliverables of the previous action, that was an extension of the CDB. The deliverables of the CDB were unclear and the action was delayed and hampered by a lack of data, which made it difficult to execute.*

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### C9 (and C14.1 - see below)

The main issue for the original C9 was the new legislation that resulted in Amendment no. 1. The legislation meant that value chain thinking changed, and hence the original ambition to use digitalization as a means of keeping track of materials in different material flows was no longer viable.

Copied from Amendment no. 1:

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*New legislation as an outcome result of the political agreement – "Climate Plan for a Green Waste Sector and Circular Economy" (Klimaplan for en grøn affaldssektor og cirkulær økonomi, Juni 2020). The Climate Plan has led to new legislation on waste treatment, with a new division of labour between the public and the private sector when it comes to material recovery of waste introduced in law L898/2022, a revised waste announcement –(affaldsbekendtgørelsen, BEK 2512, 10-12-2021) and the waste operator announcement (affaldsaktørbekendtgørelsen, , BEK 938, 20-06-22).*

*The intention in action C9 was to digitize knowledge about materials and material flow along the value chain and this isn't possible with the new division of labour between the public and private sector. CDR has tried to redefine the action C9 within the original purpose together with the original partners, but this was not possible.*

*The above-mentioned new legislation has a major impact on how to manage the flow along the value chain. The division of labour between the public and the private sectors, which is a derivative effect of the new legislation, has such a large impact on the original construction of C9 that it can't be implemented.*

*This is primarily due to the following limitations:*

- *Municipalities must continue to carry out initial sorting, which is considered to be part of carrying out the collection task.*
- *The private sector takes over after the initial sorting*
- *Municipalities may neither treat nor sort household waste suitable for material recovery and can no longer own and operate recycling facilities.*

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### C14.1

Even though the above changes did not directly affect the activities in action C14.1, it still hindered the action's ability to have a value chain-oriented approach to the collaboration between private companies and the public sector that would have been a natural way forward. When the original C3 was designed, Skive Municipality (SKK) were very active in promoting the idea of working groups across CEBW because they wanted to digitalize the material flows relevant to their action, but because of the change in legislation, this interest also vanished as a natural consequence, because the value chain was cut in half as described above. It should be emphasized that these revised considerations in C14.1 have no impact on the scope, results, or other aspects of C14.1.

### C10.2

In this action, digitalization is the primary focus. The action has now finished its own primary activities and deliverables. We will invite them to work with us on C3, when the action starts.

Overall, it made no sense to start up the partnership that C3 intended to establish.

Before the changes occurred, we did speak with three different external companies in order for us to engage with them in the action. However, these efforts have also been set aside, although we have made good contacts with companies that might be able to help us in future as well.

Further, during phase 1 of this project, global focus is increasingly shifting away from digitalization and towards Artificial Intelligence, which both challenges the original C3 and adds new possibilities that we are eager to explore. As mentioned above, this may well result in an amendment to the original C3 to include AI, but this is still unclear.

#### **C. Targets and goals for Phase 2, 2025-2027**

Because of the circumstances explained above we decided to postpone action C3, which gives us time to redefine the content of the action. This may require significant changes – and possibly an amendment – but since we are still working on the specific content, we are not yet ready to make concrete changes.

Though overall, we anticipate working with C3 in phase 2 of the project with an increased focus on artificial intelligence. We will also of course engage with several of our partners in exploring new opportunities in relation to this.

#### **D. After Life**

Because of the postponement of C3 and the need to make significant changes it is not possible to describe the expected after life of C3 at the moment.

## **Action C4: Extended Producer Responsibility - Contributing to a more Efficient Product Design, Increased Reuse, Recycling and Collection**

Beneficiary responsible for implementation: Environmental Protection Agency (MST)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2027

### **Purpose of action**

The purpose of this action is to develop a coherent legislative and administrative model for extended producer responsibility schemes (EPR) in DK, which will be able to accommodate both the existing responsibility regimes (WEEE, batteries and ELVs) and the new producer responsibility regimes (packaging and SUP products). In the following paragraphs, the activities and results from phase 1 are presented.

### **PM unit's (CDR) overall assessment of action**

The work conducted in C4 focuses on implementing EU directives and regulations in the areas mentioned above to enhance producer accountability in product design, post-consumer product collection, and consumption patterns. This work is expected to result in new legislation that aligns with national waste targets. To ensure these objectives are met, C4 has opted to engage all major stakeholder organizations from municipalities, industrial actors, waste management, recycling, food, and agriculture, representing both public and private sectors. Furthermore, a series of analyses have been undertaken to facilitate business compliance and improve impact measurement.

The PM Unit assesses that the establishment of a reporting system that encourages and supports producers in coping with EPR by involving practical applications enhances the possibility of success. The involvement of practitioners in the creation of the tool will make it easier to use, thereby fostering greater motivation for compliance. Consequently, we anticipate that the revised executive orders on extended producer responsibility (six orders) will lead to concrete actions supported by the plan for implementing the organization of EPR schemes (including registry, data, supervision), which has also been finalized.

### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C4 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C4</b>								
WP1								
WP2								

### Explanation for timetable delays (if any)

Action C4 was originally planned to be implemented within Phase 1. When we made Amendment No1 WP2 was extended to 2027. It was approved by CINEA and is therefore the applicable deadline. There are no other changes.

<b>WP1 Management, communication, monitoring, replication</b>					
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.					
Effective communications via mst.dk (the EPA's website), clearly setting out the rules and administration of the organisation.					
Timely engagement with stakeholders and communication through effective website communication of rules and administrative setup to successfully implement the organisation of the EPR schemes across the six regimes.					
<b>WP2 Prepare new and revise existing producer responsibility regimes</b>					
<ol style="list-style-type: none"> <li>1. Conduct technical analyses, draft legislation.</li> <li>2. Contribute to rigorous consultation through meetings and workshops with stakeholders including key industry players (e.g. producers, waste managers, business organisations and associations) to further clarify and consider options to successfully implement functional extended producer responsibility schemes. This will be done working in close collaboration with the Ministry of the Environment to ensure coordination with the ministerial agenda as well as other Government departments, through engagement in the form of meetings and workshops.</li> <li>3. Develop a plan for implementation of the organisation of the EPR schemes, including register, data, supervision and control to ensure timely preparation for starting up the activities.</li> <li>4. Prepare and start-up of register, supervision, and control to enable businesses, industry and other key stakeholders to fulfil their obligations under the implemented requirements and for the competent authorities to operate according to the new legislation.</li> <li>5. Plan for evaluating producer responsibility in 2026-2027.</li> <li>6. Start-up of operating organisation, the structure of which has not yet been determined, but could take the shape of e.g. a national producer responsibility register and individual schemes for producers to join, ensuring an operational system providing the support required practically functional extended producer responsibility regimes.</li> <li>7. Internal evaluation of the project to which the EPA will contribute.</li> </ol>					

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
A total of six new executive orders for existing and new producer responsibility regimes - WEEE, Batteries, ELVs, packaging, litter from certain single-use	WP2	31.12.2024	Delayed	01.07.2025	-

plastic products and deposit return scheme					
Website communicating rules and administrations setup on mst.dk to be completed before the new executive orders come into force.	WP2	31.12.2024	Delayed	01.07.2025	-

Name of the Milestone	Related Work Packages	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
New and revision of existing executive orders on extended producer responsibility (6 executive orders) prepared.	WP2	31.12.2024	Achieved	31.12.2024	N/A
A plan for implementation of the organisation of the extended producer responsibility schemes (including register, data, supervision and control) developed	WP2	31.12.2022	Achieved	31.12.2022	N/A
Preparation and start-up of register, supervision and control	WP2	31.12.2024	Achieved	31.12.2024	N/A
Internal evaluation of the project	WP2	31.12.2027	Not started	-	-

#### Explanation for delays in Deliverables and Milestones (if any)

In relation to the deliverable, “A total of six new executive orders.....”, it was expected at the start of the action that all executive orders related to EPR would be implemented and enforced by January 1<sup>st</sup> 2023. However, it turned out to be a complex and extensive task to adapt the Danish legislation accordingly. Due to this complexity, combined with a prolonged standstill period at the EU level, the originally anticipated deadlines for the implementation of packaging, single-use plastics (SUP), and batteries could not be met within the initial timeframe. The expectation is that all executive orders will come into force no later than July 1<sup>st</sup> 2025. The new and proposed deadline 01.07.2025 reflects this expectation.

The deliverable “Website communicating rules and....” is closely linked to the first deliverable and the same reason for delays apply. However, the EPA has already communicated regulations and administrative structure on its website, including visual guides to help explain the general rules, especially the producer definition (Website link is under “Communication”).

#### A. Expected and achieved results

##### The correlation between expected and achieved results

**Expected:** “The project will result in Danish legislation that outlines the regulation for extended producer responsibility in line with the requirements under the WFD and the SUP Directive. It will specifically lead to six executive orders implementing EPR for: WEEE, Batteries, ELVs, packaging, litter from certain single-use plastic products and deposit return scheme. The project will lead to the development

*of regulatory regimes for EPR that will underpin national targets for waste, thus ensuring that the political goals for recycling of packaging in 2025, 2030 and 2035 are accomplished. Additionally, the project will result in the administrative implementation and organisation of producer responsibility schemes to support the new and amended legislation. Furthermore, the project aims to communicate about EPR and guide companies that are subject to the new regulations.”*

In the development of the six national executive orders, the Danish Environmental Protection Agency (EPA) has aimed to create harmonized legislation across product and waste sectors under EPR. This includes a unified, data-driven monitoring model and standardized solutions for invoicing, administration, and complaint handling. The goal is to reduce business burdens, ensure efficient administration, and promote environmental protection. This work is part of a broader effort to modernize EPR regulation in Denmark, with technical and legal support from EPA to the Ministry of the Environment.

At the start of the action, the goal was for all executive orders on extended producer responsibility (EPR) to be in effect by January 1<sup>st</sup> 2023. However, due to complex legislation and EU standstill, deadlines for packaging, single-use plastics, and batteries could not be met. The expectation is that all executive orders will come into force no later than July 1<sup>st</sup> 2025. Additionally, the deposit return scheme executive order has not yet been developed, as this area was only recently transferred to the Ministry of the Environment.

### Communication

MST communicates the regulations for producer responsibility and administrative organization on its official website: [Electronical waste \(WEEE\) and batteries \(BAT\) - The Danish Environmental Protection Agency](https://www.mst.dk/en/electrical-and-electronic-equipment-and-batteries-wEEE-and-BAT)

### **B. Evaluation**

The evaluation of activities from Phase 1 has identified important learning points.

During the period, EPA has successfully provided technical and professional support in drafting and preparing six executive orders that implement extended producer responsibility. The subjects covered are WEEE, Batteries, ELVs, packaging, litter from certain single-use plastic products and deposit return scheme. Furthermore, a plan for implementation of the organization of the extended producer responsibility schemes (including register, data, supervision and control) has been developed. However, as explained above, the six orders are not yet in effect but are expected to be by July 1<sup>st</sup> 2025. This is also portrayed by the new deadline for the deliverables of C4.

The success of EPA, in reaching milestones across multiple areas, is largely due to stakeholder management and engagement, as well as the development of relevant analyses that contribute to a well-grounded decision-making process. These are detailed below:

- *Collaboration Forum:* EPA has acted as the secretariat for the Collaboration Forum for implementing extended producer responsibility (SAF), established by the government to receive recommendations for new producer responsibility schemes in Denmark. The forum includes large Danish Industry Organizations such as Local Government Denmark (KL), the Confederation of Danish Industry (DI), the Danish Chamber of Commerce, the Danish Agriculture & Food Council, Circular Denmark, the Danish Waste and Resource Industry and the Ministry of the Environment.
- *Working Groups for Environmentally Graduated Contributions:* EPA has invited organizations to the working group representing stakeholders with an interest in environmentally graduated contributions. The group helps develop a proposal for a Danish model for producer responsibility for

packaging and identifies companies for qualification workshops. EPA will also involve relevant stakeholders not represented by industry organizations or those with expertise in developing criteria.

- *Negotiation Committee for Household Waste:* The committee advises on the service level for municipal waste management regarding packaging waste collection from households, where waste is physically transferred between parties. Representatives from both municipal and producer sides are involved.
- EPA has ensured close coordination with the organization Dansk Producentansvar, which manages part of the producer responsibility schemes.

Several analyses have been conducted, including impact assessments, allocation models, cleanliness and cost analysis, and other consultancy services. The outcomes include:

- A methodology for waste analysis of packaging in household waste to assess cost allocation between producers and municipalities in a hybrid model.
- A data-driven risk model for monitoring and extracting businesses based on selected parameters and risks. The model will inform itself in terms of increasing accuracy and efficiency via a feedback loop adjusting business risk scores based on violations or compliance.
- A unified administrative basis across schemes, ensuring efficient case handling and a consistent experience for businesses covered by multiple legal frameworks.

### C. Targets and goals for Phase 2, 2025-2027

MST will continue communication on producer responsibility via its website:

<https://mst.dk/erhverv/groen-produktion-og-affald/affald-og-genanvendelse/producentansvar>

In addition, the executive orders for packaging and batteries will be finalized before the mid-2025 deadline. A politically mandated evaluation will also be initiated in 2027.

### D. After Life

Administrative tasks for producer responsibility will transition to operational and general administrative duties within the Ministry of the Environment.

### **Action C5: Circular Database and new Ways of Measuring Waste Reduction**

Beneficiary responsible for implementation: Environmental protection agency (EPA)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The purpose of the action is to develop an add-on for the existing version of a waste data reporting system (ADS). The overall C5 action was an extension to the now defunct Circular Databank and therefore the action had to be redefined (Amendment no 2). The evaluation and assessment of the action have therefore been done in respect to the amended version of the actions objectives and expected results.

#### **PM unit's (CDR) overall assessment of action**

The PM unit finds the shift in focus from data on materials for recycling to focus on data on reuse both necessary and important. It is necessary due to the defunct of the existing version of a waste data system and important addressing the need of and extended focus on reuse instead of recycling in order to support the possibilities of climbing the waste hierarchy.

Instead of developing a new database for material flows, C5 will integrate reuse data into the existing Danish National Waste Platform (ADS), which the EPA is currently expanding and enhancing. The collected reuse data will be utilized in accordance with Directive 2008/98/EC but, most importantly, to promote reuse among the public. Additionally, this data will play a key role in informing the revision of the APCE.

In Denmark data on reuse are lacking. A focus on quantitative data on reuse support a more concrete political dialogue on reuse and potentially pave the way for new legislation in Denmark. This is essential to lower the consumption of resources and promote a circular economy – the aim of the APCE.

