Clean flux50 ENERGISING THE FUTURE Smart Waste Portugal

Joint Action Plan for Circular Economy in Plastics

3R – Connect

Interconnected Innovation Ecosystems – Reduce, Reuse and Rethink

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Setting the Scene for a Circular Economy in PLASTICS

The European Commission launched the Circular Economy Action Plan (CEAP) in March 2020 as a cornerstone for the European Green Deal. This action plan especially targets sectors which consume the most resources, and where the potential for circularity is high. One of the target sectors is the plastics industry, where the consumption and production has grown exponentially in the past decades and is expected to double on a global scale in the next 20 years. This action plan will however solely focus on the EU, where 58,8Mt of plastic was produced in 2022 and recycling rates reached 26,9% on average.

Another focus sector in the CEAP is the packaging industry, where circularity is lagging behind as several member states have yet to properly implement efficient systems and measures for circularity. In the recent Regulation for Packaging and Packaging Waste (PPWR), the aim is to implement various measures and targets such as:

- Minimum standards for the recyclability of packaging
- Inclusion of recycled materials in new packaging, and particularly in plastic packaging
- Reduction of packaging waste
- Labeling and information standards
- Measures to promote the acceptance and use of reusable packaging, including incentives for manufacturers and retailers

A core objective in the CEAP is to “make circularity work for people, regions and cities”. This system-level transformation towards a circular economy requires efficient and interconnected innovation ecosystems to accelerate the adoption and up-take of circular innovation. This calls for concerted action and a holistic approach that brings together private, public and research stakeholders from different regions on joint action.

The 3R Connect project has therefore convened actors from different EU regions to propose a set of actions which contribute to a more circular economy in these sectors.

The project has taken its starting point in three focus regions; The Greater Copenhagen, which spans parts of Denmark and Sweden, Flanders in Belgium and Northern Portugal. However, the scope was extended to include strategies and competencies from the countries as a whole, as well as other regions within and beyond the EU.

By assessing the priorities, capacities and challenges in the respective innovation ecosystems, various opportunities for circular transformation of the sectors were identified. The opportunities which gained the most support from the broad range of actors in the different ecosystems were developed into concrete actions to be implemented through cross regional collaboration:

1. SUPPORT PUBLIC PROCUREMENT OF INNOVATIVE SOLUTIONS FOR CIRCULAR ECONOMY WITHIN PLASTICS
2. ESTABLISH DECENTRALIZED TAKE-BACK/REUSE SYSTEMS IN CLOSED LOOP SETTINGS WITH LARGE VOLUMES OF TAKEAWAY PACKAGING (E.G. AIRPORTS, FESTIVALS AND BIG EVENTS WHERE THE WASTE STAYS ON THE VENUE)
3. ESTABLISH CENTRALIZED REUSE SYSTEMS IN OPEN-LOOP SETTINGS SUCH AS CITIES WHERE THE TAKE AWAY PACKAGING FROM CAFES AND RESTAURANTS IS DISPERSED ACROSS LARGER AREAS
4. IMPLEMENT STANDARDIZED REUSABLE PACKAGING IN COLLABORATION WITH PRODUCERS AND LARGE FLAGSHIP COMPANIES
5. UTILIZE DATA TO ENSURE TRANSPARENCY, MEASURE IMPACT AND INFORM DECISION MAKING

We hope this action plan can be used to convene actors from different regions on joint actions for a more circular use of packaging and plastics in general!

Sign up here to show your commitment to taking action!

How can you use this action plan to engage in future projects and collaborations?

In this action plan, actions refer to activities on different levels:

- On the micro-level, actions are carried out by individual stakeholders. This can for example include bilateral collaboration between two companies.
- On the meso-level, actions are carried out by ecosystem mediators or other supporting organs in the innovation ecosystem such as clusters. Activities can for example include matchmaking between innovative companies and private or public end-users or facilitation of co-creation processes and innovation collaborations between research institutions and other private or public actors.
- In general, the macro level refers to legislation and policy making. However, policy development is not part of this action plan, and macro level actions therefore refer to projects and initiatives which can be used to inform or inspire future policy development, as well as actions which help stakeholders comply with upcoming legislation on circular economy.

How can the action plan be used by different stakeholders?

As a private company you can:

- Gain new project and business opportunities by signing up to join one or several of the actions in the section on “Priority actions for circular transformation in the plastics and packaging industry”.
- Identify relevant collaboration partners or best practices from other regions in the Appendix 1.

As a public buyer you can:

- Participate in future projects where you improve your capacity for public procurement of innovation and circularity by signing up to join Action 1.
- Get inspired by best practices for public procurement of innovative circular solutions and identify promising technologies in the Appendix 1.

As a cluster or similar ecosystem mediator you can:

- Gain an understanding of key challenges and needs for packaging and plastics across different regions in the section on "Cross-regional key challenges and needs".
- View the 5 proposed actions as concepts for future projects to be implemented in collaboration with clusters from other regions. You can find partners for project development through the International Cleantech Network.
- Involve relevant members from your region in one or several of the proposed actions.

As a university or research & technology institute you can:

- Gain an understanding of key challenges and needs for packaging and plastics across different regions in the section on "Cross-regional key challenges and needs".
- Participate in research or development projects by signing up for one or several actions in the section on "Priority actions for circular transformation in the plastics and packaging industry".

As a public authority you can:

- Gain an understanding of the priorities and needs of different actors in the innovation ecosystem in the section on "Cross-regional key challenges and needs".
- Get input for policies and prioritization of public funding for circular projects in the section on "Priority actions for circular transformation in the plastics and packaging industry".

To understand which role you can play in each specific action, please refer to the tables in the section "Priority actions for circular transformation in the plastics and packaging industry" and sign up to join the actions.

Methodology:
Alignment with national and regional strategies and bottom-up action development

To develop and plan joint actions for a more circular economy within plastics and packaging, a thorough assessment was conducted of the industry's existing practices and the degree of alignment with circularity principles. This assessment identified key challenges and highlighted opportunities for collaborative efforts and initiatives across the three regions.

The project was organized in different phases:

Phase 1: Mapping Regional Challenges

An assessment was conducted to map regional challenges and potentials in circular economy practices within the plastics and packaging sectors. This process aimed to identify opportunities for enhancing resource efficiency, reducing waste, and promoting circular practices throughout the value chain. To ensure that the actions are rooted in regional/national strongholds, the process took its starting point in already existing strategies and roadmaps. As these strategies and roadmaps have different levels of detail, target groups and time horizons, they were supplemented by desk research to mitigate the differences.

Phase 2: Dialogue with key stakeholders

The consortium involved private, public, and research actors to engage in dialogue about the common regional challenges identified in the first phase. The focus was on sharing information, exchanging applications of innovative techniques, and gaining insight into each other's ecosystems.
Subsequently, the consortium examined which actions were desirable and necessary to address these challenges. The outcome of this phase is summarised in the chapter “Cross-Regional Key Challenges and Needs.”

Phase 3: Setting priorities for cross-regional collaboration

In the last phase, the “needed actions” were prioritized. It was assessed which actions would benefit from cross-regional collaboration, where joint innovation projects could be planned, and how the implementation of the prioritized actions could be prepared.

Action 1 Action 2 Action 3
Action 4 Action 5

The 3R Connect Project aimed, not only to address current circularity challenges in these sectors, but also to create a robust network of cooperation that strengthened circular economy practices across multiple regions and countries. More than 200 private, public and research actors were involved in co-developing and prioritizing actions over the 2-year project period. This bottom-up approach was applied to ensure that the actions would gain support from a critical mass of actors.

