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Joint Action Plan for Circular Economy in Textiles

3R - Connect

Interconnected Innovation Ecosystems – Reduce, Reuse and Rethink

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Index

Index

Setting the Scene for a Circular Economy in TEXTILES

The textile industry has the current challenge to adopt more sustainable and circular practices. Conventional textile production follows a linear economy model that results in considerable waste and pollution. However, the circular economy presents a hopeful alternative, with the potential to transform the textile industry into a more sustainable system. Thus, there is an urgent need for a transformative shift in the textile industry towards a circular economy. This transition is crucial for achieving the social, environmental, and economic goals outlined in the 2030 Agenda for Sustainable Development and in the Paris Agreement. By adopting circular economy principles, it is possible to reduce global greenhouse gas emissions by 45% and unlock a $4.5 trillion economic opportunity. [1]

The continuous exploitation of resources at the current rate, by 2050, will imply the need for resources equivalent to three Earths. The finite nature of these resources and the pressing climate issues demands a shift from a "take-make-dispose" model to a carbon-neutral, environmentally sustainable, toxic-free, and fully circular economy by 2050. [2]

The textile industry employs significant pressure on natural resources, requiring vast amounts of water and land. Producing a single cotton t-shirt, for example, consumes about 2,700 liters of water. Additionally, textile production is a major contributor to water pollution, with dyeing and finishing processes accounting for roughly 20% of global freshwater contamination. Synthetic textiles, like polyester, release microplastic fibers during washing, posing risks to marine life and ecosystems. The fashion industry also contributes to greenhouse gas emissions, responsible for 10% of global carbon emissions—more than international flights and maritime shipping combined. [3]

1 World Resources Institute (2021). Opportunities of a Circular Economy. Retrieved from https://www.wri.org/insights/5-opportunities-circular-economy.

2 Renewable Carbon (2021). How the EU wants to achieve a circular economy by 2050. Retrieved from https://renewable-carbon.eu/news/how-the-eu-wants-to-achieve-a-circular-economy-by-2050/

3 European Parliament (2024). The impact of textile production and waste on the environment. Retrieved from https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics

Managing textile waste remains a critical challenge. Less than half of used clothes are collected for reuse or recycling, and with only 1% recycled into new garments due to technological limitations.[3] In the EU alone, textile purchases in 2020 generated approximately 270 kilograms of CO_2 emissions per person, totalizing 121 million tonnes of greenhouse gases.[4]

There are several challenges that must be addressed in the textile sector. Transitioning to a circular economy will reduce CO_2 emissions, while promoting economic growth and creating job opportunities.

EU Circular Economy Action Plan

Circular economy is an economic framework aimed at eliminating waste and pollution by keeping resources in use for as long as possible, as well as to regenerate nature.

In the context of the textile industry, this involves:

- Design for circularity: Creating textile products that are easy to repair, reuse, and recycle.
- Sustainable production: Utilizing eco-friendly materials and production methods that reduce environmental impacts.
- Responsible consumption: Encouraging consumers to purchase fewer garments, take better care of them, and recycle them at the end of their life cycle.
- Waste management: Developing and establishing effective systems for collecting, sorting, and recycling textile waste.

In March 2020, the European Commission introduced the EU Circular Economy Action Plan, which includes measures covering the entire life cycle of products. This Plan promotes circular economy practices, encourages sustainable consumption, and ensures waste reduction. It specifically targets sectors such as electronics and ICT, batteries and vehicles, packaging and plastics, textiles, construction and buildings, and the food chain. [5]

4 European Environment Agency (2024). Greenhouse gas emissions in the upstream supply chain of EU-27 household consumption domains, million tonnes CO_2 equivalent, 2020. Retrieved from https://www.eea.europa.eu/data-and-maps/figures/greenhouse-gas-emissions-in-the-1

5 European Commission (2020). Energy, Climate Change, Environment. Circular Economy Action Plan. Retrieved from https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

To align with the EU's 2050 climate neutrality goal outlined in the European Green Deal, the European Commission proposed the first set of measures in March 2022 to accelerate the transition to a circular economy.[6] These proposals, as part of the Circular Economy Action Plan, aimed to promote sustainable products, empower consumers for the green transition, review the construction product regulation, and introduce a strategy for sustainable textiles.

EU Strategy for Sustainable and Circular Textiles

In March 2022, the European Commission launched the EU strategy for sustainable and circular textiles. The strategy wants to make sure that by 2030 textile products placed on the EU market are long-lived and recyclable, made as much as possible of recycled fibers and free of hazardous substances.[7]

This strategy emphasizes the reduction of greenhouse gas emissions, water conservation, and waste minimization throughout textile production. It mandates stringent eco-design requirements, including criteria for product longevity, ease of upgrade, repair, refurbishment, and recycling. Additionally, the strategy introduces the Digital Product Passport (DPP), supporting informed purchasing decisions across the supply chain. The strategy also integrates eco-design principles for product durability and recyclability, to enhance the resilience and competitiveness of the textile sector.