We expect that a focus on quantitative data on reuse - including uniform ways of measuring it - will serve to extend and improve the already existing platform hosted by the EPA, which is meaningful, because all data on resources will be made available from one source.

#### **Action progress**

To monitor action progress, each action is equipped with a timetable and a set of work packages (WP). The WPs show technical progress and the path towards deliverables and milestones, and the timetable shows the timeline of each WP.

#### **C5 Timetable**

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II

C5													
WP1													
WP2													
WP3													
WP4													

### Explanation for timetable delays (if any)

n/a

WP1 Management, communication, monitoring, replication
Management, communication and monitoring activities will take place in all phases. Early in phase 1 appropriate monitoring indicators and measures will be planned in order to assess the impact of the action. Replication, where applicable, primarily takes place in phase 2 and 3.
WP2 Preliminary project: Detailed analysis of the available data, user needs and ways of meeting these with the data bank.
<ol style="list-style-type: none"> <li>1. Analyse stakeholders and study the available data: The setup of the preliminary study will be tied to a similar preliminary study design about gathering of waste data, which EPA and KL are conducting in 2021 and expect to implement in 2022. The stakeholder analysis includes research about potential stakeholders and clarification of their data needs and demands to the circular data bank. The analysis consists of interviews and workshops with the relevant stakeholders to identify and decide the priorities for the circular data bank. It is expected to include approximately 5-10 primary stakeholders in this part of the process.</li> <li>2. Data study focused on datatypes, formats and quality, which will analyse the possibilities and barriers connected to using the data. This part of the preliminary study will investigate e.g. technical formats, accessibility, data standards, update rates and compatibility across sectors and EU partners.</li> <li>3. Analysis of technical solutions: When stakeholder interests and data availability are defined the next step is to analyse the possible technical solutions and choose the one that is best suited to meet the requirements. Here, a number of factors will be considered, such as the need for transformation of data from the new sources, relevant updating frequencies, user interfaces to the input and output of data, necessary analytical programs, and how data output should be displayed to the users.</li> <li>4. The connections and alignment of different data both across monitoring of the circular economy and sustainability measures developed by the European Commission will be carried out by the circular data-bank to the extent that it is possible within the frame of the timeline.</li> <li>5. Building an IT-platform: The analysis of the technical solutions will lead to the building of a model of the chosen solution with an outline of the IT architecture and system requirements as well as a cost estimation of the development.</li> </ol>
WP3 Expansion of the data bank
<ol style="list-style-type: none"> <li>1. Extent and test the data bank: Based on the results of the preliminary project the existing data bank will be expanded according to the chosen IT architecture. The process will follow the standard agile development structure where small parts of the whole project are developed, tested and released in so-called sprints. This is to ensure that each expansion step works properly and without interfering with the functioning of the existing data bank.</li> </ol>

2. Develop a user manual, info-materials and workshops: When all steps have been completed and tested, documentation and user manuals will be issued and the EPA will host workshops with the new actors to introduce them to the expanded data bank.

#### WP4 Pilot study on further improvements

The pilot study will focus on an area where the experiences from the preliminary project, and the expansion of data bank indicate that there is a potential for further improvement of the data bank. One example of this is changing the way of collecting waste data so that data can be updated more frequently and with less demand for manual error checking and data washing. This might be obtained by using automatic reporting devices when collecting the waste and by using automatic procedures to ensure high data quality. In this case, the pilot study would involve setting up a number of waste transport trucks and containers with online reporting equipment and build corresponding functions in the data bank to receive and handle these data on a test level.

### Deliverables and Milestones

Name of the Deliverable	Related Work Packages	Original/ Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Preliminary project circular reuse data bank: Summary	WP2	30.12.2024	Completed	30.12.2024	YES
Data gathering module and reuse database	WP3	30.10.2027	Not started	-	-
Pilot project Summary	WP4	30.10.2029	Not started	-	-

Name of the Milestone	Related Work Packages	Original/ Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Preliminary project	WP2	30-11-2024	Achieved	30-11-2024	N/A
Streamlining of reuse categories and unites	WP3	30-04-2027	Not started	-	-
Pilot study begun	WP4	31-10-2027	Not started	-	-

### Explanation for delays in Deliverables and Milestones (if any)

As part of Amendment no 2 the deliverable “Circular data bank online platform: summary” was removed and the wording of the remaining deliverables and milestones was adjusted to be in line with the revised action description.

#### A. Expected and achieved results

The add-on to the existing version of a waste data reporting system (ADS), refers to a bank of data that facilitates exchange, policymaking and analysis of data regarding waste and reuse. The aim of the basic version of the circular data bank is to bring together data on reuse from the municipalities, NGOs and others to the EPA in one place in order to make it easier to compare data on reuse and make use of data for waste planning, benchmarking and environmental monitoring and statistics. In the following paragraph the activities and results from phase 1 are presented.

##### The correlation between expected and achieved results

(The expected results have been abbreviated)

**Expected:** “The primary result of C5 is the development of the actual add on to the ADS data bank itself. [...]

The primary result of C5 is the development of the actual add-on to the waste data system (ADS) itself. That means the focus is on gathering data on reuse and thereby supporting the Danish Action Plan for Circular Economy (APCE). Therefore, the action has to collect and store quantitative data on reuse in Denmark and furthermore build a presentation layer to visualize and report data on reuse.

To identify and decide the priorities for the circular data bank we have completed a stakeholder analysis and studied potential available data (WP2). We have conducted interviews and held workshops with stakeholders within the reuse sector e.g. relief shops, e-commerce platforms and municipal reuse centres. The aim was to discuss technical formats, how to categorise and to collect data. These discussions are essential for building a database about reuse, as the action is dependent on voluntary data due to the lack of national legislation about collecting data on reuse.

During phase 1 more than 30 stakeholders have been interviewed and three workshops have been held about the aforementioned technical topics. The result of the interviews and workshops is formalised in the written summary in deliverable “Pilot project summary”.

**Expected:** “New analysis and reuse rates - The circular data bank will enable easy calculation of e.g., reuse rates. Today, the monitoring of reuse is more or less absent and located in different databases handled by different actors [...] By also adding reuse into the same databases as the waste data, measurements for actual reuse become easier to calculate. The gathering of the data from the separate “lifecycle steps” for many different types of resources is an essential step in the monitoring of product lifetime and thereby help promoting extended use of products before obsolescence.”

**Expected:** “Access - The circular reuse data bank and the gathering of different waste data on one single platform will improve access to data. [...]”

**Expected:** “Synergy effects - The circular reuse data bank will provide a foundation for comparison which will create synergy effects on more levels. [...]”

**Expected:** Automation – The circular reuse data bank is constructed with respect of the prospects of automation of data collection regarding waste data. [...] The automation seeks to ensure that the circular data bank can adapt to future evolutions in the waste and digital areas. [...]”

The expectations above are linked to activities and results that will not be present until Phase 2 and/or 3.

### B. Evaluation

In this section, the progress, successes and challenges of the action are evaluated.

#### Progress, outcome evaluations, successes and learnings

The overall C5 action was an extension to the now defunct Circular Databank and therefore the action had to be redefined. This has resulted in an amendment and a postponement of activities.

Stakeholders was identified and involved early on in the action and more than 30 actors from e.g. the building sector, municipal waste management sector, non-profit reuse organisations and trade associations have been interviewed (among others Kredsløb – Aarhus, Affaldplus – Næstved, both recycling companies, Danish Industry - The Federation of Danish Industries, Circular Denmark (a political interest organisation consisting of municipal waste companies, The Danish Association of Construction Clients and Danish Red Cross. These actors were part of three workshops that have been held. The purpose of the interviews and the workshops have been to discuss how to collect data about reuse in an efficient manner and how to avoid double counting, and further which data would be of value for the stakeholders to promote the circular economy. Most of the stakeholders interviewed were very forthcoming and interested in the development of the action, i.e. private and public stakeholders.

#### Challenges

The main obstacle has been the lack of legislation about collecting reuse data and for some stakeholders to differentiate between reuse and preparing for reuse. Also, the implementation of the extended producer responsibility for textiles has resulted in some frustrations especially among the NGO's that are managing relief shops.

### C. Targets and goals for Phase 2, 2025-2027

Development of a reuse database, with a data-gathering module and a presentation layer is scheduled for deployment during phase 2 (WP3).

Extent and test the data bank: Based on the results of the preliminary project the existing data bank will be expanded according to the chosen IT architecture. The process will follow the standard agile development structure where small parts of the whole project are developed, tested and released in so-called sprints. This is to ensure that each expansion step works properly and without interfering with the functioning of the existing data bank.

Develop a user manual, info-materials and gather information based on amongst others workshops: When all steps have been completed and tested, documentation and user manuals will be issued, and the EPA will host workshops with the new actors to introduce them to the expanded data bank.

### D. After Life

After C5 is completed the database, data-gathering module and the presentation layer will be a permanent part of the Environmental Agencies IT-platform together with the national waste database (ADS).

### 6.3.5 The obligatory pillar

The obligatory pillar consists of the obligatory actions:

- Monitoring of the impact of the project actions (D1 and D2)
- Public awareness and dissemination of results (E1, E2, E3 and E4)
- Project management and monitoring of project progress (F1 and F2)

### Action D: Monitoring of the impact of the project actions (obligatory)

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 30.03.2033

#### **Purpose of action**

The purpose of this action is to monitor the progress and the - quantitative and qualitative - impacts of CEBW. The IP is monitored against the objectives of the APCE/WFD (APCE: Action Plan for Circular Economy, National Waste Prevention Programme and Waste Management Plan 2020-2032 / WFD: Waste Framework Directives) and the IP project's own objectives O1 Waste prevention, O2 Circular waste management and O3 Regulation. Monitoring results from one phase are transferred to the next to create optimal outputs and ensure that new phases build on the lessons learned from previous phases. The following section describes the activities and outcomes from Phase 1.

#### D Timetables

Phase	Phase 1						Phase 2						Phase 3							
	2022			2023			2024			2025			2026			2027		2028		2029
Action	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
D1																				
D2																				

#### **Deliverables and Milestones**

Name of the Deliverable	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Monitoring plan	D1	30.09.2022	Completed	30.09.2022	YES
1 overview report over APCE implementation	D1.1	31.03.2025	Completed	31.03.2025	YES
1 overview report of the capacity-building impacts	D1.2	31.03.2025	Completed	31.03.2025	YES
1 feasibility report of pilot/demonstration actions	D1.3	31.03.2025	Delayed	31.03.2028	-
1 updated overview of complementary funding	D1.4	31.03.2025	Completed	31.03.2025	YES
1 final monitoring report	D1	31.03.2030	Not started	-	-
1 first extract of the project (environmental and socioeconomic data from the KPI webtool (max. 9 months after kick-off)	D2	30.11.2022	Completed	30.11.2022	YES

1 second extract of the project data from the KPI webtool in the middle of the project.	D2	Tentatively 2026	On track	-	-
1 third extract of the project data from the KPI webtool as part of the Final Report. Max. 3 months after the project ends.	D2	30.03.2030	Not started	-	-
1 report "CE Beyond Waste – Socio-economic impacts" to be delivered with the Final Report.	D2.2	30.03.2030	Not started	-	-
1 last data reporting to the KPI database 3 years after the end of the IP.	D2	30.03.2033	Not started	-	-

Name of the Milestone	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Development of overview report of the APCE implementation based on C-actions as part of the auditing of phase 1 (max. 3 months after phase 1).	D1.1	31.03.2025	Achieved	31.03.2025	-
Development of overview report of the capacity-building impacts as part of the auditing of phase 1	D1.2	31.03.2025	Achieved	31.03.2025	-
Development of feasibility report of pilot/demonstration actions as part of the auditing of phase 1	D1.3	31.03.2025	Delayed	31-03-2028	-
Develop an overview of complementary funding as part of the auditing of phase 1	D1.4	31.03.2025	Achieved	31.03.2025	-
Develop a final monitoring report describing both plan implementation, capacity building, complementary projects and pilot/demonstration actions (part of the Final Report). Max. 3 months after the project ends.	D1	31.03.2030	Not started	-	-
Preparing first reporting of the project (environmental and socioeconomic) data to the KPI database	D2	30.11.2022	Achieved	30.11.2022	-
Preparing second reporting of the project (environmental and socioeconomic) data to the KPI database in the middle of the project	D2	Tentatively 2026	Not started	-	-
Preparing third reporting of the project (environmental and socioeconomic) data to the KPI database in the middle of the project	D2	30.03.2030	Not started	-	-

Preparing the report " <i>Ce Beyond Waste - Socio-economic impacts</i> " to be delivered with the Final Report with an estimation of the project's socio-economic impact evaluated according to the selected socio-economic indicators. The report will consolidate data collected from all projects and their impact on society	D2.2	30.03.2030	Not started	-	-
Collection of the last data reporting to the KPI database max. 3 years after the end of the KPI	D2	30.03.2033	Not started	-	-

### **Explanation for delays in Deliverables and Milestones (if any)**

Both the deliverable "*1 feasibility report of pilot/demonstration actions*" and the corresponding milestone "*Development of feasibility report of pilot/demonstration actions as part of the auditing of phase 1.*" are requested to be postponed to 31/03/2028. This is because the results and findings from the various actions are only now beginning to emerge and will become even clearer during Phase 2. The PM Unit will therefore support dissemination and replication efforts throughout Phase 2 (as well as Phase 3). It therefore makes sense to postpone the feasibility report until immediately after Phase 2, allowing for the collection of knowledge and learnings from Phase 2 efforts. This will help qualify and strengthen the continued work in Phase 3.

### **Expected and achieved results**

#### *The correlation of expected and achieved results*

Monitoring reports providing an overview of the status of the project, which will form the basis for formulating more concrete activities in the next phases of the project.

The PM Unit has written an interim report based on activities and results in phase 1, which lays the foundation for the project's further development in phase 2.

When the project reaches the end of phase 2, the PM Unit will provide a similar monitoring report looking towards the third and final phase of the project.

#### *Action D1: Deliverables and Milestones*

This action has achieved deliverables and milestones for both D1 and D2 in Phase 1.

Most of the deliverables are finished except "*1 feasibility report of pilot/demonstration actions*" (deadline 31/03/2028) and "*1 final monitoring report*" (deadline 31/03/2030). These are due later in Phase 2 and 3.