The process was driven by the three organizations, Clean – The Water and Environment Cluster in Denmark, Smart Waste Portugal and Flux50 with support from regional authorities in the Greater Copenhagen region, Flanders and Northern Portugal. The International Cleantech Network, which convenes 24 clusters worldwide, has been closely involved in the process and will be a key part of the implementation of the actions by convening stakeholders across different regions in joint projects and through matchmaking activities. Similarly, the three partner clusters will continue to gather stakeholders to implement the actions. The clusters will continuously present SMEs and other relevant stakeholders with funding opportunities which can be utilized to implement the actions. Currently available funding opportunities have also been mentioned in this Action Plan.

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Cross-regional Key Challenges and Needs

With a starting point in regional strategies and roadmaps, as well as inputs from private, public and research stakeholders, a set of common needs and challenges have been identified. The following list of common challenges and needs is non-exhaustive, as there are many other challenges for a circular economy of plastics. The priorities and challenges described below are selected because they were prioritized by the actors who participated in the process.

Some of the challenges and needs are specific for certain parts of the value chain while others are more overarching and relate to the dynamics of the market. Therefore, the challenges are divided into two separate sections:

Market Dynamics:
Cross-regional challenges and needs

Business Models

The adoption of alternative business models is highly prioritized in the strategies and roadmaps, as well as among the actors that were involved in the action development process. This includes business models for reusable packaging as well as take-back and take further systems for plastics in private and public sectors.

Business models for packaging, as well as plastics in general, are predominantly based on linear thinking, and circular infrastructures and business models exist only on a small scale. The fact that infrastructures are still largely based on linear principles creates a systemic barrier for the shift towards a circular economy, as circular business models are often incompatible with the existing system. Circular business models are in many cases not (yet) economically feasible, and many economic and logistic barriers persist, such as the expensive process of washing reusable packaging before entering it into another life cycle.

Actors in the 3R Connect process expressed a need for public investment in circular infrastructure as well as new collaborations and initiatives to improve the feasibility and address the barriers for circular business models.

Public Procurement

The roadmaps and strategies mention public procurement as an important driver to accelerate the demand for more circular products and solutions. Surveys conducted as part of the 3R Connect process showed that public buyers in the focus regions, as well as other EU countries, especially had an interest in procurement of innovative solutions for:

- Reuse or recycling of plastics from public institutions, for example packaging from healthcare instruments
- Improved sorting of waste at public recycling stations through innovative sorting technologies (e.g. artificial intelligence, robotics, sensoring, detection etc.)
- Return/take back systems for take-away packaging
- Setting minimum requirements for recycled or biobased content in public procurement of plastic products

The surveys showed great interest among public buyers to improve their capabilities for procurement of circular and innovative solutions (Image 1), and some had already implemented circularity as part of their procurement criteria and processes.

Procurement of innovative solutions

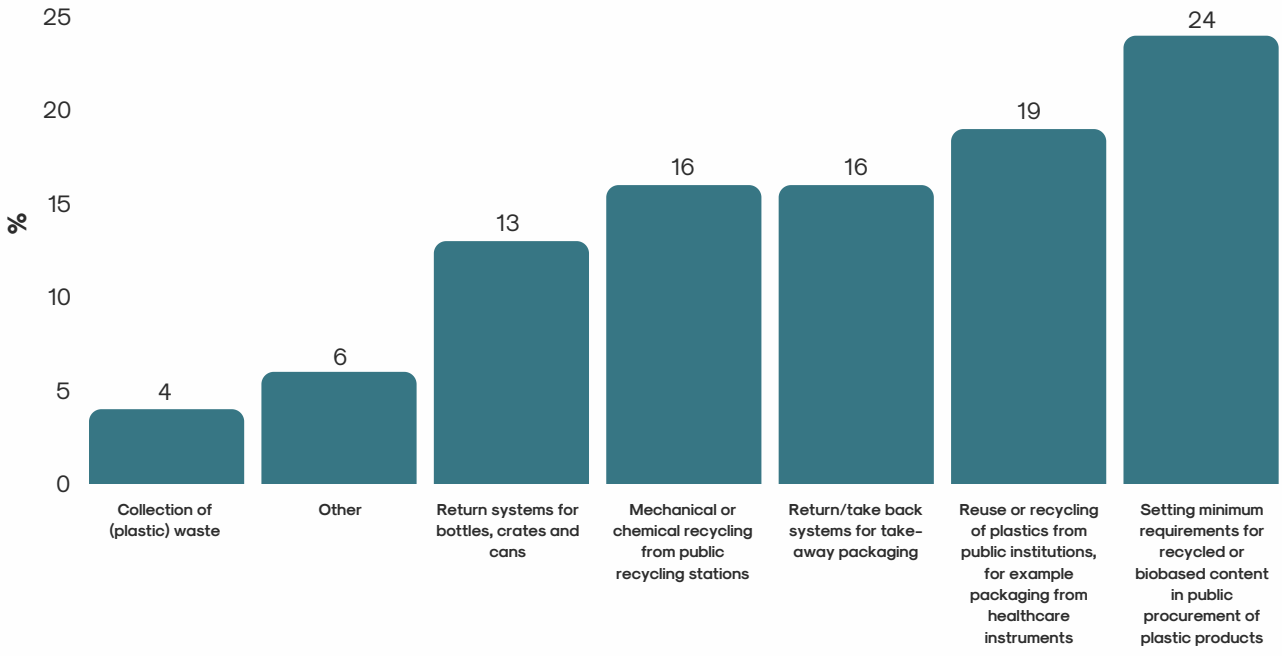


Image 1 - Percentage of participants interested on the procurement of innovative solutions.

However, most of the respondents had only implemented it on a small scale (e.g. through procurement of recycled material for small-scale projects), and 90% of respondents replied that they have some knowledge about circular procurement, but they are not sure how to implement it broadly. Hence, there is a need for capacity building, sharing of best-practices and projects to support public buyers in carrying out procurement of innovative circular solutions.

Consumer Behavior

Portugal, Belgium and in particular Denmark have high levels of plastic and packaging waste generation per capita compared to EU average, although inconsistencies in measurement methods from country to country may also have an influence on these datasets. This is a systemic challenge, which should be addressed by different stakeholders along the value chain, including the consumer. Consumer behavior is one of the many factors which should be addressed to reduce the generation of waste, and all three regions prioritize initiatives focused on the role of citizens in the transition to a circular economy within plastics.

Barriers include a lack of awareness about, and access to, circular alternatives, a lack of knowledge about the direct impact of the choices we make, and a preference for convenience when it comes to buying and disposing of products with packaging. To reduce the consumption of unnecessary plastic and packaging, participants in the 3R Connect process expressed a need for awareness campaigns and education, as well as easy access to circular business and service models. To this end, it is necessary to improve the data foundation and understanding of consumer behavior and to test the consumer reactions to circular alternatives.