Textile Waste Management in Europe

To establish a foundational framework for textile waste management in Europe and to promote an action plan that aligns with the needs of the market and stakeholders, it is essential to consider current management practices in place. The following points highlight key aspects of textile waste management currently in Europe.[8]

6 European Parliament (2021). How the EU wants to achieve a circular economy by 2050. Retrieved from https://www.europarl.europa.eu/topics/en/article/20210128STO96607/how-the-eu-wants-to-achieve-a-circular-economy-by-2050#the-eu-circular-economy-action-plan-1

7 European Commission (2022). Environment Publications. EU Strategy for Sustainable and Circular Textiles. Retrieved from https://environment.ec.europa.eu/publications/textiles-strategy_en

8 European Environment Agency. (2024). Management of used and waste textiles in Europe's circular economy. Retrieved from https://www.eea.europa.eu/publications/management-of-used-and-waste-textiles

- In over half of the EU-27 Member States, a separate collection of textiles is already mandatory, predominantly aiming to capture reusable textiles. The Waste Framework Directive (WFD) mandates that EU Member States establish separate collection systems for used textiles by 2025.
- Out of the almost 7 million tonnes of textile waste produced in Europe, currently the average capture rate for textile waste in Europe is only 12%, with the remaining textiles ending up in mixed municipal waste, often resulting in landfilling or incineration. [9] This low capture rate underscores the need for enhanced separate collection systems.
- Regarding the sources of textile waste, in 2020, a significant 82% of all textile waste produced was originated from used clothing or household textiles, known as post-consumer waste. [8] There is limited information from Member States regarding pre-consumer textile waste, such as unsold textiles at the retail stage and manufacturing waste, considering that a considerable fraction is expected to be destroyed before even being used.
- Without scaling up collection, sorting and recycling capacities in Europe, there is a significant risk that large amounts of collected textile waste will continue to be incinerated, landfilled, or exported outside the EU.
- In general, there is a voluntary reporting gap in how textiles are classified, collected, and prepared for reuse. Therefore, harmonizing definitions and mandating reporting, regarding collection and sorting guidelines, are essential for setting future targets and monitoring the sector's progress towards achieving circularity.
- In 2020, the EU treated 1.41 million tonnes of textiles, but collected 1.95 million tonnes, indicating a gap between collection and treatment capacities. [10]
- Landfilling of textiles has significantly decreased from 21% in 2010 to 11% in 2020, demonstrating progress in waste management practices. During the same period, the amount of textile waste directed towards energy recovery increased from 9% in 2010 to 16% in 2020. [11]

9 European Environment Agency. (2024). Overview of the capture rates for textiles and shoes per country, 2020. Retrieved from https://www.eea.europa.eu/data-and-maps/figures/overview-of-the-capture-rates

10 Eurostat. (2024). Generation of waste by waste category, hazardousness and NACE Rev. 2 activity. Retrieved from https://ec.europa.eu/eurostat/databrowser/view/ENV_WASGEN__custom_7485542/default/table?lang=en

11 European Environment Agency. (2024). Treatment of textile waste in the EU, 2010-2020, in percentages. Retrieved from https://www.eea.europa.eu/data-and-maps/figures/treatment-of-textile-waste-in

- A recent mapping of textile actors in Europe showed that there are 17 textile recycling companies in Europe. These companies aim to recycle between 1.25 and 1.3 million tonnes of fibers annually by 2025, with 1 million tonnes being recycled mechanically and 250,000 tonnes being recycled chemically. [12]

- To enhance the sustainability and circularity of the textile industry in Europe, efforts should prioritize expanding treatment capacities to align collection with processing capabilities. Advancing recycling technologies, both mechanical and chemical, are essential to maximize textile waste diversion from landfills and incineration.

- The European Commission's revision of the Waste Framework Directive in 2023 proposed harmonized Extended Product Responsibility (EPR) regulations for textiles. Key goals include allocating EPR contributions towards waste prevention and reuse; addressing financial gaps created by the export of used textiles to ensure adequate waste management support in receiving countries; implementing the Ultimate Producer Responsibility (UPR), to enhance accountability by stakeholders and product traceability. EPR is also seeking to encourage more sustainable practices like reuse and repair, which offer significant environmental and socio-economic benefits. To make large-scale repair operations commercially viable in Europe, it is essential to provide subsidies and tax reductions for repair and reuse practices.

In summary, while Europe has made strides in reducing textile landfill rates and improving collection systems, significant challenges remain. Increasing the capture rate, enhancing pre-sorting at the source, and expanding sorting and treatment capacities, including preparation for recycling are critical steps toward a more sustainable textile waste management system. The implementation of EPR regulations will also further drive progress toward a circular textile economy.