Similarly, most of the milestones are finished, except "*Development of feasibility report of pilot/demonstration actions as part of the auditing of phase 1.*" (deadline 31/03/28) and "*Develop a final monitoring report describing both plan implementation, capacity building, complementary projects and pilot/demonstration actions (part of the Final Report). Max. 3 months after the project ends*" (Deadline: 31/03/2030).

### Action D2: Deliverables and Milestones:

The first deliverable (and corresponding milestone) is finished – “*1 first extract of the project (environmental and socio-economic) data from the KPI webtool (max. 9 months after kick-off)*”. All other Deliverables and Milestones are not due until later.

#### **A. Evaluation**

The PM Unit has successfully developed a monitoring plan and the tools necessary to implement comprehensive project monitoring.

By engaging a leading advisory company, the PM Unit secured expert input, resulting in a robust framework and precise monitoring tools aligned with the overall project targets and individual action objectives. The monitoring tools are applied during relevant processes, including monitoring visits and phase proposal development.

The advisory company also assisted in identifying relevant KPIs for the KPI assessment tool provided by EU CINEA.

Effective monitoring is essential for progressing through project phases. For the interim report between Phases 1 and 2, the PM Unit emphasized the expected results and deliverables for each action.

As part of preparations for Phase 2, the PM Unit conducted visits to all partners (both leads and collaborators) to gain a detailed understanding of action progress. Two PM Unit employees attended each of the 17 visits, documenting observations and data on progress and results. These insights provided a comprehensive understanding for the PM Unit of the project’s overall progress, the Action D deliverables and Phase 2 planning in every action.

Partner visits also revealed which action results were ready for dissemination and replication within the partnership and externally.

Environmental and socio-economic baseline data has successfully been provided and inserted into the KPI webtool by the PM Unit. Projections and goals from APCE have been taken into account while providing the data. A comprehensive evaluation of the progress towards achieving the KPI targets by the end of Phase 1 is carried out in Chapter 7. Key Project-level Indicators.

#### **B. Targets and goals for Phase 2, 2025-2027**

The PM Unit aims to continuously collect information relevant to monitor the progress of the implementation of APCE across all actions.

Specifically, the PM Unit intends to replicate the process used for the 1st interim report when Phase 2 concludes. This will involve visiting all actions to gather information necessary for transitioning to the project’s final phase.

It is expected that a second set of environmental and socio-economic data will be requested and subsequently provided and inserted into the KPI webtool by the PM Unit during phase 2.

#### **C. After Life**

Once the final monitoring report is completed and approved, formal project monitoring will cease. Thus, no dedicated "after life" is planned for this action.

However, it is expected that ongoing and replicated actions will be monitored locally by the respective organizations.

Additionally, the EPA, as the legal authority in charge of APCE, will continue to monitor the progress of the implementation of APCE.

### **Action E: Public awareness and dissemination of results (obligatory)**

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.12.2029

#### **Purpose of action**

The CEBW project involves many different stakeholders. The purpose of this action is therefore to ensure effective and coordinated communication activities across the CEBW consortium. In the following paragraph the activities and results from Phase 1 are presented.



*A communication workshop was held in the beginning of the project period to ensure coordination of communication activities and effective dissemination.*

#### **E Timetable**

Phase	Phase 1						Phase 2						Phase 3			
	2022		2023		2024		2025		2026		2027		2028		2029	
Action	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
E1																
E2																
E3																
E4																

## Deliverables and Milestones

Name of the Deliverable	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
Communication and outreach plan version 1	E1	31.12.2024	Completed	31.12.2024	YES
Communication and outreach plan revised	E2	31.12.2027	On track	-	-
Replication plan	E1	31.12.2027	On track	-	-
Link to website for CE Beyond Waste	E2.1	30.06.2023	Completed	30.06.2023	YES
Notice boards to be displayed and shown on the website and at beneficiaries' offices	E2.2	30.06.2023	Completed	30.06.2023	YES
Layman's report in colour copy and available for online download	E2.3	31.12.2029	On track	-	-
Conference material and evaluations of the conferences are made available	E3.1	30.11.2024	Completed	30.11.2024	YES
Conference material and evaluations of the conferences are made available	E3.2	31.12.2029	On track	-	-
Online materials created for international dissemination	E4	31.12.2029	On track	-	-

Name of the Milestone	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / If delayed, new deadline	In BUT-LER
The first draft of the Communication and outreach plan is discussed among stakeholders	E1	31.12.2022	Achieved	31.12.2022	N/A
Draft version of the website is created	E2.1	30.06.2022	Achieved	30.06.2022	N/A
Final website is created	E2.1	30.06.2023	Achieved	30.06.2023	N/A
Work is commenced making notice boards	E2.2	30.06.2022	Achieved	30.06.2022	N/A
Systematically work with the Layman's report is commenced	E2.3	31.01.2029	Not started	-	-
LIFE IP CE Beyond Waste - End of Phase 1 Conference	E3.1	30.11.2024	Achieved	30.11.2024	N/A
LIFE IP CE Beyond Waste - Final Conference	E3.2	31.12.2029	Not started	-	-
International dissemination work is commenced	E4	31.07.2022	Achieved	31.07.2022	N/A

## Explanations for delays in Deliverables and Milestones (if any)

N/a

### A. Expected and achieved results

#### The correlation between expected and achieved results

**Expected:** “E2.1 will result in a website, including 8 newsletters, for dissemination and keep stakeholders and other relevant people updated”

The website ([www.cebeyondwaste.eu](http://www.cebeyondwaste.eu)) is a key source of online dissemination for the broad range of stakeholders. It includes descriptions of actions, produced materials, as well as news and info about the project, actions, news and material developed. During Phase 1, the site has had more than 20,000 page views and 8,850 visitors.

In addition to the website, the PM Unit chose to establish the knowledge-sharing platform Connect (<https://connect.cebeyondwaste.eu/start-side>). This platform has primarily been used by the partnership to share results and engage in dialogue about experiences throughout the project.

So far, [9 newsletters](#) have been produced, with more in the pipeline. The newsletter has 201 subscribers.

**Expected:** “E2.2 will result in app. 100 produced notice boards of various sizes, which are displayed strategically at project sites with public access”

So far, a poster/notice board is displayed at the location of each partner (39). The poster can be found on the website via this link: [a3\\_plakat\\_print.pdf](#). For various events, we have 16 movable posters/information boards (roll-ups) and 10 larger banners. Additionally, 5 information boards are currently installed at action-specific sites. The total number of notice boards is 70.

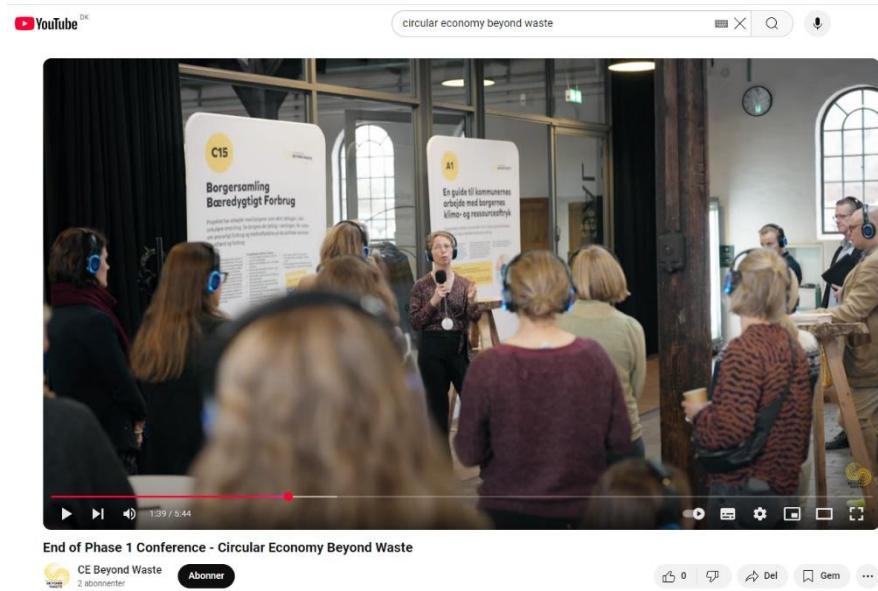
**Expected:** “E2.3 will result in a Layman's report, which will be made available to all at the project's website(...)”

To be produced by 31/12/2029.

**Expected:** “The conferences in E3.1 and E3.2 will together with seminars and webinars carried out in C1 and F be significant tools to disseminate the IP to many stakeholders. The two major CE Beyond Waste conferences will result in dissemination to at least 600 Danish and European attendees”

We consider the ‘End of Phase 1 Conference,’ held on November 20, 2024, to be a major success. Over 200 participants attended, representing industry organizations, municipalities, regions and waste management companies. Subsequent feedback confirmed that both internal partners and external stakeholders found significant professional value and inspiration from the event. Many also established new cross-sector contacts.

Conference materials and videos were distributed to all attendees via mail.



### Reportage from End of Phase 1 Conference, November 20., 2024



*Networking, knowledge sharing and dissemination of project results were the focus of the End of Phase 1 Conference.*

**Expected:** "Networking with other projects and international information material etc. (E4) will result in the dissemination of CE Beyond Waste to a wide international audience"

This effort will receive special focus in Phase 2 and Phase 3. However, the PM Unit has already established international contacts, such as engaging with CCRI and being in dialogue with contacts from the study trip to the Netherlands in April 2024, e.g. the people behind the Dutch 'legislation tool' [Cir-cuLaw](#).

#### B. Evaluation

This paragraph presents the progression, successes, and obstacles of the action.

During the project's first phase, the PM Unit has established a communication platform encompassing several channels and a visual identity that is widely utilized across the project and its partners. These communication methods have helped place the project on the national agenda and in the minds of key stakeholders beyond the project partnership.

Through dialogue with partners and participants at dissemination events, we analyze feedback to understand what works well and what doesn't, allowing us to make necessary adjustments. This approach also applies to external communication.

Regarding press work, we have found that broadly distributed press releases are not highly effective. Consequently, we revised our press strategy to focus on direct outreach to specific media outlets, providing drafts for articles and opinion pieces. This has resulted in greater success in publishing articles in relevant industry media. Examples include opinion pieces in *WasteTech* ([March 2022](#)) and the political magazine *Altinget* ([September 2023](#)).

LinkedIn has proven to be an effective and active channel. By the end of 2024, we reached 1,100 followers. Posts are shared approximately once a week, generating significant reach and engagement in comment threads. [View our channel](#).

Our podcast series, "En fremtid uden affald" ("A Future Without Waste"), has been highly successful, prompting us to continue it in Phase 2. We have produced 10 episodes so far ([Podcast link](#)). The series combines cases and results from CEBW with other Danish cases and actors working in circular economy. Including external stakeholders enhances the podcast's reach through their channels and networks.



*Podcasts, local media invitations, debate articles, and LinkedIn videos are among the communication channels embraced by CEBW.*

Participation in professional conferences, public meetings, and other events are activities that the PM Unit has prioritized to some extent. Especially climate and resource-focused events, where we have had the opportunity to present professional content from the project, make sense to invest time in. For example, in 2022 and 2024, we participated with workshops and debates at the national climate event, "Klimafolkemødet" ([Forside](#)).



*CE Beyond Waste on Klimafolkemødet*

### **C. Targets and goals for Phase 2, 2025-2027**

The PM Unit will continue working to meet the milestones and deliverables outlined in the original action description, as they remain natural outcomes of the PM Unit's work.

**For Phase 2, the PM Unit will specifically focus on:**

- Development of a replication plan – deadline: 31/12/2027
- Revised communication and outreach plan – deadline: 31/12/2027

In addition to these deliverables, the PM Unit will intensify dissemination activities across existing platforms while identifying new opportunities to share project results.

Strategic collaborations with industry organizations like Cirkulær and Concito will be explored in 2025.

An increased focus on dissemination outside Denmark, particularly in other EU countries, will also take place. CDEU (CEBW-partner), based in Brussels, will play a central role in 'opening doors' to relevant EU officials, organizations, as well as connecting CEBW with other IPs.

The website will undergo an update to include more English-language content and communicate achieved results as they come in.

#### D. After Life

CDR will ensure that all communication materials developed in CE Beyond Waste—website, podcasts, newsletters, and more—will remain available for at least five years after the project concludes in 2029.

### **Action F: Project Management and monitoring of project progress (obligatory)**

Beneficiary responsible for implementation: Central Denmark Region (CDR)

Foreseen start date: 01.01.2022

Actual start date: 01.01.2022

Actual/anticipated end date for action specific activities 31.03.2030

#### **Purpose of action**

The purpose of this action is ensuring that the project meets its objectives and outcomes. The coordinating beneficiary (CDR) has assumed the responsibility for Project Management (PM) and will make sure that the project runs within the designated timeframe according to the milestone plans, as well as meets required reporting and financial requirements. Also, CDR is the single point contact for EC and manage the overall project. The following sections describe the action's activities and results in Phase 1.

#### **Deliverables and Milestones**

Name of the Deliverable	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUT-LER
Phase two proposal	F1	31.03.2025	Completed	31.03.2025	YES
Phase three proposal	F1	31.03.2028	Not started	-	-
Kick off press release	F2	31.03.2022	Completed	31.03.2022	YES

Name of the Milestone	Code of the associated action	Original/Approved deadline	Status	Actual date of completion / <i>If delayed, new deadline</i>	In BUT-LER
Interim report Phase 1/2	F1	31.03.2025	Achieved	31.03.2025	N/A
Interim report Phase 2/3	F1	31.03.2028	Not started	-	-
Final report	F1	31.03.2030	Not started	-	-
Kick off seminar	F2	31.03.2022	Achieved	31.03.2022	N/A
Communication workshop	F2	31.03.2022	Achieved	09.06.2022	N/A

#### **Explanation for delays in Deliverables and Milestones (if any)**

N/a

##### **A. Expected and achieved results**

###### *The correlation of expected and achieved results*

**Expected:** “Professional management of the IP with a competent, structured and highly engaged PM Unit”

CDR quickly established a highly professional IP management team, consisting of five employees with distinct responsibilities. In the startup phase, the PM Unit benefited significantly from the fact that two employees had led the project application process, while a third had provided financial support during the application phase. This eased the transition to project implementation with new people on board. The team was further strengthened with two new staff members in 2022 and 2023, followed by an additional employee in autumn 2024, bringing the team to a total of six members. This latest addition will, among other tasks, focus on complementary actions and expanding national and international networks.

**Expected:** *“Clear division of responsibility”*

The PM Unit operates with a well-defined division of responsibilities while maintaining close collaboration to ensure strong and effective project management.