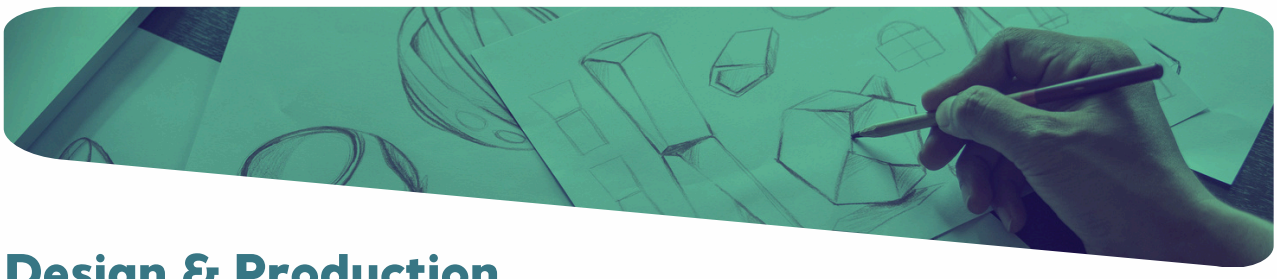
Value Chains:
Cross-regional challenges and needs

Materials

All three regions aim to increase the percentage of recycled plastic in the production of new products – both in private and public sectors. The development of bio-based plastic is also a priority, although this topic gained less traction in Portugal compared to the two other regions during the workshops.

To increase the use of recycled plastics in new products, there is a need to improve the trustworthiness and quality of the materials, as well as ensuring sufficient supply. It is necessary to use pure materials without contaminants and with known properties, which can maintain these properties during use and recycling.

To increase the use of biobased material there is a need for research to improve the properties while also ensuring compatibility with existing reuse and recycling systems, to ensure a sustainable end-of-life phase. There is a need to establish new value chains for biobased production of plastic to guarantee a stable supply while avoiding competition with food resources and ensuring sustainable land use. In addition, the use of captured CO_2 as raw material for production of plastic was mentioned as a priority, and in particular the need to move to industrial scale.



Design & Production

All three regions have targets for ecodesign to ensure that products are designed for reuse or recycling. Design guides have been developed in many different EU regions, although they have different levels of detail and are disseminated differently. Optimization and adaption of production processes has also been highlighted as a priority.

This requires increased collaboration along the value chain, as the design decisions which are made upstream have a direct impact on the opportunities for sorting and recycling downstream. There is a need for knowledge sharing on best practices for ecodesign as well as initiatives to increase the efficiency of production processes, and adapting them to ensure that they can handle recycled and biobased feedstock. This also requires initiatives to increase the use of digitalization, automation and other technologies to support a more circular and resource efficient design and production phase.

Collection & Sorting

The collection rates for plastic to be reused or recycled vary from country to country, but the three regions all have targets for increasing the collection and sorting of plastic waste (e.g. packaging), both from households, in public spaces and at large events such as festivals, amusement parks etc.

Contamination from food residues as well as other waste fractions, the use of multi materials and labels remain key barriers for proper sorting and handling of plastic waste. There is a need for a better understanding of the behavior of citizens when it comes to sorting of waste. Moreover, there is a need to improve the traceability of materials and to develop and implement new technologies to improve waste sorting such as sensors, optical sorting, automation and robot technology. This is a challenge that is relevant across many industries, including the textile and construction industries. To read more about circular economy in these two industries, please refer to the two other action plans from 3R Connect.

Recovery

The recycling rates for plastics differ significantly from country to country with Belgium having the highest recycling rates among the three regions.

The recycling rates for plastics differ significantly from country to country with Belgium having the highest recycling rates among the three regions. However, a general priority in all regions is to increase the recycling of plastic waste, and it is generally acknowledged that materials should always be utilized at the highest possible level of reuse or recycling to preserve a high material value, although this is not always the practice.

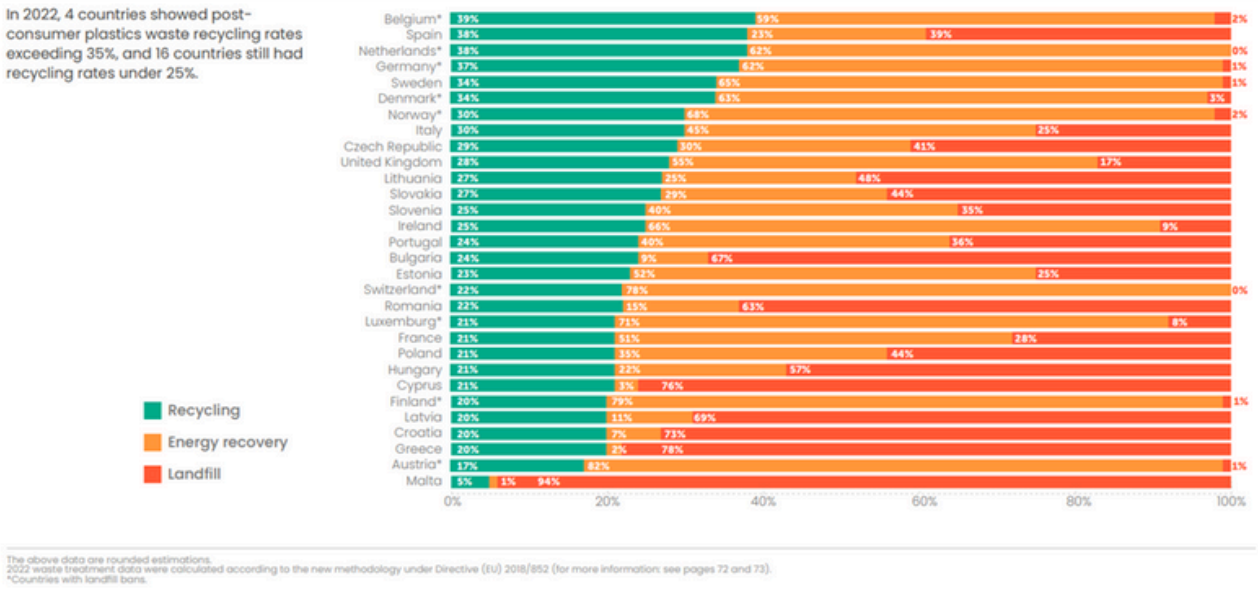


Image 2 - Plastics Waste Treatment by country (Source: Plastics Europe, 2024). [1]

Higher recycling rates require sufficient feedstock of similar and clean waste fractions as input for recycling processes. To this end, there is a need to identify and develop new partnerships for more selective collection and recycling of specific material flows (e.g. food grade). However, there is also a need for further development of recycling processes to enable recycling of more diverse and contaminated fractions, and to improve recycling processes in general. This includes research in mechanical recycling to enhancing polymer recovery, as well as research in chemical recycling, biological, catalytically, and thermal processing for monomer and oil recovery.

All these challenges and needs should be pursued through future initiatives and projects. However, in the 3R Connect process, a prioritization has been made to focus on a few selected challenges to set the frame for specific projects.

1 Plastics Europe (2024). The Circular Economy for Plastics - A European Analysis. Retrieved from https://plasticseurope.org/knowledge-hub/the-circular-economy-for-plastics-a-european-analysis-2024/.

Translating Challenges into Opportunities for Joint Action

To translate these challenges and needs into opportunities and joint actions, they have been formulated as actionable challenge statements. Each challenge statement laid the ground for discussions with private, public and research actors from the different regions, who suggested various activities to address the challenges. The following provides an overview of the suggested activities.

Material choices and packaging design: How can we support sustainable and circular material and design choices?