- EU and Administrative Project Manager: Mainly responsible for the administrative tasks of managing an EU LIFE project, including EU reporting and financial reporting.
- Technical Project Manager: Mainly responsible for the project's technical implementation and impact, coordinates key organizational structures (coordinating body, steering group, and political committee), and supports capacity building and communication.
- Financial Officer: Responsible for handling financial data collection from partners, validates financial statements, and manages budget revisions.
- Strategic Developer: Mainly responsible for capacity-building efforts, particularly through Action C1.
- Communications Officer: Mainly responsible for developing and maintaining the communication platform and producing content.
- Developer: Mainly responsible for complementary actions and national/EU networking.

This structured approach ensures clear accountability while fostering collaboration across key project areas.

**Expected:** *“High quality capacity building in order to secure best practice”*

The PM Unit has successfully built a high-quality capacity building action, which is highly appreciated by all partners in the project. This is elaborated in-depth above in action C1.

The PM Unit has also successfully built a communication platform with a clear visual identity and communication through both homepage, newsletter, podcast series, LinkedIn profile, articles and more. This platform is pivotal in securing best practice, because visibility of the project is required for this.

**Expected:** *“Clear Communication”*

The PM Unit has established clear communication to both partners in CEBW and stakeholders outside the project. The communication channels include:

- Mandatory website ([www.cebeyondwaste.eu](http://www.cebeyondwaste.eu))
- Podcast series with 10 episodes so far (deliverable in action C1) <https://www.cebeyondwaste.eu/viden/podcast/>
- Newsletter published 9 times so far: (<https://www.cebeyondwaste.eu/presse-og-nyheder/nyhedsbrev/>)

- The project's own communications platform, Connect (<https://connect.cebyondwaste.eu/start-side>) - used mainly for networking within the partnership and with outside stakeholders.
- More than 35 articles/news produced by the PM Unit with stories and learnings from the actions (<https://www.cebyondwaste.eu/presse-og-nyheder/nyheder/>)

**Expected:** *"National and international visibility"*

The project is gaining increasing recognition at the national level, with more stakeholders reaching out to the PM Unit for information and potential collaboration.

Internationally, the newly hired employee is expected to enhance visibility by working closely with CDEU, CDR's EU office. One project action has already been represented in Brussels with a conference talk, and two partners have spoken at a CCRI webinar. The PM Unit anticipates more such engagements in the future. Additionally, active participation in CCRI network activities is expected to further raise awareness as project results continue to emerge.

**Expected:** *"The kick-off seminar in F2.1 will result in dissemination of formal requirements, practical information and further mobilize engagement among partners"*

The kick-off seminar on March 22, 2022, effectively communicated formal requirements and practical information. Additionally, feedback from several partners revealed that the seminar strengthened their commitment to the project.



*Kick-off Event, March 2022*

**Expected:** *"Dissemination of formal requirements, practical information and further mobilize engagement among partners (F2.1)"*

The communications workshop held on June 9, 2022, provided an ideal platform to share the LIFE IP communication guidelines with local communication officers. Since then, the communications officer has continued to support partners in this area as needed.



*Communication workshop, June 2022*

The PM Unit has also developed administrative guidelines and held webinars to secure in-depth understanding of formal requirements among partners. Furthermore, the PM Unit has visited all partners to have more direct and personal dialogue on specific issues.

#### **B. Evaluation**

Action F is progressing successfully and as planned, based on the results achieved so far.

#### **C. Targets and goals for Phase 2, 2025-2027**

The PM Unit will focus on delivering the two key proposals for phases 2 and 3, with particular emphasis on the Phase 2 proposal, due by March 31, 2025. Work on this proposal began in June 2024, while preparation for Phase 3 will start in June 2027, with a deadline of March 31, 2028.

The primary goal for project management in Phase 2 is to maintain and strengthen a robust management structure across all areas—administrative, technical, monitoring, capacity building, communications, complementary actions, and networking.

The PM Unit will continue working closely with the coordinating body, steering group, and political committee to ensure smooth project execution and maximize their impact on dissemination and network-building. Additionally, the PM Unit will nurture strong relationships with all partners to ensure effective administrative and technical outcomes, alongside sound financial management.

Communications and capacity building will increasingly focus on disseminating and replicating the project's learnings and solutions to secure a catalytical effect of project results, both nationally and internationally. A specific focus for Phase 2 will be on complementary actions, as partners identify new opportunities. The PM Unit aims to help turn these ideas into reality by supporting project development and fundraising efforts.

A more targeted approach to EU networking will also enhance the international visibility of the project's results, with collaboration between the PM Unit and CDEU.

#### **D. After Life**

Post-CEBW, Action F activities will no longer be required, as the results of the project should have been widely disseminated and replicated on a large scale.

## 7. Key Project-level Indicators

In this section we will assess the IP's progress towards achieving the Key Project-level Indicator (KPI) targets as well as justify significant deviations from the targets and comment on targets already met or exceeded.

We refer to KPI indicators in the headings.

### 1.5. Project area/length, Area of environmental/climate implementation actions (e.g. development, testing, demonstration, application of best practices/innovations):

Baseline data inserted in KPI:

At the end / Beyond 5 years: Denmark: 42.924 km2 (KM2 per. January 2022, <https://www.eu.dk/da/fakta-og-tal/statistik/indbyggere-og-areal>)

Assessment, End of Phase 1:

No changes.

### 1.6. Humans (to be) influenced by the project, Persons who may have been influenced via dissemination or awareness raising project-actions (reaching):

Baseline data inserted in KPI:

In the beginning, End value and Beyond 5 years value: 0, 70000 and 70000, Number of residents within or near the project area

Comments:

"0" at the beginning means that no persons have been influenced by the project

How will we reach these numbers: C15, Citizen Assembly has already in 2022 reached out to 40.000 citizens in order to be able to establish Citizen Assembly activities. Furthermore, our website, LinkedIn profile, End of phase 1 conference and final conference of CEBW, general dissemination and replication activities are expected to reach out to a large number of people (estimated 30.000 at the end). Beyond 5 years after the project ends, we don't expect more people to be influenced than at the end.

Assessment, End of Phase 1:

Finishing Phase 1 on the IP, our assessment is that we are well under way. In the following we mention concrete numbers of people potentially influenced.

In C15 40.000 citizens have been reached out to in 2022, when establishing the Citizen assembly.

Our website has had 8.850 visitors from 9 June 2022 – 31 December 2024.

Our LinkedIn profile has a total number of followers of 1.123 (as per 8 January 2025)

Kick off Conference and End of Phase 1 Conference had 320 participants

Seminars conducted by CDR: 167 participants

Webinars conducted by CDR: 947 participants

Podcasts conducted by CDR: 907 downloads (8 podcasts)

Newsletter, CE Beyond Waste: 201 subscriptions

Presentations at large conferences by CDR: 325 participants

### **3.1. Waste, Waste management**

#### Baseline data inserted in KPI:

Line 1. Mass of non-appropriately managed waste

Unit: 1000 x tons/year

At the beginning: 4,620.00

At the end: 2,940.00

Beyond 5 years: 2,940.00

Mass reduction due to waste prevention

Unit: 1000 x tons/year

At the beginning: 0

At the end: 1,680.00

Beyond 5 years: 1,680.00

#### Comments:

Line a. is used to clarify input to line 1 (cf. "Open guide")

We only have national values for the amount of waste produced in kg. per capita. (Denmark is waiting for EU to set reduction targets, see explanation below). We have therefore made a calculation using Waste in kg per capita times the number of inhabitants in Denmark.

We use 2018 as baseline year.

Number of inhabitants in Denmark: 2018=5.781.200. 2029=6.017.800

(Source: <https://www.dst.dk/da/Statistik/emner/borgere/befolning/befolkningsfremskrivning> and <https://extranet.dst.dk/pyramide/pyramide.htm#!y=2029>)

2018: Municipal waste pr. capita in Denmark = 799 kg. (cf. National waste management and prevention plan 2020-2032)

"At the end" and "Beyond 5 years": We have set a preliminary target of 489 kg (EU28 average in 2018). Denmark does not have an official target for waste reduction but is waiting for an official waste reduction target from EU (Cf. National Waste Management Plan, p. 7)

Calculation: Waste in kg per capita X number of inhabitants.

2018:  $799 \times 5,781,200 = 4,619,178,800$  total kg waste = 4.62 (1000 tons/year)

2029:  $489 \times 6,017,800 = 2,942,704,200$  total kg waste = 2.94 (1000 tons/year)

Line a. shows the impact of Line 1 on waste saved in kg. At the beginning "0" kg of waste is saved, "at the end" 1.68 (1000 tons) of waste is saved, which remains the same "Beyond 5 years" (see explanation below).

This is calculated this way:

4.62 minus 2.94 = 1.68 at the end, and 1.68 Beyond 5 years:

#### Assessment, End of Phase 1:

We have made calculations below in the same way as the baseline data that was inserted, to be able to assess progress. We still use 2018 as baseline data. And we have numbers for 2022 (no numbers are yet available for 2023 and 2024)

Number of inhabitants:

Number of inhabitants in Denmark: 2018=5.781.200. 2022=5.934.002

Source: Statistics Denmark, <https://www.dst.dk/da/Statistik/emner/borgere/befolkning/befolkningsstat>

Waste pr. Capita:

2018: Municipal waste pr. capita in Denmark = 799 kg. (cf. National waste management and prevention plan 2020-2032)

2022: Municipal waste pr. capita in Denmark = 746 kg

Source: Affaldsstatistik 2022 Danish Environmental Protection Agency, p. 5 and Ch. 5 (table 5.2) <https://www2.mst.dk/Udgiv/publikationer/2024/11/978-87-7038-665-4.pdf>

Calculation:

Calculation: Waste in kg per capita X number of inhabitants.

2018:  $799 \times 5,781,200 = 4,619,178,800$  total kg waste = 4.62 (1000 tons/year)

2022:  $746 \times 5,934,002 = 4,489,279$  total kg waste = 4.49 (1000 tons/year)

(2029:  $489 \times 6,017,800 = 2,942,704,200$  total kg waste = 2.94 (1000 tons/year))

Based on the above numbers, we can calculate an impact on waste saved in kg. from 2018 to 2022. At the beginning (2018) "0" kg of waste is saved, in 2022 " 0,13 (1000 tons) of waste is saved.

This is calculated this way:

4.62 minus 4.49 = 0,13 in 2022

Conclusion:

The calculation shows a slight tendency towards less waste in kg. than expected.

#### **4.4. Resource efficiency – circular economy**

Number of entities where green circular economy practices are implemented (only if applicable)

Baseline data inserted in KPI:

Following the instructions in the "Open guide", we have selected "Provide values later" because the system does not allow "0" "0" "0" to be inserted. In the second-level indicator 1,2 and 3 we do not have any numbers, therefore N/A in these lines. In the second-level indicator 4, "Number of entities where green circular economy practices are implemented (only if applicable)" we would have inserted the values "0" at the beginning, "150" at the end and "200" beyond 5 years and the unit was to be "number of entities"

Assessment, End of Phase 1:

In the following, we provide a cautious estimate of the trend we observe regarding the "Number of entities where green circular economy practices are implemented," based on experiences and activities within the partnership during phase 1. We have not conducted an actual measurement but based on the reporting from beneficiaries in connection with the phase 1 reporting, it is our impression that both the partners themselves and at least one external collaborator/entity per action have implemented circular economy practices. Therefore, we estimate that 33 (number of partners by the end of phase 1) + 24 (number of C-actions/one external collaborator) = 57 entities are implementing circular practices.

### 8.1.1. Climate Change Mitigation, Green House Gas Emissions, CO<sub>2</sub>

Baseline data inserted in KPI:

Indicator descriptor - "Other"- we use this descriptor to show "Reduction in Co<sub>2</sub>e in the Waste sector"

We use tons of CO<sub>2</sub>, not kg CO<sub>2</sub>/person, therefore no values/ numbers in the first indicator line.

The Danish Waste Man. Plan uses CO<sub>2</sub> equivalents (not pure CO<sub>2</sub>) and therefore we use only 8.1.1 (and not 8.1.2 as well) to define total CO<sub>2</sub>e (following the "Open Guide")

Since we are not allowed to insert "0" "0" "0" in the first indicator line and we still would like to insert values in the second line, we have selected "provide values later" and below we have made comments regarding the values we would have inserted in the second line if it was possible.

"At the beginning" would be the value in 2019 as this value is known by now. The value would be 2,900,000.00 tons of CO<sub>2</sub>e/year.

Total CO<sub>2</sub>e-emissions from the waste sector [mio. tonnes CO<sub>2</sub>e]. Source: "Danish Waste Prevention and Waste Management Plan 2020-2032 (APCE)"

"At the end/Beyond 5 years": The value would be 2,200,000,00 tons of CO<sub>2</sub>e/year. Source: "The National Waste Prevention and Waste Management Plan 2020-2032 (APCE)" - "In June 2020, the Danish Government and a large parliamentary majority have reached agreement on Climate Plan for a green waste sector and circular economy. The implementation of the agreement is estimated to reduce waste sector emissions by 0.7 million tonnes of CO<sub>2</sub>e in 2030 by increased recycling and reduced incineration capacity".

### Assessment, End of Phase 1:

In 2019 the value was set to 2,900,000 tons of CO<sub>2</sub>e/year (Total CO<sub>2</sub>e-emissions from the waste sector [mio. tonnes CO<sub>2</sub>e]).

From 2019 to 2021 the total emissions have decreased to 2,300,000 tons of CO<sub>2</sub>e/year.

The 2023 projection from the Danish Energy Agency also indicates that the downward trend is continuing.

"...The sector's total emissions decrease from approximately 2.3 million tons of CO<sub>2</sub>e to 1.2 million tons of CO<sub>2</sub>e from 2021 to 2035. Compared to KF22, the projection shows a reduction in the sector's emissions by approximately 0.3 million tons of CO<sub>2</sub>e in 2025, an increase of approximately 0.2 million tons of CO<sub>2</sub>e in 2030, and a reduction of approximately 0.1 million tons of CO<sub>2</sub>e in 2035. It should be noted in this context that the data basis for landfilled waste quantities has been revised for KF23. The revision results in a reduction of greenhouse gas emissions from landfills by approximately 0.1 million tons of CO<sub>2</sub>e annually, due to a lower historical baseline."

Source: Klimastatus og -fremskrivning, 2023, The Danish Energy Agency, p. 65

[https://ens.dk/sites/ens.dk/files/Basisfremskrivning/kf23\\_hovedrapport.pdf](https://ens.dk/sites/ens.dk/files/Basisfremskrivning/kf23_hovedrapport.pdf)

### **10.2 Involvement of non-governmental organizations (NGOs) and other stakeholders in project activities, Public body/bodies + Private body/bodies**

Indicator name: Involvement of non-governmental organizations (NGOs) and other stakeholders in project activities

Indicator descriptor: Public body/bodies

Unit: number of stakeholders involved due to the project

Baseline data inserted in KPI:

At the beginning: 0

At the end: 48

Beyond 5 years: 48

Method: We expect that on average every C-action will involve 2 public bodies

At the end: 24 (sub)C-actions x 2 public bodies = 48

Beyond 5 years: 48

Indicator descriptor: Private for profit

Unit: number of stakeholders involved due to the project

Baseline data inserted in KPI:

At the beginning: 0

At the end: 48

Beyond 5 years: 48

Method: We expect that on average every C-action will involve 2 private companies

At the end: 24 (sub)C-actions x 2 public bodies = 48

Beyond 5 years: 48

Assessment, End of Phase 1:

It is a widely used working method among the many partners in CE Beyond Waste and in Denmark in general to involve external stakeholders, especially when working with value chain issues as we do in CE Beyond Waste. We have not conducted an actual measurement but based on the reporting from beneficiaries in connection with the phase 1 reporting, it is our impression and assessment that we have already achieved the targets of 48 public and private bodies during phase 1.

**11. Information and awareness raising to the general public**

**11.1 Website (Mandatory), No. of unique visits**

Baseline data inserted in KPI:

At the beginning: 0

At the end: 5000

Beyond 5 years: 5000

Assessment, End of Phase 1:

The number of unique visits to our website <https://www.cebeyondwaste.eu/> is 6.571 in the period 9/6-22 to 31/12-24.

**11.2 Other tools for reaching/raising awareness of the general public**

Number of events/exhibitions organized, (Unit: Number of outcomes (e.g. nr of reports, events, etc))

Baseline data inserted in KPI:

At the beginning: 0

At the end: 50

Beyond 5 years: 50

Method: Events and exhibitions organised by the partners for the general public and/or stakeholder groups.

Assessment, End of Phase 1:

Finishing Phase 1 on the IP, our assessment is that we are well under way. Below, we present the number of major selected events, etc. during Phase 1.

Number of conferences: 2 Kick off Conference and End of Phase 1 Conference for CE Beyond Waste

Number of seminars conducted by CDR: 3

Number of webinars conducted by CDR: 18

Number of Podcasts conducted by CDR: 8

Number of CEBW-newsletters: 8

Number of videos conducted by CDR: 14

Number of large conference presentations by CDR and invited speakers: App. 15

The PM Unit has also conducted a count of reports from the partnership regarding the interim reporting. This has resulted in an estimate of the number of events and exhibitions organized by the partners for the general public and/or stakeholder groups in Phase 1, totaling 27.

A smaller portion of these 27 are presentations given by partners as part of events organized by external actors. It should be noted that partners have also held a number of workshops and networking meetings for professional stakeholders, which are not included in this count.

Conclusion: Based on the above-mentioned numbers we have by the end of Phase 1 reached a total of 94. Although some of the activities may not be considered as events or exhibitions, it is our assessment that we have reached the target of 50 already by the end of Phase 1.

**Number of different displayed information created (posters, information boards), (Unit: Number of outcomes (e.g. nr of reports, events, etc))**

Baseline data inserted in KPI:

At the beginning: 0

At the end: 70

Beyond 5 years: 70

Method: "One poster/information board per. partner (39) + 16 posters/information boards (roll-ups) + 5 posters/information boards at action specific sites + 10 larger banners= 70

We are aware that we have estimated app. 100 noticeboards in the IP Full Proposal in Action E, but since we have started implementing the IP project, we have realized that this number is unrealistically high."

Assessment, End of Phase 1:

By the end of phase 1 we are no longer 39, but 33 partners in the IP. 33 partners have posters and information boards already now visible at their locations. At least 12 roll-ups + 16 conference walls have been made. Several partners have made posters/information boards at action specific sites, that includes BRK, AVA, RENO, Samsø K and we have already reached the target of 5. By now we have already made 10 large banners and thus reached this target. The target of 70 is thus already reached.

**Other distinct media products created (e.g. different videos/broadcast/leaflets), (Unit: Number of outcomes (e.g. nr of reports, events, etc.))**

Baseline data inserted in KPI:

At the beginning: 0

At the end: 122

Beyond 5 years: 122

Method: "2 podcasts, 10 videos, 10 hand-outs (leaflets/brochures/one-pagers) - produced by CDR

Publications and other types of output - 100 - produced in all actions"

Assessment, End of Phase 1:

By the end of phase 1 CDR has produced 8 podcasts, 45 articles (shown on website and LinkedIn), 14 videos, 1 one-pager and a game board for innovation workshops.

We have not conducted an actual measurement but based on the reporting from beneficiaries in connection with the phase 1 reporting, mentioning different publications produced, it is our impression that a number of publications and other products have already been created by the other partners as well.

## 12. Capacity building

### 12.1 Networking (mandatory)

Laymen, Unit: No. of individuals

Baseline data inserted in KPI:

At the beginning: 0

At the end: 100

Beyond 5 years: 100

Method:

Action C15 aims at creating a ""Citizen Assembly"" with around 100 citizens"

Assessment, End of Phase 1:

During phase 1 a large number of citizens participated in various activities. C15 had 66 participants in the Citizen Assembly during Phase 1. More than 100 people have been involved in C7.4 establishing brushwood fences. Thus, the target is already reached.

Professionals -experts in the field, Unit: No. of individuals

Baseline data inserted in KPI:

At the beginning: 0

At the end: 1900

Beyond 5 years: 1900

Method: "Method:

Cap. building action C1, Steering group/political committee: 125 indiv. pr year x 8 years = 1.000

Communication activities action E: 2 major conferences: 100 indiv. x 2= 200

Actions C2 - C15: 14 actions with 10 indiv. pr year on average x 5 years (average duration of C actions)=700

Total= 1900"

Assessment, End of Phase 1:

During phase 1 a number of professionals have been involved in numerous ways. Below major numbers from phase 1 are mentioned referring to the method used for the baseline data:

Cap. building action C1, Steering group/political committee. Baseline data:

Seminars, webinars conducted by CDR: 167 + 947 participants

Podcasts conducted by CDR: 907 downloads

Newsletters: 201 subscriptions (most expected to be professionals)

Presentations at large conferences by CDR: 325 participants

Steering group/political committee: 50 participants

Network meetings – grouped C-actions: 47 participants

Study tour Amsterdam, CEBW partnership: 56 participants

Training course for partners: 80 participants

Communication activities, cf. baseline data:

Conferences: Kick off and End of Phase 1 conference: 320 participants

A total of 3,130 professionals involved in the abovementioned phase 1 activities

Involvement of professionals in each C action (apart from C1):

It is a widely used working method among the partners in CE Beyond Waste involves other professionals and engage in networking activity, let alone working with value chain issues as we do in CE Beyond Waste. We have not conducted an actual measurement, but based on the reporting from beneficiaries in connection with the phase 1 reporting we assess that Actions C2 - C15 = 14 actions have involved at least 10 indiv. pr year on average x 3 years (phase 1) = 420 professionals involved

Conclusion: Using the abovementioned calculation method and assessment we have already by the end of phase 1 reached the target of involving 1900 professionals, thus 3,130 + 420 = 3,550

### 13. Jobs, Unit: No. of FTE

Baseline data inserted in KPI:

At the beginning: 0

At the end: 15

Beyond 5 years: 15

Method:

Cf. Open guide to this indicator - jobs, this indicator is interpreted as jobs created in the LIFE IP project itself by the partners and not possible jobs created outside of the partnerconsortium.

#### Assessment, End of Phase 1:

Employment effects are expected to rise even further as the IP is implemented and beyond, due to for example, new business opportunities resulting in job creation. Job creation etc. is elaborated in ch. 4.2, Economic and social benefits. By the end of Phase 1 partners have created a total of 13 jobs resulting from the actions in CE Beyond Waste:

Jobs divided by action: PM Unit at CDR: 2, C6.3: 2 ½, C7.2: 4, C7.3: 2, C10.1: 1½, C14.2: 1, a total of 13 jobs.

## 14. Economic growth

### 14.1 Running cost/operating costs during the project and expected in case of continuation/replication/transfer after the project period

Assessment, End of Phase 1: No changes

14.2.2 Operating expenses expected in case of continuation/replication/transfer after the project period

Assessment, End of Phase 1: No changes

14.3 Future funding, Grants, subsidies

Assessment, End of Phase 1: No changes

14.3 Future funding, Beneficiary own contribution

Assessment, End of Phase 1: No changes

14.4.1 Entry into new entities/projects, Replication

Baseline data inserted in KPI:

We expect that the same methods, techniques, prototypes or practices developed and/or used in the project are used again in the same way and for the same purposes by other entities.

Assessment, End of Phase 1:

Fundamentally, all materials developed in CEBW are designed to be scalable and replicable across other municipalities, waste management companies, projects, etc. A variety of approaches, including models, tools, and manuals, have great potential and at least one initiative has already been replicated by other partners or outside the project setting. The initiative is More Nature – Less Waste (included in C7.4 by partner Renosyd (RENO)). Inspired by this, 12 Danish municipalities have already established brushwood fences, including another CEBW partner, Samsø Kommune (SK).

## 8. Next phase: changes/adjustments

In phase 2, the IP proceeds as described in amendments 1 and 2, where some actions have been granted extensions of deadlines and changes in content of deliverables. Additional expected deviations are submitted as part of Annexes 2 and 3. All other actions will proceed as described in the grant agreement.

However, a major amendment will be necessary to implement in 2025. This is due to new legislation in Denmark concerning the responsibilities of the Danish regions, which will revoke the regions' right to work with climate-related matters, among other areas, by the end of 2025.

The legislation covers the area of "Regional Development" within the regions, where climate-related activities are carried out in the geographical territory. Regional Development serves as the coordinating beneficiary in Central Denmark Region (CDR), where the Project Management Unit is located. As a consequence, the CDR will no longer be able to act as the coordinating beneficiary in CE Beyond Waste. However, the legislation does not cover climate-related work and projects within the region's own organization, which are managed by the Healthcare Administration. This means that there is still a possibility for CDR to continue as a beneficiary with Action C6.3, which is currently led by the CDR Healthcare Administration.

Two other beneficiaries, the Capital Region of Denmark (CR) and the Region of Southern Denmark (RSD), are covered by the same legislation. Both regions are expected to withdraw from their commitments in CE Beyond Waste. This means that RSD is expected to withdraw from CE Beyond Waste entirely. Similar to CDR, however, there is a possibility that CR may continue some of its activities — specifically, Action C8, in which CR participates through its Healthcare Administration.

In addition, Fredensborg Kommune (FK) wishes to withdraw from the partnership.

Regarding the role of Coordinating Beneficiary, in spring 2025 CDR conducted a process to identify an actor willing and able to take over the role. On that basis, Silkeborg Municipality (SIK) expressed interest in assuming the role. On 24 June 2025, the City Council of SIK made the final political decision to take over the role of Coordinating Beneficiary and has allocated the necessary co-financing.

CDR and CINEA have already initiated dialogue concerning the amendment process.

## 9. Comments on the financial report

### *Overall comments:*

From the outset of the project, CDR has prioritized financial and administrative tasks. Particular emphasis has been placed on allocating staff resources to these tasks, and as a result, the PM Unit for CE Beyond Waste includes both an EU and Administrative Project Manager as well as a dedicated financial officer. Additionally, the PM Unit has focused on providing guidance and capacity building for project partners in financial matters, including through joint sessions and individual meetings.

There have been challenges along the way, as many partners are not accustomed to participating in projects like EU LIFE IP. Therefore, CDR has conducted reporting exercises with the partners after both the first and second year to build capacity in the financial area and better prepare them for the reporting process after Phase 1.

Below is provided an explanation of specific costs concerning one partner, CR. Summary of costs incurred is presented in section 9.1, while the subsequent sections cover the accounting system (1.2), partnership arrangements (1.3), certificate on the financial statement (1.4), and allocation of costs (1.5).

### Explanation of specific costs, partner CR:

Coordinating Beneficiary received the following request from the FMO during preparation of the Financial Part of the Interim Report:

"CR: A mix of travel costs was reported in the Other Costs category in one single line (seq. no. 2, €10,189.09) without indication of any details.

The costs should be reported separately with all information required."

Below is an explanation of the costs and the reason why they were not reported separately.

As part of Action C15 on Citizens' Assemblies, 66 citizens from the Region of Southern Denmark and the Capital Region of Denmark participated in a process from September 2022 to April 2023. They met five times to hear expert presentations and develop visions and recommendations. Subsequently, launch events were held in April and May. The assemblies were held alternately in the two regions, which involved significant travel for many participants. The project covered transport costs for both citizens and external presenters, including: Travel by private car (kilometre-based reimbursement); Bridge tolls and parking; Train and bus tickets.

As the budget for transport was limited, all reimbursements were based on documentation of actual costs, ensuring fairness and compliance with the budget. Participants submitted consolidated statements with supporting documentation, and each type of expense was accounted for separately due to differences in VAT status and tax liability (e.g., private car travel is taxable income for the individual). Each participant's reimbursement typically included 5–6 individual entries.

To ensure transparency and meet administrative requirements—while avoiding over 250 individual entries—one consolidated cost was reported, based on an agreement with RM. Supporting documentation was provided as a single file, with all cost breakdowns and receipts included in ZIP files.

## 9.1 Summary of Costs Incurred

*For projects with a single (merged) budget*

Cost category	Approved budget. Eligible costs (€)*	Eligible costs accepted in previous Phase(s) (€)	Consolidated cost statement for Phase N. Eligible costs (€)	Percentage of costs incurred (from Phase 1-N) per whole budget (%)
Personnel	11.263.158		5.908.400,88	52,45%
Travel	163.238		59.349,01	36,36%
External Assistance	3.779.908		1.175.030,24	31,08%
Infrastructure	9.750		805,79	8,26%
Equipment	52.462		18.587,96	35,43%
Prototype	325.960		80.256,27	24,61%
Land Purchase	0.00		0	—
Consumables	82.286		71.746,93	87,21%
Other Costs	39.976		94.739,10	236,89%
Overheads	1.100.172		518.624,13	47,14%
<b>TOTAL ELIGIBLE COSTS</b>	<b>16.816.909</b>		<b>7.927.540,31</b>	<b>47,13%</b>

\*) If the Agency has officially approved a budget modification through an amendment, indicate the breakdown of the revised budget. Otherwise this should be the budget in the original Grant Agreement.