There is a need to facilitate capacity building and informed decision making for packaging producers. Participants suggested that this could be carried out through initiatives to:

- Establish a joint platform/knowledge bank across different countries to share best practices and principles from different design guides. The data should enable producers to understand trade-offs in terms of functionality, reusability and recyclability when choosing alternative materials or designs.
  - Test and implement principles from different design guides across the value chain and different countries.
- Share experience and data from the tests/implementation across regions to enable comparison
  - Demonstrate the benefits and challenges of Life Cycle Analysis (LCA) and other methodologies for impact analysis to provide input for establishment of a unified system. Impact analysis needs to assess different materials based on the same calculation principles and take into account the full product cycle.
- Share knowledge about materials and material compositions which are difficult to reuse or recycle and which should therefore be avoided in future production (including mixed plastics).

There is an interest among some of the stakeholders to increase the use of biobased material in packaging. Participants suggested that this could be carried out through initiatives to:

- Ensure that the selected materials are compatible with existing collection, sorting and recycling systems to avoid contamination of waste streams.
- Focus on data and measurement of the impacts from different materials to inform decision making. A suggestion could be to establish new tools with detailed scientific information about different biobased materials.
- Research and development to improve the mechanical properties of biobased material.
- Improve the business model and economic viability of using biobased materials.
- Projects could for example focus on sourcing, increasing efficiency of production processes and establishing or scaling up value chains to ensure that there are sustainable sources of biobased polymers available in sufficient quantities.
- Research and development on recycling of paper that has been laminated with biobased foils.

Reusable packaging:
How can we implement reuse models and take back systems for food packaging?

There is a need to test and scale systems for reusable packaging. Participants suggested that this could be carried out through initiatives to:

- Test and implement a digital and convenient system in collaboration between several stakeholders, which is flexible and can be adapted to different settings and locations.
  - Test decentralized take back and washing systems in closed loop settings with large volumes of take away packaging (e.g. airports, festivals and big events, where the waste typically stays on the venue).
- Address the main barriers for take back systems by improving consumer acceptance, efficiency, logistics and convenience as well as reducing the price for end users. Projects should also include a focus on replicability and scalability.

There is a need to strengthen and utilize data. Participants suggested that this could be carried out through initiatives to:

- Share data and best practices from pilot projects and previous implementation of reuse/take back systems for packaging in different contexts.
- Use data to select waste streams and locations with the highest potential impact. For example, it can be beneficial to choose locations with already existing infrastructure, or waste streams where the recycling rates are low.
- Ensure transparency. This can for example be done by including data on how many times a packaging item should be reused before the environmental impact is better than that of single use packaging.
- Analyse the differences between existing deposit/return systems in different countries and regions.

Innovative sorting methods:
How can we increase the sorting of plastic waste?

There is a need to increase the use of innovative solutions (e.g. sensoring, detection, robotics, AI and digital technologies). Participants suggested that this could be carried out through initiatives to:

- Open innovation and sharing of best practices at EU level.
- Facilitate open dialogue between research institutions, technology providers and the companies and public actors who can implement the solutions.
- Address barriers for implementation of innovative technologies for sorting (e.g. legal infrastructural and economic barriers)
- Assess how much of the plastic is sorted for recycling that is actually being recycled.

The initiatives that gained the most traction among the participants were selected as the focal point for further discussions and co-development of joint actions, as they are most likely to convene a critical mass of stakeholders for implementation. The initiatives that were not selected are however still important and can be pursued in other ways.

Priority Actions for Circular Transformation in the Plastics and Packaging Industry

Based on the selected priority topics, a set of actions were developed through involvement of stakeholders from the three focus regions as well as other EU territories. The aim of the actions is to contribute to a circular economy within plastics and packaging through research & development, capacity building, innovation and procurement of circular solutions. In this, lies also a need for matchmaking, joint investments and co-creation of new solutions.

The list of actions is not an exhaustive description of required initiatives, but rather a catalogue of selected suggestions based on the inputs from private, public and research actors across different EU regions.

Actions to accelerate the uptake of innovative circular solutions

Action 1: Support public procurement of innovative solutions for circular economy within plastics

Public procurement can be a significant driver for the development, testing and broad implementation of innovative circular solutions. Pilots conducted by public actors can be crucial in the initial phases of technology development through early-stage testing of new solutions, while more market ready solutions can be more widely applied through public procurement of circular technologies, materials and techniques. To increase public procurement of innovative circular solutions, it is crucial to:

- Ensure sufficient awareness of and access to innovative solutions and suppliers
- Apply the necessary framework and procedures for innovative procurement

In this action, future projects and collaborations will be planned to enable public buyers to procure innovative circular solutions which contribute to a circular economy within plastics and packaging.

Throughout the 3R Connect process, the aim has been to identify opportunities for future projects by assessing which topics public actors have an interest in pursuing.

Steps for Implementation

Implementation of this action requires steps to:

Share knowledge, best practices and inspirational cases for innovation procurement:

To increase the uptake and drive the demand for innovative circular solutions, there is a need to continuously showcase inspirational examples through networks and cross-regional collaborations between public buyers to ensure that best practices can be replicated in other regions. Examples of best practices can be found in the Appendix 1.

Facilitate capacity building on innovation procurement:

It is also necessary to build competencies among public buyers to change traditional procurement practices and procure alternative solutions. A distinction should be made between different strategies for innovation procurement depending on the availability of solutions. If the solutions are commercially available, a simple approach can be taken, while a more explorative approach is needed if the needs can only be met by solutions which are not yet developed. If only parts of the solution are available, adaptation and further development may be necessary, while a more strategic co-development approach can be taken for critical materiel. This calls for procurement experts and innovation brokers to set up networks and joint programs to support public actors in the change of processes and showcasing best practices. Several successful initiatives and projects on public procurement of innovation already exist and should be drawn on for inspiration (Appendix 1).

Establish connection between public buyers and innovators through cross regional matchmaking and launch of joint innovation challenges:

To ensure that public buyers are aware of the circular solutions which already exist on the market, there is a need for innovation brokers, such as clusters, to identify and showcase promising market ready solutions.

Similarly, there is a need for procurement experts and innovation brokers to support the adaptation and co-creation of new solutions to match the needs of public buyers.
Based on surveys which were shared with public stakeholders and other actors working with innovation procurement, a set of innovation challenges and needs for innovative and circular solutions have been identified as common across different EU regions. These priorities will therefore be the focus in future projects on public procurement of innovation with the aim of accelerating the demand for circular solutions and products as well as sustainable materials. The joint priorities and topics of interest are:

- Setting minimum requirements for recycled or biobased content in public procurement of plastic products. The targets should at a minimum follow the requirements set forth by the EU, and the available supply should be considered when setting the targets. Ideally, minimum requirements should be harmonized across EU countries to prevent market distortion. However, initiatives could also include frontrunner municipalities or other public buyers with more ambitious targets to lead by example.
- Reuse or recycling of plastics from public institutions, for example packaging from healthcare instruments. Several initiatives already exist in Belgium and Denmark, and best practices should be shared and replicated (Appendix 1). Future projects should also address the various barriers and challenges which have been identified in previous initiatives.
- Improved sorting of waste at public facilities through innovative sorting technologies (e.g. artificial intelligence, robotics, sensoring, detection etc.). Various solutions and initiatives already exist, e.g. in the private sector, and it is crucial to learn from existing cases (Appendix 1).
- Return and take back systems for take-away packaging. Several small scale initiatives already exist in the three focus regions in certain areas and for specific types of packaging. There is a need to scale up successful initiatives and replicate them to other packaging types and locations (Appendix 1).

Other topics also received interest among the public buyers and could also be explored in future projects facilitated by the partner group and in the International Cleantech Network. This includes mechanical or chemical recycling of plastics from public recycling stations, and recycling of specific fractions such as diapers.