### Note on "Other Costs"

The relatively high percentage under "Other Costs" is due to some partners having placed expenses here that might have been more appropriately categorised as "External Assistance", which has a significantly larger budget. If 75% of the amount listed under "Other Costs" were instead reported under "External Assistance", the percentage for "External Assistance" would increase from 31% to approximately 33%, while the percentage for "Other Costs" would decrease from 236% to around 59%. Going forward, partners will be encouraged to better distinguish between these two cost categories.

## 9.2 Accounting system

This section provides an overview of the accounting systems and procedures used in the project. It outlines the methods for identifying and approving project costs, procurement procedures, and the

time recording system in place. Additionally, it explains how invoices are marked to clearly reference the LIFE IP project.

#### *Guidelines*

Based on the Grant Agreement and Annex X, the Coordinating Beneficiary (CDR) has developed guidelines on eligible costs and reporting. These guidelines have been distributed to all partners.

#### *Accounting systems*

Each partner maintains its own individual accounting system. Specific codes have been established to identify project costs and facilitate cost analysis. All partners have booked all costs in their internal book keeping systems.

#### *Procedures for procurement etc.*

Each partner follows its own internal procedures for procurement, approval, and payment of expenses. Several partners are bound by the Government and Municipalities Purchase Agreement (SKI), ensuring compliance with rules on vendor selection, pricing, and other procurement requirements—securing the best value for money.

#### *Time recording and contracts*

Both electronic and manually completed timesheets are used in the project. Actual productive hours per year are used to calculate the hourly rate. For staff working on average less than two days per month in a given calendar year, a standard of 1,720 hours per year is applied for hourly rate calculations.

Project employees using electronic or manual timesheets complete them daily. At the end of each month, manual timesheets are signed by the employee and approved by their superior, while electronic timesheets are signed within the system. Project employees who have been contractually assigned to the project for a fixed percentage of their time have signed a special employment contract, all of which have been approved by their superior.

#### *Invoices marked with reference to the LIFE IP project*

Each project manager from each beneficiary ensures that invoices clearly reference the LIFE IP project by including the LIFE IP project number, demonstrating the link to the project.

### 9.3 Partnership arrangements (if relevant)

As the Coordinating Beneficiary, CDR has entered into Partnership Agreements with each individual partner. These agreements outline the roles and responsibilities of both the Coordinating Beneficiary and each partner in relation to both technical and financial matters. In relation to the financial matters it is particularly important, that responsibilities and tasks related to financial statements are specified in the agreements. This includes details on when and how partners must report their expenditures, as well as the specific information and documentation they need to submit to the Coordinating Beneficiary. Additionally, each partner's estimated eligible costs and financial contribution to the project are described in the agreements.

#### *Proces for the preparation of financial statements*

In December 2024, the PM Unit requested expenditure reports from partners for Phase 1 (2022–2024), with a submission deadline of January 20, 2025.

To facilitate this process, the PM Unit implemented the X-Flow system, which allows partners to electronically input and submit their expenditures, categorized with attached documentation. X-Flow operates within a secure, closed IT system, making it well-suited for handling financial reporting, including GDPR-sensitive information.

In both 2022 and 2023, partners were also asked to report their expenditures through X-Flow, providing them with an opportunity to practice while allowing the PM Unit to offer concrete feedback and guidance.

Once expenditures and supporting documentation were received in X-Flow, the data was transferred to Excel for further processing and validation. It is the responsibility of the Coordinating Beneficiary to validate and prepare the financial statement for each partner.

Although some partners have previously prepared financial statements for 2022 and 2023, the official financial statement for each partner will be a consolidated statement covering the full period from 2022 to 2024.

Once validated, the PM Unit sent the completed financial statements to each partner for signature, after which they were returned to CDR. All partners have reviewed, approved, and signed their financial statements.

Following this, CDR prepared the final consolidated financial statement, which forms part of the financial reporting for Phase 1.

## 9.4 Certificate on the financial statement

Central Denmark Region (CDR) is required to provide a certificate on the financial statements and underlying accounts. The audit is conducted by Ernst & Young, who has certified the statements in accordance with the standard audit report format available on the LIFE website.

## 9.5 Allocation of costs per action

A cost allocation per action has been requested. Unfortunately, this is not possible, as cost registration is generally done per partner rather than per action—aligning with the Financial Forms in the Full Application. An allocation of costs per action would therefore be extremely time consuming and, in practice, impossible for the partners to carry out.

## ANNEX 1: DELIVERABLE AND MILESTONES (COMPLETED)

This Annex provides an overview of the main deliverables and milestones that were completed in the reporting period. The completed deliverables have been uploaded to BUTLER. Deviations from the latest approved changes (Amendment no. 1 & 2) are displayed through Track Changes.

### MAIN DELIVERABLE PRODUCTS OF THE PROJECT

Name of the Deliverable	Code of the associated action	Deadline	Actual date of completion
A framework for estimating and communicating the value and costs of circular initiatives	A1	31.12.2024	31.12.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>01.09.2023</u> <u>31.12.2024</u>	31.12.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>15.12.2023</u> <u>31.12.2014</u>	31.12.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>15.12.2024</u> <u>31.12.2024</u>	31.12.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	15.12.2025	31.12.2024
A podcast with reflections from the participants on lesson learned from participating in C1 – what has been helpful, what has been superfluous, what is the good advice to the next capacity building phase.	C1	31.12.2025	31.01.2025
Preliminary project circular reuse data bank: Summary	C5	30.12.2024	30.12.2024
1 overview of the tools to be applied in the task-force (incl. the guidance "Sustainable Plastic Choices" prepared as part of AK's Plastic Strategy.	C6.1	30.09.2022	30.09.2022
A replicable taskforce concept based on the experiences in the project made available to inspire other municipalities to set up similar taskforces	C6.1	31.12.2024	31.12.2024
1 plan of a new service system able to document the performance of multiple-use textiles	C6.3	<u>31.03.2023</u> <u>31.03.2025</u>	31.01.2025
Business case for a local reuse centre	C7.1	31.12.2024	07.01.2025
Concept for cooperation with housing associations	C7.1	31.12.2024	07.01.2025
A full concept and development plan for the continued implementation of a fully built infrastructure for reuse and waste prevention in AK	C7.1	31.12.2024	07.01.2025
Complete concept and knowledge sharing	C7.1	31.12.2024	07.01.2025
Educational material for schools and educational institutions (WPX)	C7.2	31.12.2023	31.12.2023
Educational programme for employees at recycling centres	C7.4	31.12.2024	31.12.2024

Descriptive catalogue on communication campaigns and actions in households and at recycling centres	C7.4	31.12.2024	31.12.2024
Descriptive catalogue on communication and behavioural campaigns for children.	C7.4	31.12.2024	31.12.2024
Best practice Case study on circular textile interventions	C8	31.12.2022	31.12.2022
Specification of concept of The Circular Materials Depeche	C10.2	01.04.2023	13.03.2023
Web-based digital version of The Circular Materials Depeche	C10.2	31.12.2023	31.12.2023
Memo/knowledge status on impacts of biochar	C13	31.12.2022	01.08.2022
Article on sewage sludge pyrolysis	C13	31.12.2023	30.12.2023
Photos and video demonstrations of the tested composting methods (A)	C13	31.12.2024	31.12.2024
A screening tool for sourcing companies	C14.2	15.12.2022	15.12.2022
A screening tool for sourcing entrepreneurs	C14.2	15.12.2022	15.12.2022
A model for establishing strategic partnerships between start-ups and established companies	C14.2	15.12.2022	15.12.2022
At least one tool for SMEs on circular practices	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
3 written showcases on businesses preventing waste and how they cooperate with suppliers and/or waste collectors	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
3 hands-on and easily accessible tools for municipalities for their dialogue with businesses about circular practices	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
A written concept with step-by-step guide for the municipalities' dialogue with businesses about circular practices	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
The Citizens' Assembly's vision and recommendations	C15	01.07.2023	01.07.2023
A package of guidelines and templates for replication of the Citizens' Assembly, including lessons learned in the process	C15	01.10.2023	01.10.2023
Monitoring plan	D1	30.09.2022	30.09.2022
1 overview report over APCE implementation	D1	31.03.2025	31.03.2025
1 overview report of the capacity-building impacts	D1	31.03.2025	31.03.2025
1 updated overview of complementary funding	D1.4	31.03.2025	31.03.2025
1 first extract of the project (environmental and socioeconomic data from the KPI webtool (max. 9 months after kick-off)	D2	30.11.2022	30.11.2022
Communication and outreach plan version 1	E1	31.12.2024	31.12.2024
Link to website for CE Beyond Waste	E2.1	30.06.2023	30.06.2023
Notice boards to be displayed and shown on the website and at beneficiaries' offices	E2.2	30.06.2023	30.06.2023
Conference material and evaluations of the conferences are made available	E3.1	30.11.2024	30.11.2024

Phase two proposal	F1	31.03.2025	31.03.2025
Kick off press release	F2	31.03.2022	31.03.2022

### MAIN MILESTONES OF THE PROJECT

Name of the Milestone	Code of the associated action	Deadline	Actual date of completion
User panel has been established	A1	<u>30.06.2023</u> <u>30.06.2024</u>	30.06.2024
User panel has contributed to development of the framework	A1	31.12.2024	31.12.2024
Beneficiaries have used the framework for capacity building and/or strategic processes within the organisation	A1	31.12.2026	31.12.2024
Analyses and desk research on identified needs of data addressing C6.C15	A2	<u>01.04.2023</u> <u>15.06.2024</u>	15.06.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>15.09.2023</u> <u>15.09.2024</u>	15.09.2024
Analyses and desk research on identified needs of data addressing C6-C15	A2	15.09.2024	15.09.2024
Podcast with lessons learned and the journey of the projects is produced, focus on the need of the participants	C1	31.12.2025	31.12.2024
New and revision of existing executive orders on extended producer responsibility (6 executive orders) prepared.	C4	31.12.2024	31.12.2024
A plan for implementation of the organisation of the extended producer responsibility schemes (including register, data, supervision and control) developed	C4	31.12.2022	31.12.2022
Preparation and start-up of register, supervision and control	C4	31.12.2024	31.12.2024
Preliminary project	C5	30.11.2024	30.11.2024
Establishment of the taskforce. Analysis of barriers and suggestions on how to challenge them. Development of a short report on identified solutions to address structural barriers in the sustainable and circular procurement of plastic. Period 2022 to medio.2022.	C6.1	30.09.2022	30.09.2022
Taskforce in operation in AK and collaboration with relevant SMEs. Description of taskforce concept. Development of a toolbox. Dissemination and replication of results via networks, business partners, business departments, etc. Period 2022-2024.	C6.1	2022-2024	01.02.2024

Project evaluation and decision about possible next step.	C6.1	30.06.2024	30.06.2024
Project implementation plan	C6.2	31.03.2023	31.03.2023
A calculation tool for measuring the degree of circular economy effects in a way that translates into the financial budget scheme in regions and municipalities	C6.2	31.12.2024	31.12.2024
Baseline study of existing procurement is carried out, and TCO++ tool is developed.	C6.3	30.11.2022	30.11.2022
Completion of needs assessment and clarification of prototype design	C7.1	01.04.2023	01.04.2023
Enactment of mini local reuse centres and bulky waste management facilities completed	C7.1	01.04.2023	01.04.2023
Completion of concept and business case for a local reuse centre	C7.1	30.06.2024	30.06.2024
Completion of final concept for infrastructure	C7.1	01.10.2024	01.10.2024
Test of unattended recycling area performed	C7.2	31.12.2024	09.01.2025
Finished concepts for schools and institutions	C7.2	31.12.2023	31.12.2023
Developed sustainability policy	C7.2	31.12.2024	31.12.2024
Study, trials, surveys and waste analysis in households carried out	C7.4	31.12.2024	31.12.2024
Study and concept for trials at recycling centres finished	C7.4	31.12.2024	31.12.2024
Study, nudging trials, waste analysis and campaigns at schools carried out	C7.4	31.12.2024	31.12.2024
Kick-off workshops completed	C8	30.06.2022	30.06.2022
Pilot projects selected	C8	31.12.2022	31.12.2022
First network meeting in the procurer network held	C8	31.12.2022	31.12.2022
Mapping of potential waste generating companies	C9	<a href="#">01.09.2023</a> <a href="#">01.06.2024</a>	01.06.2024
Five different outdated plastic fractions are identified as a new resource	C9	<a href="#">01.12.2023</a> <a href="#">01.09.2024</a>	01.09.2024
Circular networks have been created and gathered annually.	C10.1	30.06.2024	30.06.2024
Expert report	C10.2	15.08.2022	15.08.2022
Industry workshop and concept design workshop	C10.2	01.12.2022	01.12.2022
Prototype of Materials Depeche	C10.2	01.04.2023	01.04.2023
Digital integration of Materials Depeche	C10.2	01.06.2023	01.06.2023
Concept for physical storage	C10.2	01.09.2023	01.09.2023
Final project report	C10.2	31.12.2023	31.12.2023
State-of-play analyses completed	C11	31.10.2022	31.10.2022
Innovative development processes with value chain actors completed	C11	31.12.2023	31.12.2023
Demonstration of innovative composting techniques	C13	31.12.2023	31.12.2023
Demonstrations of pyrolysis of sewage sludge	C13	30.06.2024	30.06.2024

Demonstration of biochar in agricultural soil	C13	31.12.2024	31.12.2024
Tender – publishing tender – sale of garden/park waste	C13	31.12.2024	31.12.2024
IRC Business workshop held . prototypes selected	C14.1	31.10.2023	31.10.2023
IRC Focus workshop held, 5 potential pilot projects outlined	C14.1	30.09.2024	30.09.2024
Complete report on IRC potentials, incl. prototypes and pilots	C14.1	31.12.2024	31.12.2024
Mapping, desk-research and validation completed	C14.2	11.07.2022	11.07.2022
Version 1 of the process model completed	C14.2	15.09.2022	15.09.2022
The trial-and-error process of developing, testing and adjusting tools for SMEs on circular practices finalised	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
The dialogue meetings with actors from the business value chain have been finalised, leading to showcases on businesses in cooperation with suppliers and/or waste collectors	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
The trial-and-error process of developing, testing and adjusting concept and tools for municipalities' dialogue with businesses on circular practices is finalized	C14.3	<u>30.06.2024</u> <u>31.12.2024</u>	31.12.2024
Stakeholders invited to suggest themes and questions to be discussed in the Citizens' Assembly	C15	01.10.2022	01.10.2022
The Citizens' Assembly's vision and recommendations produced and communicated in public	C15	01.11.2023	01.11.2023
Development of overview report of the APCE implementation based on C-actions as part of the auditing of phase 1 (max. 3 months after phase 1).	D1.1	31.03.2025	31.03.2025
Development of overview report of the capacity-building impacts as part of the auditing of phase 1.	D1.2	31.03.2025	31.03.2025
Develop an overview of complementary funding as part of the auditing of phase 1.	D1.4	31.03.2025	31.03.2025
Preparing first reporting of the project (environmental and socioeconomic) data to the KPI database	D2	30.11.2022	30.11.2022
The first draft of the Communication and outreach plan is discussed among stakeholders	E1	31.12.2022	31.12.2022
Draft version of the website is created	E2.1	30.06.2022	30.06.2022
Final website is created	E2.1	30.06.2023	30.06.2023
Work is commenced making notice boards	E2.2	30.06.2022	30.06.2022
LIFE IP CE Beyond Waste - End of Phase 1 Conference	E3.1	30.11.2024	30.11.2024
International dissemination work is commenced	E4	31.07.2022	31.07.2022
Interim report Phase ½	F1	31.03.2025	31.03.2025
Kick off seminar	F2	31.03.2022	22.03.2022
Communication workshop	F2	31.03.2022	09.06.2022

### ANNEX 2: TIMETABLE

Annex 2 provides an updated timetable. Deviations from the latest approved changes (Amendment no. 1 & 2) are highlighted in orange.