A set of “needs statements” should be launched jointly in collaboration between municipalities and other public stakeholders within the topics that were deemed most relevant. The innovation needs from public buyers will be matched with innovative circular solutions from different regions, and in the cases where the required solutions do not already exist, they will be (further) developed in collaboration between relevant stakeholders. A common denominator for most of the prioritized topics is that the required solutions are sold to both public and private buyers. This should be considered in the co-development of new solutions.

How can support for public procurement of innovative circular solutions be funded?

The consortium and the International Cleantech Network will develop proposals to implement this action through relevant funding schemes such as Interreg Europe as well as region-specific Interreg programs. Joint Interreg projects will ensure training and support for public actors in innovation procurement, matchmaking and co-creation of circular solutions within the selected topics and adaptation of processes and policies for public procurement in the participating municipalities and public institutions.

Actors and roles

To contribute to a system level shift from a linear to a circular economy, the lines of action require concerted efforts from many different types of stakeholders simultaneously. Therefore, it is necessary to specify which roles the different actors need to take to contribute to the implementation of the actions. To support public procurement of innovative circular solutions, the following actors should be involved (non-exhaustive list):

Public Buyers — **Innovative companies** — **Clusters as innovation brokers** — **Experts on public procurement strategies** — **EU**

Public Buyers

Be willing to change internal processes and policies to procure innovative solutions, and introduce circular requirements.

Innovative companies

Engage in matchmaking and co-creation processes, and be prepared to adapting solutions to fit the needs of public buyers.

Clusters as innovation brokers

Facilitate the establishment of networks and knowledge sharing between public buyers.
Clusters can function as brokers between public actors and innovators – specifically through matchmaking and facilitation of co-creation processes.

Experts on public procurement strategies

Support public buyers on innovation procurement processes. As legislation and policies differ from country to country, projects should provide access to legal expertise from all involved countries.

EU

Ensure that the rules are flexible enough to allow for experimentation of solutions and provide programmes with funding to carry out circular procurements.

Sign up here to show your commitment to taking action!

Actions to implement reuse systems for take away packaging

The participants have co-developed joint actions to implement and scale up reuse and take back systems for take away packaging. These actions have focused specifically on addressing the need for testing and implementing a digital and convenient reuse system which is flexible and can be adapted to different settings and locations. Another important requirement is to improve consumer acceptance, efficiency, logistics and reducing the price for the end users. To this end, data is an important enabler, and actions have been developed to strengthen the data foundation and ensure better utilization of data.

The proposed actions aim to support and prepare the implementation of the Packaging and Packaging Waste Regulation (PPWR) by developing solutions, methods and best practices which can be implemented on a broader scale and replicated across different EU regions. Moreover, the actions should be aligned with and contribute to later implementation of national systems for reuse of packaging.

Action 2: Establish decentralized take-back/reuse systems in closed loop settings with large volumes of takeaway packaging

While some regions have policies and requirements for reuse of packaging in festivals and events, others are lagging behind. Successful cases of take-back/reuse systems exist on a small scale in some areas, but there are still significant challenges to address to ensure sufficient implementation and scalability. Best practices need to be replicated to other settings, and systems should be further developed and put in place in various closed loop settings.

Steps for Implementation

Implementation of this action requires steps to:

Identify appropriate test sites:

Identify locations for testing reuse systems for take-away packaging. The locations need to have adequate volumes of packaging, and the tests need to be performed in different types of locations (e.g., festivals, airports, big events, etc.) to gather data from different environments. When selecting these sites, it is also crucial to consider the logistical system in place. While it makes good sense to collect and reuse (wash or similar) packaging, basic logistical factors such as access conditions, availability of water and electricity, and other infrastructure elements need to be carefully considered to ensure the system's effectiveness.

Make material and design choices which enable reuse of packaging:

To ensure that the packaging is easy to reuse in several use phases, tests need to be performed on different types of packaging. The material and design should be durable and easy to clean. Before setting up the test, it is necessary to estimate which types and volumes of packaging that will be handled in order to understand the variety of materials. The design of the packaging can to some extent be standardized, but still enable vendors to have their individual logos on the packaging. Research is also needed to assess how different materials influence human health.

Ensure consumer acceptance and promote behavioral change:

To increase return rates, there is a need to promote behavioral change. This calls for projects to conduct research on the effects of different incentive structures and penalty schemes. In general, there is a need to understand the behavior through research on the user journey, and by evaluating the actual behavior. Initiatives to promote behavioral change should include awareness campaigns, storytelling and solutions to make it visible for consumers what the effects of their choices are.

Information and capacity building are necessary measures to ensure that information about reuse options and collection points is communicated to consumers at the venue, and the collection should be convenient for users through clearly marked collection points. This requires training for staff and educational material set up at the venue. Another key element is the design of the take back system, which needs to be human centered, meaning that citizens/users need to be involved in the different steps of the design process.

Optimize washing processes:

One of the main challenges for reuse and take back systems is to optimize the washing systems. The packaging needs to be washed to ensure food safety and meet health standards before entering a new use cycle. This has proven to be very expensive and logistically challenging, and new initiatives should aim to improve the processes and systems as much as possible. When testing new processes and washing systems, it is necessary to evaluate the economic feasibility and environmental impact in order to conclude whether reuse is the best solution for the chosen setting.

At festivals, big events and other sites with large quantities of packaging, it is recommended that the washing is done on the site when possible, rather than transporting it to a central location, as decentralized on-site washing stations will reduce transportation and minimize the risk of mold growing due to long waiting times. This calls for projects to develop convenient cleaning systems, which can be located close to collection points and used for different types of packaging. However, this is not always possible or feasible. In example, the necessary wastewater treatment may not be available in remote locations. Therefore, an important first step is to determine the most appropriate location for the washing system for different types of festival and event sites.

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Action 3: Establish centralized reuse systems in open-loop settings such as cities where the take away packaging from cafes and restaurants is dispersed across larger areas

The PPWR sets forth requirements to increase the reuse of packaging, and several industry players, researchers and public stakeholders call for national reuse systems for takeaway packaging. Therefore, there is a need to develop solutions and best practices which can be implemented on a broad scale. Action 3 proposes a series of steps which can be taken by different actors to co-create new systems, solutions and methods with emphasis on scalability, harmonization and feasibility.

Steps for Implementation

Implementation of this action requires steps to:

Identify appropriate locations for implementation:

The system should be implemented in areas with open loop systems (e.g. cities), and a diverse set of appropriate locations should be identified (e.g. municipalities and cities of different sizes and in different countries). The differences between the locations should be carefully considered to ensure that the strategies, logistics and collection methods are tailored to each location.

Material and design choices:

These aspects should be considered in the same way as Action 2.

Collaborate with restaurants and cafes to offer reusable packaging:

Restaurants and cafes in the cities should be involved in the planning and implementation in order for them to offer reusable takeaway packaging to their customers. Initiatives are needed to identify the most appropriate return system and the restaurants and cafes should be involved in this process. However, it is difficult for them to specify which solutions they need as there are very few well-functioning systems on a large scale for other product categories than bottles, crates and cans. Therefore, the process should be framed around the challenge that needs to be solved, rather than the specific solution that is needed. Convenience for the food vendors and their customers should be a core requirement and the solution should be interoperable with the operating systems at various different restaurants. This requires initiatives to improve the technological integrations.

Enable easy return of packaging:

To ensure that consumers can easily return takeaway packaging, a standardized collection/return system should be set in place with several collection points. Experience from pre-existing pilots is that consumers are generally not willing to return packaging in the restaurant they bought it from, so it is necessary to ensure that various types of packaging can be returned at all collection points. In the long run, there is a need to set up collection systems that work across municipal and even national borders to enable consumers to return packaging from one place in another. This requires early dialogue and knowledge sharing across regions and coordination between initiatives to ensure that the infrastructure is compatible.

Ensure consumer acceptance and promote behavioral change:

Awareness and educational campaigns should be introduced to inform and educate the general public about how the new system works, how to engage in it and what the impact is for the individual consumer and the environment. To this end, comprehensive communication campaigns can be conducted through social media, traditional media, public events, collaboration with influencers etc.

Another key element in ensuring consumer acceptance is finding the right pricing model. This calls for initiatives to study the consumers' willingness to pay, as well as studying the effects of models where the consumer is refunded when returning the packaging. Experiences from the actors who contributed to this proposal shows that a penalty based system is more effective than a reward based one. Therefore, systems where consumers lose money if they do not return the packaging is preferred over systems where they get a reward if they do.

Optimize washing processes:

A standardized washing system should be established at different locations around the city and on the longer term around the country. Early dialogue between washing providers and packaging producers is necessary to ensure that the packaging is designed in a way that enables easy cleaning and compatibility with the washing system.

Enable refill as supplementary option:

Refill options should be enabled as part of the infrastructure for reusable take-away packaging. Consumers should be enabled and encouraged to bring their own packaging to cafes and restaurants. This calls for restaurants and cafes to test out new refill models and address the challenges that are associated with it, such as the increased hygiene risk. However, refill options cannot stand alone, as it requires more of consumers, and should be seen as a supplementary option to reuse systems with packaging offered by the restaurants and cafes.

Actions to implement reuse/take back systems for retail packaging

4 Action 4: Implement standardized reusable packaging in collaboration with producers and large flagship companies

In some of the regions, pilots and initiatives for reusable packaging in retail have already been conducted on a small scale. However, there is a need to establish new initiatives, develop solutions and scale up systems. New initiatives should include the lessons learned from previous initiatives.

Steps for Implementation

Implementation of this action requires steps to:

Determine product categories where reusable packaging is most relevant:

Different types of products should be considered, keeping in mind that food packaging poses more challenges than other product categories due to health considerations. It is suggested that a few categories are selected and piloted in the initial phase.

Design, test and showcase standardized packaging and labelling:

There is a need for large food producers in collaboration with packaging manufacturers, researchers and other experts to design a standardized packaging which can be used for several different product categories. Similarly, standardized labelling for reuse should be developed. The standardized packaging and labelling should be tested on a pilot scale with one or several producers as flagship companies. Such projects can pave the way for implementation of extended producer responsibility on a larger scale by developing good practices and setting a standard for others to follow.

Establish a deposit system which is adaptable to different use cases:

Convenience for the consumer should be a key aspect when designing the system, and it is necessary to ensure that consumers can return the packaging at various collection points regardless of where they purchased it. Similarly to the take-away packaging, it is necessary to build a return system that can fit different use cases and types of packaging. Initiatives should also focus on space management at the retailers, as well as collaboration with logistic providers to ensure an efficient system.

Development of a pilot program with selected areas or stores:

The pilot program should focus on creating a closed-loop system for food packaging, where packaging is collected, cleaned, and either reused or recycled to produce new food packaging. This initiative will enable the evaluation of the system's effectiveness in reducing waste and conserving resources, while also gathering critical data on logistics, consumer participation, and the potential for scaling the program to a broader scope.

Ensure consumer acceptance and promote behavioral change:

There is a need for research on consumer preferences and initiatives to test the consumer behavior related to the piloted deposit systems, e.g. through user journeys. Studies regarding the willingness to pay should also be conducted to assess how much consumers are willing to pay for reusable alternatives, and expertise on business models and efficient value chains should be included to identify possibilities for reducing the price for end users.

5 Action 5: Utilize data to ensure transparency, measure impact and inform decision making

This action is complementary to the other actions, as data should be used to ensure that the most appropriate systems and solutions are selected, that necessary alterations are made to improve and adapt the systems, and that the initiatives are scalable and replicable across different geographical areas.

Steps for Implementation

Implementation of this action requires steps to:

Identify parameters for data collection:

When preparing new pilots or implementation of reuse systems on a larger scale, the parameters for data collection need to be established from the beginning to determine which kind of data that needs to be collected, and what it should be used for. E.g. the data and feedback from pilots should be utilized to refine the system before rolling it out at a broader nationwide scale.

In example, the contributors to the 3R Connect process suggested initiatives focusing on collection of the following types of data:

- Packaging Material Data: Analyze data on the types and volumes of packaging materials used by producers to guide decisions on reusable packaging design and material selection.
- Demographic and Consumption Data: Analyze population density, consumer behavior, and takeaway consumption patterns to identify areas with the highest potential impact for the introduction of the reuse system.

System design:

The data collection system needs to be agnostic to support different use cases related to packaging and logistics, and it is crucial that each packaging item can be individually identified through a QR Code, RFID tags, digital product passport or similar. The traceability of each unique item is important to get accurate data on how many times it has been reused and therefore, what the environmental impact is. Life Cycle Analyses should also include data on water and energy consumption related to the washing of packaging between each use cycle. This calls for new projects which demonstrate promising solutions and contribute to the implementation of a digital product passport.

Support existing initiatives and test/demonstrate solutions for standardized labelling:

The contributors emphasized the need for harmonized labelling for reusable packaging across the EU to make it easy for consumers to know whether the packaging is reusable. Initiatives should support and build on already existing best practices for new labelling and tracking solutions. In example, the New Reuse Alliance is, together with other partners, developing a unified symbol for reuse as well as a campaign to increase awareness and inform consumers about the option to reuse.

Make the data accessible:

Several different options for tracing already exist, but it is still a challenge to gather data on waste behavior over longer periods of time and making it accessible to the right stakeholders. It is crucial to determine how the data should be shared, taking into consideration the different aspects of competition, legislation, confidentiality etc. To facilitate this management of data, a neutral intermediate may be relevant. Contributors to the 3R Connect process suggested that governmental agencies (e.g. environmental agencies) could be the ones to take this role.

Utilize data to promote behavioral change:

There is a need for initiatives to visualize the impact of the consumers' decisions. In example, solutions could be developed to show consumers the data on the waste they generate, or solutions which make it visible what the impact is of returning packaging versus throwing it out. Such initiatives require projects to design the solutions in a way that is easy for consumers to interact with.

How can reuse and take back systems for packaging be funded?

Funding programmes for research & development, pilot, demonstration and commercialization projects

Government grants and relevant funding programs should be utilized to support operators in doing the initial investments in testing and setting up new systems and infrastructures, as this is extremely expensive and therefore risky for companies to invest in without support. The International Cleantech Network of clusters will continuously identify relevant funding for piloting and testing at a regional and cross regional level to enable coordinated piloting across different countries and ensure alignment of initiatives and coordination and complementarity of funding mechanisms. A working group has been established in the International Cleantech Network to develop proposals for implementation of the actions, and the following funding programmes have been deemed relevant:

- Horizon Europe Cluster 6 upcoming programme: A working group will be established within the International Cleantech Network once the new work programme opens.
- LIFE Standard Action on Circular Economy and Quality of Life: Consortias are being established between the participants of the 3R Connect process.
- LIFE Environmental Governance Standard Action: There are ongoing discussions in the International Cleantech Network on the relevance of this call for implementation.
- Horizon Europe – Increasing Circularity in Plastic Value Chains: An application was submitted in collaboration between ICN partners across 5 regions within and beyond the EU. The application contributed to the implementation of action 2, 4 and 5, as well as circular value chains in the construction industry.
- Eureka Eurostars: A matchmaking process has been initiated for innovative SMEs, universities and research centers focusing on implementation of the developed actions.
- Euroclusters: The International Cleantech Network will develop an application for the Euroclusters programme to provide cascade funding for the implementation of the actions.