#### TIMETABLES FOR ALL ACTIONS

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
Action	I	II	I	II	I	II	I	II
A1								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
Action	I	II	I	II	I	II	I	II
A2								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C1								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C2								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C3								
WP1								

WP2															
WP3															
WP4															

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C4</b>								
WP1								
WP2								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C5</b>								
WP1								
WP2								
WP3								
WP4								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C6.1</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C6.2</b>								
WP1								
WP2								
WP3								
WP4								
WP5								
WP6								
WP7								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C6.3								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C7.1								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C7.2								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
C7.3								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C7.4</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C7.5</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C8</b>								
WP1								
WP2								
WP3								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C9</b>								
WP1								
WP2								
WP3								
WP4								
WP5								
WP6								
WP7								
WP8								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C10.1</b>								
WP1								
WP2								
WP3								
WP4								
WP5								
WP6								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C10.2</b>								
WP1								
WP2								
WP3								
WP4								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C11</b>								
WP1								
WP2								
WP3								
WP4								
WP5								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029
WP	I	II	I	II	I	II	I	II
<b>C12</b>								
WP1								
WP2								
WP3								
WP4								

Phase	Phase 1			Phase 2			Phase 3	
Year	2022	2023	2024	2025	2026	2027	2028	2029

WP	I	II												
<b>C13</b>														
<b>WP1</b>														
<b>WP2</b>														
<b>WP3</b>														
<b>WP4</b>														
<b>WP5</b>														

Phase	Phase 1			Phase 2			Phase 3					
	Year	2022	2023	2024	2025	2026	2027	2028	2029			
WP	I	II	I	II	I	II	I	II	I	II	I	II
<b>C14.1</b>												
<b>WP1</b>												
<b>WP2</b>												
<b>WP3</b>												
<b>WP4</b>												

Phase	Phase 1			Phase 2			Phase 3					
	Year	2022	2023	2024	2025	2026	2027	2028	2029			
WP	I	II	I	II	I	II	I	II	I	II	I	II
<b>C14.2</b>												
<b>WP1</b>												
<b>WP2</b>												
<b>WP3</b>												

Phase	Phase 1			Phase 2			Phase 3					
	Year	2022	2023	2024	2025	2026	2027	2028	2029			
WP	I	II	I	II	I	II	I	II	I	II	I	II
<b>C14.3</b>												
<b>WP1</b>												
<b>WP2</b>												
<b>WP3</b>												
<b>WP4</b>												

Phase	Phase 1			Phase 2			Phase 3					
	Year	2022	2023	2024	2025	2026	2027	2028	2029			
WP	I	II	I	II	I	II	I	II	I	II	I	II
<b>C15</b>												
<b>WP1</b>												
<b>WP2</b>												
<b>WP3</b>												

WP4														
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#### TIMETABLES FOR D ACTIONS

Phase	Phase 1			Phase 2			Phase 3							
Year	2022	2023	2024	2025	2026	2027	2028	2029						
Action	I	II	I	II	I	II	I	II	I	II	I	II	I	II
D1														
D2														

#### TIMETABLES FOR E ACTIONS

Phase	Phase 1			Phase 2			Phase 3							
Year	2022	2023	2024	2025	2026	2027	2028	2029						
Action	I	II	I	II	I	II	I	II	I	II	I	II	I	II
E1														
E2														
E3														
E4														

### ANNEX 3: DELIVERABLE AND MILESTONES UPDATED SCHEDULE

This overview presents the updated deliverables and milestones of CE Beyond Waste. Expected deviations are included and highlighted through track changes.

#### MAIN DELIVERABLE PRODUCTS OF THE PROJECT

Name of the Deliverable	Code of the associated action	Deadline
A1		
A framework for estimating and communicating the value and costs of circular initiatives	A1	31/12/2024
A2		
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>01/09/2023</u> <u>31/12/2024</u>
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>15/12/2023</u> <u>31/12/2024</u>
Analyses and desk research on identified needs of data addressing C6-C15	A2	<u>15/12/2024</u> <u>31/12/2024</u>
Analyses and desk research on identified needs of data addressing C6-C15	A2	15.12.2025
C1		
A podcast with reflections from the participants on lesson learned from participating in C1 – what has been helpful, what has been superfluous, what is the good advice to the next capacity building phase.	C1	31/12/2025
C2		
List of barriers and missing drivers	C2	01/10/2025
Catalogue of policy initiatives to be used as input to next national waste plan and municipal waste plans	C2	01/05/2026
C3		
A catalogue of digital use cases across all activity work streams as well as digital use cases in directly related subject areas interfacing with the activities	C3	31/12/2027
C4		
A total of six new executive orders for existing and new producer responsibility regimes - WEEE, Batteries, ELVs, packaging, litter from certain single-use plastic products and deposit return scheme	C4	<u>31/12/2024</u> <u>01/07/2025</u>
Website communicating rules and administrations setup on mst.dk to be completed before the new executive orders come into force.	C4	<u>31/12/2024</u> <u>01/07/2025</u>
C5		
Preliminary project circular data reuse bank: Summary	C5	30/12/2024
Data gathering module and reuse database	C5	30/10/2027

Pilot project Summary	C5	30/10/2029
C6		
1 overview of the tools to be applied in the task-force (incl. the guidance "Sustainable Plastic Choices" prepared as part of AK's Plastic Strategy.	C6.1	30/09/2022
A replicable taskforce concept based on the experiences in the project made available to inspire other municipalities to set up similar taskforces.	C6.1	31/12/2024
A calculation tool for measuring the degree of circular economy effects in a way that translates into the financial budget scheme in regions and municipalities.	C6.2	31.12.2025
A userfriendly dashboard based on the metrics in the calculation tool to support the financial decision-making process in regions and municipalities.	C6.2	31.12.2026
Competence development and course modules for both for the political board (i.e. financial committee), the board of directors and the top-level management in regions and municipalities as well as key staff in the financial departments	C6.2	31.12.2027
The roadmap itself: A step-by-step guide circular accounting and budgeting in municipalities and regions	C6.2	31.12.2027
1 plan of a new service system able to document the performance of multiple-use textiles	C6.3	<a href="#">31/03/2023</a> <a href="#">31/03/2025</a>
1 overview of product specifications for min. 10 multiple use textiles	C6.3	31/12/2025
1 overview of min. 10 tender documents based on the early market consultation/innovation procurement	C6.3	30/06/2025
C7		
Business case for a local reuse centre	C7.1	31/12/2024
Concept for cooperation with housing associations	C7.1	31/12/2024
A full concept and development plan for the continued implementation of a fully built infrastructure for reuse and waste prevention in AK	C7.1	31/12/2024
Complete concept and knowledge sharing	C7.1	31/12/2024
Catalogue of activities, workshops, and information initiatives	C7.2	31/12/2027
Educational material for schools and educational institutions (WPX)	C7.2	31/12/2023
Sustainability policy (WPX)	C7.2	01/07/2025
Catalogue of activities, workshops, and information initiatives	C7.3	<a href="#">30/06/2025</a> <a href="#">31/12/2025</a>
Educational material for schools, firms, and educational institutions	C7.3	<a href="#">31/12/2024</a> <a href="#">31/12/2025</a>
Sustainability policy	C7.3	<a href="#">30/06/2025</a> <a href="#">31/12/2025</a>
Educational programme for employees at recycling centres	C7.4	31/12/2024

Descriptive catalogue on communication campaigns and actions in households and at recycling centres	C7.4	31/12/2024
Descriptive catalogue on communication and behavioural campaigns for children.	C7.4	31/12/2024
Overall note with product analysis, logistics analysis and player analysis	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
Concept for teaching courses at FGU that create new products	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
System for registering resources that are moved from waste to becoming a reusable product	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
Model for the Danish version of Belgian De Kringwinkel	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
C8		
Best practice Case study on circular textile interventions	C8	31/12/2022
Report from the pilot projects on fiber-to-fiber recycling (focusing on business cases, organization, logistics, environmental impact and scaling potential)	C8	30/04/2025
Procurement criteria for end-of-life handling of public textiles	C8	30/04/2025
C9		
Five calls for tenders.	C9	<u>01/12/2024</u> <u>01/12/2025</u>
Recommendation report to local governments on innovative public procurement promoting circular economy and closed resource loops.	C9	<u>01/05/2025</u> <u>01/01/2026</u>
Ten potential resource loops with a low climate impact between the plastic processing companies and the plastic waste generating companies are identified.	C9	<u>30/09/2024</u> <u>01/11/2025</u>
Five sustainable business plans are developed, and the implementation has begun by the companies based on the identified potential resource loops.	C9	<u>01/06/2025</u> <u>01/09/2025</u>
Recommendations to local governments on how to promote the development of business plans for industrial symbiosis (urban mining) are drawn up and presented at minimum 2 European wide conferences linking the recommendations to the Packaging directive.	C9	<u>01/06/2025</u> <u>01/01/2026</u>
Five new business plans for new resource loops are developed	C9	<u>31/12/2024</u> <u>01/01/2026</u>
C10		
1 presentation on a method for measuring of construction and demolitions waste delivered for direct reuse at the recycling centres including calculations showing the increased amounts in the three municipalities.	C10.1	<u>30/06/2024</u> <u>01/10/2025</u>
Specification of concept of The Circular Materials Depeche	C10.2	01/04/2023
Web-based digital version of The Circular Materials Depeche	C10.2	31/12/2023
C11		

Synthesis of experiences from the pilot, e.g. level of source-separated food and beverage carton waste quality from households, identification of non-carton composites and multilayer materials, operational assessment of recycling solution or model.	C11	<a href="#">31/12/2024</a> <a href="#">01.07.2026</a>
Replication guide	C11	<a href="#">31/12/2024</a> <a href="#">01.07.2026</a>
C12		
1 blueprint proposal per experiment team (3 total)	C12	01/06/2028
1 dissemination plan to re-use blueprints on a national level	C12	31/12/2029
C13		
Memo/knowledge status on impacts of biochar	C13	31/12/2022
Article on sewage sludge pyrolysis	C13	31/12/2023
Tendering of organic domestic waste	C13	30/06/2026
Photos and video demonstrations of the tested composting methods (A)	C13	31/12/2024
Photos and video demonstrations of the tested composting methods (B)	C13	31/12/2027
C14		
Report on 5 sustainable and feasible IRC business cases	C14.1	15/12/2027
Generic model for industrialisation of recycling - in writing and graphics.	C14.1	31/08/2029
A screening tool for sourcing companies	C14.2	15/12/2022
A screening tool for sourcing entrepreneurs	C14.2	15/12/2022
A model for establishing strategic partnerships between start-ups and established companies	C14.2	15/12/2022
A design and process model for turning waste into new marketable products	C14.2	<a href="#">31/12/2024</a> <a href="#">31/12/2025</a>
At least one tool for SMEs on circular practices	C14.3	<a href="#">30/06/2024</a> <a href="#">31.12.2024</a>
3 written showcases on businesses preventing waste and how they cooperate with suppliers and/or waste collectors	C14.3	<a href="#">30/06/2024</a> <a href="#">31.12.2024</a>
3 hands-on and easily accessible tools for municipalities for their dialogue with businesses about circular practices	C14.3	<a href="#">30/06/2024</a> <a href="#">31.12.2024</a>
A written concept with step-by-step guide for the municipalities' dialogue with businesses about circular practices	C14.3	<a href="#">30/06/2024</a> <a href="#">31.12.2024</a>
C15		
The Citizens' Assembly's vision and recommendations	C15	01/07/2023
A package of guidelines and templates for replication of the Citizens' Assembly, including lessons learned in the process	C15	01/10/2023
A report describing results and lessons learned from the local pilot actions	C15	01/02/2026
D1		
Monitoring plan	D1	30/09/2022

1 overview report over APCE implementation	D1.1	31/03/2025
1 overview report of the capacity-building impacts	D1.2	31/03/2025
1 feasibility report of pilot/demonstration actions	D1.3	31/03/2025 31/03/2028
1 updated overview of complementary funding	D1.4	31/03/2025
1 final monitoring report	D1	31/03/2030
D2		
1 first extract of the project (environmental and socio-eco-nomic) data from the KPI webtool Max. 9 months after kick-off	D2	30/11/2022
1 second extract of the project data from the KPI webtool in the middle of the project.	D2	Tentatively 2026
1 third extract of the project data from the KPI webtool as part of the Final Report. Max. 3 months after the project ends.	D2	30/03/2030
1 report "CE Beyond Waste – Socio-economic impacts" to be delivered with the Final Report.	D2.2	30/03/2030
1 last data reporting to the KPI database 3 years after the end of the IP.	D2	30/03/2033
E		
Communication and outreach plan version 1	E1	31/12/2024
Communication and outreach plan revised	E2	31/12/2027
Replication plan	E1	31/12/2027
Link to website for CE Beyond Waste	E2.1	30/06/2023
Notice boards to be displayed and shown on the website and at beneficiaries' offices	E2.2	30/06/2023
Layman's report in colour copy and available for online download	E2.3	31/12/2029
Conference material and evaluations of the conferences are made available	E3.1	30/11/2024
Conference material and evaluations of the conferences are made available	E3.2	31/12/2029
Online materials created for international dissemination	E4	31/12/2029
F		
Phase two proposal	F1	31/03/2025
Phase three proposal	F1	31/03/2028
Kick-off press release	F2	31/03/2022