Moreover, reusable packaging systems will be tested at various festivals in the South Baltic region as part of the granted Interreg project “Sustainable Tourism through Resilient and Innovative Festival Ventures” (STRIVE), which is led by Clean.

Other public funding for operating costs and long term implementation

A key requirement for implementation of reuse systems on a large scale is the financial setup of the system. Ideally, the cost of reusable alternatives should be equal to or less than single-use alternatives. This is currently not possible – in part due to the costs for cleaning, maintenance and operations of the reuse system. This calls for a financial framework to implement subsidies for reuse systems and/or fees on single-use alternatives. Incentive schemes and public (co)funding for reusable packaging systems are needed from national and regional governments, as well as, the EU.

This includes a need for public investments in circular infrastructure supporting reuse of other types of packaging than bottles, crates and cans, and it was suggested by contributing actors in the 3R Connect process, that centralized washing stations should be publicly (co) funded. It was also recommended that public funding in the shape of subsidies or tax benefits should be granted to retailers offering reusable packaging on some of their products. Initiatives should also focus on reducing the operation costs as well as developing strategies for ensuring the economic self-sustainability of the system over time.

Customer fees

Another option for funding the running/operation costs is user fees, e.g. through deposit systems where the fee is refunded upon return of the packaging. The contributors to the 3R Connect process also called for implementation of penalties for single-use options. It was also suggested by the actors contributing to this process, that fees could be implemented based on the environmental impact of different types of packaging, pushing producers to select more sustainable options.

Private funds

Additional investments could come from private companies focusing on sustainable solutions and green technologies. This could include venture capital firms, CSR (Corporate Social Responsibility) funds from larger corporations and green investment funds.

Actors and roles

To implement reuse systems for take-away and retail packaging, the following actors should be involved (non-exhaustive):

Packaging manufacturers and producers — **Producer Responsibility Organisations** — **Testsite (e.g. festivals)** — **Vendors/ food operators, restaurants, cafes and fast food chains**

Providers of reverse logistics and solutions for reuse of packaging

Providers of solutions for traceability and databased solutions

Payment systems

Local waste management companies

Universities and Research & Technology Institutions

Clusters and other intermediary organisations

Municipalities, cities or other open loop locations which can function as testbeds

Retailers, distributors and retail associations

Public authorities and governmental agencies

EU

Packaging manufacturers and producers

Design and produce packaging that is standardized, durable, easy to clean and lives up to national guidelines (see national design guides). Innovation is needed to improve user experience while reducing costs. This requires a willingness to test new packaging designs, adapt new processes and collaborate with retailers and solution providers. The producers who are involved in the first tests should therefore be flexible and accept increased risk. Moreover, there is a need to incorporate designated labels on packaging, provide accurate information, and adhere to EPR regulations for transparent consumer communication.

Producer Responsibility Organisations

Ensure that data is shared between actors in the value chain while ensuring the necessary confidentiality.

Testsite (e.g. festivals)

Function as a platform for testing new solutions, adapting them to new settings and sharing data with other sites.

Vendors/ food operators, restaurants, cafes and fast food chains

Commit to testing new solutions and systems for reusable packaging.

Providers of reverse logistics and solutions for reuse of packaging

Provide scalable solutions for reuse of packaging including deposit systems, collection methods, efficient cleaning systems, redistribution etc. When necessary, the solutions should be adapted to the setting through close collaboration with the restaurants, cafes and others.

Providers of solutions for traceability and databased solutions

Provide solutions for tracing, data analysis and sharing as well as visualization of data. This can come from SMEs and other providers of digital and databased solutions along the value chain. It was also suggested to consider collaboration with telecommunication providers, as payment via smartphones has become mainstream.

Payment systems

Ensure smooth return of deposits and financial setup which does not require users to download an app.

Local waste management companies

Ensure recycling and appropriate treatment of the packaging when it can no longer be reused (after several use cycles).

Universities and Research & Technology Institutions

Ensure that data is collected, analyzed and utilized for further adapting and scaling up the solutions.

Clusters and other intermediary organisations

Establish a network of key stakeholders in collaboration with government agencies and including municipalities, industry players (food and beverage industry, packaging manufacturers) waste management companies and consumer groups. Clusters can, for example, organize workshops and meetings to discuss the system's goals, benefits and the roles of each stakeholder. Working groups can be formed for specific areas such as logistics, finance, legislation and public engagement. Clusters can also facilitate matchmaking, co-creation of new solutions and innovation collaborations between private, public and research actors.

Municipalities, cities or other open loop locations which can function as testbeds

Facilitate networks and alliances between regional stakeholders (cafes, restaurants, SMEs and experts on reuse and take back). Municipalities can be a driving force for implementation of new systems through public private partnerships and public tendering.

Retailers, distributors and retail associations

Retailers need to collaborate with producers to test new packaging designs. They also need to work together to set up a deposit system where consumers can return the packaging at all collection stations regardless of where they bought it. Support the integration of tracking solutions and sustainability information in the supply chain. This includes ensuring accurate labeling on products, promoting sustainable packaging practices, and engaging consumers in responsible disposal methods.

Public authorities and governmental agencies

Ensure alignment on food safety legislation and environmental policies. There is also a need to provide public funding and incentives for implementation of reuse and take back systems as well as regulatory support. Public private partnerships are essential in this regard, and the Danish and Swedish return systems for bottles, crates and cans serve as inspirational examples which can be scaled up, replicated or adapted to other product categories and regions.
Governmental agencies can also take a role in managing data on waste.

EU

Align/integrate systems across the EU to ensure that packaging from one country can be returned in another and ensure harmonized labelling schemes.
There is a need for harmonized EU legislation pushing for reusable food packaging while ensuring food safety in reusable food contact materials. Similarly, legislation from different government agencies (e.g. food and environmental agencies) should be aligned.
EU legislation pushing for reuse should be followed up by funding from national and regional funding bodies to drive innovation.

Sign up here to show your commitment to taking action!

Appendix 1: Best practices and inspirational cases

A series of best practices and inspirational cases have been identified from various private, public and research stakeholders in the Danish, Portuguese and Belgian ecosystems. These have been listed to serve as inspiration for future initiatives and collaborations.

The following is a non-exhaustive list of examples which are identified in the three focus regions. Additional promising cases, solutions and actors from these and other regions within and beyond the EU can be found by reaching out to the International Cleantech Network.