### MAIN MILESTONES OF THE PROJECT

Name of the Milestone	Code of the associated action	Deadline
A1		
User panel has been established	A1	30/06/2023

		<b>30/06/2024</b>
User panel has contributed to development of the framework	A1	31/12/2024
Beneficiaries have used the framework for capacity building and/or strategic processes within the organisation.	A1	31/12/2026
<b>A2</b>		
Analyses and desk research on identified needs of data addressing C6-C15	A2	<b>01/04/2023</b> <b>15/06/2024</b>
Analyses and desk research on identified needs of data addressing C6-C15	A3	<b>15/09/2023</b> <b>15/09/2024</b>
Analyses and desk research on identified needs of data addressing C6-C15	A2	15/09/2024
All analyses shared on platform	A2	15/12/2025
<b>C1</b>		
Podcast with lessons learned and the journey of the projects is produced, focus on the need of the participants	C1	31/12/2025
15 hands-on examples are made as a part of cross learnings between the project, focus on the need of creating knowledge that is usable for others mostly inside the framework of CE beyond Waste	C1	31/12/2025
Examples and lessons learned are shared on a national level	C1	31/12/2028
<b>C2</b>		
Action leaders invited to share barriers from the different C-actions and final list of barriers created	C2	01/10/2025
Catalogue of policy initiatives created and communicated to relevant public authorities	C2	01/05/2026
<b>C3</b>		
Identification of key themes, involving expert in digitalisation and two of main responsible beneficiaries of the C1 – C14	C3	<b>31/12/2023</b> <b>31/03/2025</b>
Innovation kick-off seminar with relevant beneficiaries and experts	C3	<b>30/04/2024</b> <b>30/04/2026</b>
A digital Partnership, two facilitated meeting a year in the period 2023- 2027	C3	31/12/2027
A catalogue showcasing digital and data initiatives and initial identification of possibilities of replication	C3	31/12/2027
<b>C4</b>		
New and revision of existing executive orders on extended producer responsibility (6 executive orders) prepared.	C4	31/12/2024
A plan for implementation of the organisation of the extended producer responsibility schemes (including register, data, supervision and control) developed	C4	31/12/2022
Preparation and start-up of register, supervision and control	C4	31/12/2024
Internal evaluation of the project	C4	31/12/2027
<b>C5</b>		
Preliminary project	C5	30/11/2024

Streamlining of reuse categories and unites	C5	30/04/2027
Pilot study begun	C5	31/10/2027
C6		
Establishment of the taskforce. Analysis of barriers and suggestions on how to challenge them. Development of a short report on identified solutions to address structural barriers in the sustainable and circular procurement of plastic. Period 2022 to medio-2022.	C6.1	30/09/2022
Taskforce in operation in AK and collaboration with relevant SMEs. Description of taskforce concept. Development of a toolbox. Dissemination and replication of results via networks, business partners, business departments, etc. Period 2022-2024.	C6.1	2022-2024
Project evaluation and decision about possible next step.	C6.1	30/06/2024
Project implementation plan	C6.2	31/03/2023
A calculation tool for measuring the degree of circular economy effects in a way that translates into the financial budget scheme in regions and municipalities	C6.2	31/12/2024
A user-friendly dashboard based on the metrics in the calculation tool to support the financial decision-making process in regions and municipalities	C6.2	31.12.2025
Competence development and course modules for both for the political board (i.e. financial committee), the board of directors and the top-level management in regions and municipalities as well as key staff in the financial departments	C6.2	31.12.2026
The roadmap itself: A step-by-step guide for circular accounting and budgetting in municipalities and regions	C6.2	31.12.2026
Implementation, adjustment of processes and procedures as well as finetuning of metrics and dashboard based on feedback and experience gathered at this point	C6.2	31.12.2027
Transversal activity plan and interim reports	C6.2	31/12/2027
Process- and evaluation report (good cases and/or learning processes)	C6.2	31/12/2029
Baseline study of existing procurement is carried out, and TCO++ tool is developed.	C6.3	30/11/2022
Product specifications for 10 multiple-use textiles developed in two phases.	C6.3	31/03/2025
Tender documents for 10 multiple-use textiles developed in two phases during the early market consultation/innovation procurement.	C6.3	30/06/2025
C7		
Completion of needs assessment and clarification of prototype design	C7.1	01/04/2023

Enactment of mini local reuse centres and bulky waste management facilities completed	C7.1	01/04/2023
Completion of concept and business case for a local reuse centre	C7.1	30/06/2024
Completion of final concept for infrastructure	C7.1	01/10/2024
Test of unattended recycling area performed	C7.2	31/12/2024
Opening of Hadsten Recycling Centre	C7.2	<u>01/07/2025</u> <u>01/07/2026</u>
Finished concepts for schools and institutions	C7.2	31/12/2023
Developed sustainability policy	C7.2	31/12/2024
Test of new unattended recycling area performed	C7.3	<u>31/12/2024</u> <u>30/06/2025</u>
Open workshop to the public	C7.3	<u>31/12/2023</u> <u>31/12/2025</u>
Measurement of total quantity moved up in the waste hierarchy	C7.3	<u>31/12/2024</u> <u>31/12/2025</u>
Finished concepts for schools and institutions	C7.3	<u>31/12/2024</u> <u>31/12/2025</u>
Developed sustainability policy applicable to all recycling sites.	C7.3	30/06/2025
Study, trials, surveys and waste analysis in households carried out	C7.4	31/12/2024
Study and concept for trials at recycling centres finished	C7.4	31/12/2024
Study, nudging trials, waste analysis and campaigns at schools carried out	C7.4	31/12/2024
Further development and scaling-up of the Phase 1 results and a search for opportunities to apply for external funding	C7.4	31/12/2025
Start-up local recycling community and recruitment of volunteer partners	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
Analyses completed, Development and commissioning of system/method for registration, Completed joint workshops and courses at FGU	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
Establish collaboration with second-hand shops / create sales channels	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
Decision on an organizational model	C7.5	<u>31/12/2024</u> <u>31/12/2025</u>
C8		
Kick-off workshops completed	C8	30/06/2022
Pilot projects selected	C8	31/12/2022
First network meeting in the procurer network held	C8	31/12/2022
C9		
First call for tender	C9	<u>01/06/2024</u> <u>01/06/2025</u>
Final offer from company received related to the last call for	C9	<u>01/03/2025</u>

tender (nr. 5)		<u>01/12/2025</u>
Mapping of potential waste generating companies	C9	<u>01/09/2023</u> <u>01/06/2024</u>
Five different outdated plastic fractions are identified as a new resource	C9	<u>01/12/2023</u> <u>01/09/2024</u>
Ten different potential resource loops are identified and described	C9	<u>01/09/2024</u> <u>01/11/2025</u>
C10		
Circular networks have been created and gathered annually.	C10.1	30/06/2024
Physical prototypes have been developed and tested	C10.1	<u>01/11/2023</u> <u>01/10/2025</u>
Amendments of internal procedures have been developed and tested.	C10.1	<u>01/12/2023</u> <u>01/10/2025</u>
A method for measuring of construction and demolition waste delivered for direct reuse has been developed and tested.	C10.1	<u>01/06/2024</u> <u>01/10/2025</u>
A best-practice model for municipal involvement in circular construction has been developed and shared with other municipalities.	C10.1	<u>31/12/2024</u> <u>01/10/2025</u>
Expert report	C10.2	15/08/2022
Industry workshop and concept design workshop	C10.2	01/12/2022
Prototype of Materials Depeche	C10.2	01/04/2023
Digital integration of Materials Depeche	C10.2	01/06/2023
Concept for physical storage	C10.2	01/09/2023
Final project report	C10.2	31/12/2023
C11		
State-of-play analyses completed	C11	31/10/2022
Innovative development processes with value chain actors completed	C11	31/12/2023
Development and demonstration of pilot completed	C11	<u>31/12/2024</u> <u>31/12/2025</u>
C12		
Mobilisation of reference group and experiment teams	C12	<u>01/04/2024</u> <u>31/12/2025</u>
Experiment design	C12	<u>31/12/2024</u> <u>31/12/2025</u>
Experiment revision	C12	<u>01/04/2025</u> <u>31/12/2025</u>
Experiment evaluation	C12	01/06/2026
Final re-use blueprint submission	C12	01/12/2027
Blueprint implementation in activity beneficiary resorts	C12	01/12/2029
Blueprint dissemination on a national level by the CDR	C12	01/12/2029
C13		
Demonstration of innovative composting techniques	C13	31/12/2023
Demonstrations of pyrolysis of sewage sludge	C13	30/06/2024
Demonstration of biochar in agricultural soil	C13	31/12/2024

Tender – publishing tender – sale of garden/park waste	C13	31/12/2024
Innovative tender/development process for organic domestic waste	C13	30/06/2026
CEBMs for the three residual biomass flows	C13	31/12/2028
C14		
IRC Business workshop held - prototypes selected	C14.1	31/10/2023
IRC Focus workshop held, 5 potential pilot projects outlined	C14.1	30/09/2024
Complete report on IRC potentials, incl. prototypes and pilots	C14.1	31/12/2024
All IRC Pilot projects initiated	C14.1	15/12/2027
Realisation of IRC Business cases initiated	C14.1	31/07/2028
Generic model for industrialisation of recycling developed	C14.1	31/08/2029
Mapping, desk-research and validation completed	C14.2	11/07/2022
Version 1 of the process model completed	C14.2	15/09/2022
Screening and agreements with 15 companies	C14.2	<a href="#">01/12/2022</a> <a href="#">01/12/2025</a>
Screening and agreements with potential entrepreneurs	C14.2	<a href="#">01/12/2022</a> <a href="#">01/12/2025</a>
Version 2 of the process model	C14.2	<a href="#">01/02/2023</a> <a href="#">30/06/2025</a>
15 entrepreneurial businesses have been established	C14.2	<a href="#">01/12/2024</a> <a href="#">01/12/2025</a>
Final process model	C14.2	<a href="#">31/12/2024</a> <a href="#">31/12/2025</a>
The trial-and-error process of developing, testing and adjusting tools for SMEs on circular practices finalised	C14.3	<a href="#">30/06/2024</a> <a href="#">31/12/2024</a>
The dialogue meetings with actors from the business value chain have been finalised, leading to show-cases on businesses in cooperation with suppliers and/or waste collectors	C14.3	<a href="#">30/06/2024</a> <a href="#">31/12/2024</a>
The trial-and-error process of developing, testing and adjusting concept and tools for municipalities' dialogue with businesses on circular practices is finalized	C14.3	<a href="#">30/06/2024</a> <a href="#">31/12/2024</a>
C15		
Stakeholders invited to suggest themes and questions to be discussed in the Citizens' Assembly	C15	01/10/2022
The Citizens' Assembly's vision and recommendations produced and communicated in public	C15	01/11/2023
The local pilot actions implemented and finalised	C15	01/11/2025
D1		
Development of overview report of the APCE implementation based on C-actions as part of the auditing of phase 1 (max. 3 months after phase 1).	D1.1	31/03/2025
Development of overview report of the capacity-building impacts as part of the auditing of phase 1.	D1.2	31/03/2025
Development of feasibility report of pilot/demonstration actions as part of the auditing of phase 1.	D1.3	<a href="#">31/03/2025</a> <a href="#">31/03/2028</a>
Develop an overview of complementary funding as part of the auditing of phase 1.	D1.4	31/03/2025

Develop a final monitoring report describing both plan implementation, capacity building, complementary projects and pilot/demonstration actions (part of Final Report). Max. 3 months after the project ends.	D1	31/03/2030
<b>D2</b>		
Preparing first reporting of the project (environmental and socio-economic) data to the KPI database.	D2	30/11/2022
Preparing second reporting of the project (environmental and socio-economic) data to the KPI database in the middle of the project.	D2	Tentatively 2026
Preparing third reporting of the project data to the KPI database as part of the Final Report.	D2	30/03/2030
Preparing the report “ <i>CE Beyond Waste – Socio-economic impacts</i> ” to be delivered with the Final Report with an estimation of the project’s socio-economic impact evaluated according to the selected socio-economic indicators. The report will consolidate data collected from all projects and their impact on society.	D2.2	30/03/2030
Collection of the last data reporting to the KPI database max. 3 years after the end of the IP.	D2	30/03/2033
<b>E</b>		
The first draft of the communication and outreach plan is discussed among stakeholders	E1	31/12/2022
Draft version of the website is created	E2.1	30/06/2022
Final website is created	E2.1	30/06/2023
Work is commenced making notice boards	E2.2	30/06/2022
Systematically work with the Layman’s report is commenced	E2.3	31/01/2029
Life IP CE Beyond Waste – End of Phase 1 Conference	E3.1	30/11/2024
Life IP CE Beyond Waste – Final Conference	E3.2	31/12/2029
International dissemination work is commenced	E4	31/07/2022
<b>F</b>		
Interim report	F1	31/03/2025
Interim report	F1	31/03/2028
Final report	F1	31/03/2030
Kick-off seminar	F2	31/03/2022
Communication workshop	F2	31/03/2022

#### REPORTS FORESEEN (mid-term & final)

Type of report	Deadline
Interim report	31/03/2025
Interim report	31/03/2028

Final report	31/03/2030
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## ANNEX 4: IMPLEMENTATION OVERVIEW OF THE TARGETED PLAN, STRATEGIES

Annex 4 has been attached as a separate PDF file.

#### ANNEX 5: ATTACHMENTS FROM SECTION 6.3.

Annex 5 has been attached as a separate PDF file.

#### Overview of attachments

Attachment 1: Absolute

Attachment 2: C6.1 Nomination for the Plastic Award 2023

Attachment 3: C6.1 Presentation at IKA Annual Conference 2023

Attachment 4: C6.1 User Manuel for Children's Sector

Attachment 5: C6.1 Washable Packaging at Søndervang School

Attachment 6: C6.3 BI Report Multiple-Use Jacket

Attachment 7: C6.3 BI Report Multiple-Use Blanket

Attachment 8: C6.3 Hospital Campaign Multiple-use Jacket

Attachment 9: C15 Before and after survey, April 2025

Attachment 10: C7.2 Test of unattended recycling area performed

Attachment 11: C7.2 Photos of events and workshops

Attachment 12: C7.2 Design suggestions for Anes Oase

Attachment 13: C14.1 Conferences and formal meetings