Best practices and inspirational projects with a focus on public-private partnerships or public procurement of innovative circular solutions*:

Reuse of packaging on city level:

- Return system in Aarhus Municipality: Test of deposit return system for to-go cups. Aarhus is the first place in the world to introduce a joint return system, and the aim is to expand the system to other types of takeaway packaging. More info at: https://aarhus.dk/nyt/teknik-og-miljoe/2024/januar-2024/banebrydende-forsoeg-nu-kan-aarhusianerne-drikke-kaffe-af-pantkopper

- Innovation Pool: The City of Copenhagen is launching a 2-year innovation fund aimed at supporting innovative solutions within reusable takeaway packaging (not covered by the Bottle Deposit Regulation) in the city. The intention is for Copenhageners to have the opportunity to return, for example, their used coffee cups or food containers, after which the packaging will be washed and reused: https://circular.kk.dk/reduce-reuse/circular-takeaway-packaging

- Change (K)now!: The project aims to promote the use of reusable packaging in takeaway and catering systems while simultaneously creating social acceptance among both companies and users in connection with the transition to the reusable solution: https://circular.kk.dk/reduce-reuse/circular-takeaway-packaging

Circularity in healthcare:

- CircleHealth: Project to map and analyze plastic and textile flows in the healthcare value chain, with the objective of proposing initiatives across the value chains for minimizing the CO_2 emissions from the flow of materials. It includes initiatives such as design of products, adoptions to consumption patterns, using public procurement as a driver for innovation and better utilization of end-of-life products. https://trace.dk/common/circularity-of-plastics-and-textiles-in-the-healthcare-sector-circlehealth/

- Select4Care: Initiative to develop circular approaches for hospitals by enhancing the recycling rates for medical plastic waste with a focus on alleviating the burden for hospital staff, addressing space constraints, reevaluating the logistics and designing for recycling: https://vlaanderen-circulair.be/nl/doeners-in-vlaanderen/detail-2/select4care

- Project to demonstrate the feasibility of reusable healthcare materials through identification of reusable alternatives to single use materials and a focus on disinfection methods: https://www.uzgent.be/reduce-single-use-van-zorgmateriaal-door-duurzame-desinfectie

- Innovation project to ensure circularity of diapers in Odense Municipality in Denmark. More info at: https://www.odenserenovation.dk/om-odense-renovation/nyheder/innovationsprojekt-skal-gentaenke-blesystemet-i-danmark/

Innovative technologies to improve sorting of waste and traceability:

- Sorting plastic and textiles using AI driven sensing solutions: Design of a competitive and efficient system for sorting of mixed and contaminated plastic and textiles in one fraction: https://trace.dk/common/sorting-plastic-and-textiles-using-ai-driven-sensing-solutions/

- Holy Grail 2.0: Initiative to assess whether a pioneering digital technology can enable better sorting and higher-quality recycling rates for packaging in the EU. The objective of the initiative is to prove the viability of digital watermarking technologies for accurate sorting and the business case at large scale: https://www.digitalwatermarks.eu/

Innovative technologies to improve sorting of waste and traceability:

- Test of Artificial Intelligence for waste sorting in Fredericia Municipality: The Danish Municipality of Fredericia is testing an innovative robotic solution to scan and identify different types of plastic to improve the sorting. The test is conducted in collaboration with the company Aris Robotics, and the ambition is to scale up the initiative to include other types of waste: https://fredericiaavisen.dk/robot-hjaelper-med-at-sortere-affald/

- GRESINT: In collaboration with Spanish partners, LIPOR (the municipality association for sustainable waste management of Greater Porto) aims to improve the separation of packaging. This will be tested through three pilots at the Sogama and LIPOR packaging sorting plants, aiming to contribute to the achievement of European recycling goals. https://www.lipor.pt/en/press-releases/the-european-project-gresint-strengthens-ties-between-galicia-and-portugal-in-the-field-of-sustainability/

Other projects with a focus on public procurement of innovation and/or circular solutions

- BRINC: This project aims to unlock the potential of cross-border public procurement of innovation (PPI) by acting as an Innovation Procurement Broker and establishing a European hub for PPI in a circular economy. It develops methodologies and builds capacity for cross-border innovation brokering: https://internationalcleantechnetwork.com/work-with-us/brinc/

- ProCirc: This project aimed to develop knowledge and understanding on how circular procurement contributes to reducing raw material usage, waste, and CO_2 emissions across industries. Throughout the project, more than 30 circular procurement pilot projects were initiated in various sectors: https://northsearegion.eu/procirc/

*NB! Some of these cases are not directly related to public procurement, but focus on the development or testing of solutions, which could be relevant for public buyers within the topics highlighted in Action 1.

Inspirational cases of reusable packaging at festivals, events and other closed loop settings

- Festivals and events in Belgium show drastic waste reduction thanks to reusable cups: Microsoft Word - Persbericht_Voorjaarsfestivals en -evenementen tekenen drastische daling afval op dankzij het gebruik van herbruikbare bekers_27062024 (vlaanderen.be)

- Reusable cups at the Ghent Festivities through collaboration with the City of Ghent: Geen bekerchaos meer op Gentse Feesten: pleinen gaan met één uniforme drankbeker werken | VRT NWS: nieuws

- Roskilde Festival in Denmark har implemented returnable cups. Moreover, the festival hosts a circular laboratory for startups to test circular solutions. More info at: https://faq.roskilde-festival.dk/hc/da/articles/19440623953821-Genbrugsglas; https://www.roskilde-festival.dk/en/the-circular-lab

- Digital return system at Northside Festival in Denmark: https://ctwatch.dk/nyheder/affald/article16289936.ece

Providers of reusable food packaging, return systems, logistics and washing systems*

- Kleen Hub: Providing reusable packaging to restaurants, festivals and events through a "Tap and Reuse" return system which works without apps or deposits: https://kleenhub.com/

- Zeroo's Smart Bulk System and cups - system of large-scale retailing with the aim of replacing single-use packaging with smart reusable packaging with full history, traceability and measurement of environmental impact throughout its life: https://www.zeroo.pt/

- New Loop: Providing a reusable packaging and a return system for food and beverage take away packaging at festivals, events, offices etc.: https://www.thenewloop.com/?language=en

- Cirqle: Technology for intelligent packaging through platform and tags– mainly in the food and beverage industry for home delivery boxes, at venues, but other reuse cases are also possible: https://cirqle.org/

Providers of reusable food packaging, return systems, logistics and washing systems*

- Genkrus: Rental, collection and logistics for reusable cups at events and festivals. https://genkrus.dk/
- Ecoceno: App-based return system for restaurants and takeaway: https://ecoceno.pt/
- The Loop: Circular economy solutions for packaging: https://www.theloop.pt/
- MIVAS: Flexible washing station for cleaning of reusable packaging of various materials, sized and purposes: Project in kijker: MIVAS (vlaanderen.be)
- Graitor: Digital solution contributing to the existing return system for bottles and cans through a reward based system: https://graitor.dk/
- FutuREproof: Packaging as a service to support businesses in their transition to reusable packaging: Project in de kijker: FutuREproof (vlaanderen.be)
- Goodless: Reusable packaging for events through a customized approach, including delivery, washing and hygiene control: Goodless | Good Stuff, Less Waste | Herbruikbare bekers | Food packaging
- Rekwup: Rental of reusable cups for festivals and events including logistics and washing services: Entreprise belge de location et lavage de gobelets | Rekwup
- Festicup: Reusable drinkware for rental, purchase and with option of customization: Home | Festicup

*The examples above relate to packaging types other than bottles and cans for which different types of systems for collection and recycling are implemented in the three regions by the following actors: Dansk Retur System, Sociedade Ponto Verde , Novo Verde, Electrão, SDR Portugal and Fost Plus. These actors could also be central in the implementation of return systems for other types of packaging in retail and for take away.

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