Taking all the above into account, this Project aimed to assess the challenges, capacities, priorities and opportunities to promote circular transformation in the textile sector in the three focus regions – North of Portugal, Greater Copenhagen and Flanders.

12 Swedish Environmental Research Institute (2023). Sustainable clothing futures - Mapping of textile actors in sorting and recycling of textiles in Europe. Retrieved from https://www.ivl.se/english/ivl/publications/publications/sustainable-clothing-futures---mapping-of-textile-actors-in-sorting-and-recycling-of-textiles-in-europe.html

It should be noted that the opportunities that gained more support from the actors that participated in the workshops, developed under the scope of the Project, were settled into concrete and detailed actions presented in the last chapter of the current document:

1. ESTABLISH STANDARDIZED SORTING PROTOCOLS ACROSS THE INDUSTRY
2. FOSTER COLLABORATION BETWEEN MUNICIPALITIES, INDUSTRIES AND RESEARCH INSTITUTIONS TO INNOVATE SORTING TECHNIQUES
3. INCREASE PUBLIC AWARENESS AND EDUCATION ON THE IMPORTANCE OF TEXTILE RECYCLING
4. PROMOTE CIRCULAR DESIGN PRINCIPLES TO FACILITATE RECYCLABILITY
5. SUPPORT PUBLIC PROCUREMENT OF INNOVATIVE SOLUTIONS FOR CIRCULAR ECONOMY WITHIN TEXTILES

We hope this action plan can be used to convene actors from different regions on joint actions for a more circular approach in the Textile Sector!

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 joining one or several of the actions in the section on "Priority actions for circular transformation in the textile sector."
- Identify relevant collaboration partners or best practices from other regions in Appendix 1.

As a public buyer you can:

- Participate in future projects to improve your capacity for public procurement of innovation and circularity by joining Action 5.
- Get inspired by best practices for public procurement of innovative circular solutions and identify promising technologies in Appendix 1.

As a cluster or similar ecosystem mediator you can:

- Gain an understanding of key challenges and needs for textile sector across different regions in the section on "Cross-regional key challenges and needs."
- View the proposed actions as concepts for future projects to be implemented in collaboration with clusters from other regions. You can also find partners for project development through relevant networks.
- 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 textiles 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 textile sector."

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 textile sector".

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 textile sector" 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 the textile sector, 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 textile sector. 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. Several 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

As a starting point it was necessary to identify the challenges of each region individually and then in a combined manner. Initially, each country held its own regional workshop to understand the specific challenges faced regarding textiles. Following these regional workshops, a cross regional workshop was conducted to identify the most important challenges collectively. The challenges identified and the main conclusions drawn from these discussions led to the proposal of possible actions.

Overall, one of the key challenges highlighted was cost, as circular textile solutions can be more expensive than traditional solutions. Another significant challenge was the lack of infrastructure for the collection, sorting, and recycling of textile waste. Additionally, changing consumer consumption habits proved to be a slow and challenging process, making consumer behavior another critical challenge to address.

Based on the different phases of the textile life cycle, the main challenges and needs were analyzed, leading to the identification of priority actions to be addressed. These include enhancing infrastructure for collection, sorting, and recycling, promoting consumer awareness and behavior change towards sustainable practices, and investing in cost-effective circular textile solutions, new materials and innovative business models. Additionally, fostering collaboration between stakeholders and advancing technological innovations are crucial to overcoming these challenges and ensuring the successful implementation of sustainable practices in the textile sector.

The challenges and actions for the different life cycle stages (and from other relevant topics) are presented in a more detailed way below.

Design / Eco-design

Eco-design is indeed a multifaceted and intricate process that demands creativity, comprehensive material knowledge, and a holistic approach to product life cycle management.

It involves considering the entire journey of a product, from its inception to its eventual end-of-life stage, with a strong emphasis on environmental sustainability and responsibility.

In this context, eco-design foresees the integration of sustainable practices and principles into every stage of the design process. It involves:

- selecting materials that have minimal environmental impacts;
- selecting materials that drive textile longevity, considering color, fastness, seam quality, and others;
- utilizing renewable and recyclable resources;
- minimizing waste generation.

Understanding the life cycle of materials and products is crucial, as it enables designers to make informed decisions that reduce the ecological footprint of products.

Moreover, eco-design entails creating products that are durable, repairable, and adaptable, thus extending their lifespan and reducing the need for frequent replacements. Considering the product's end-of-life from the outset allows designers to develop strategies for easy disassembly, recycling, or upcycling, thereby minimizing the volume of waste and promoting a circular economy approach.

Effective eco-design also requires collaboration with different stakeholders, including suppliers, manufacturers, and consumers, to ensure the implementation of sustainable practices throughout the supply chain.
In the textile sector, the challenge stems from the expectations of the requesting party – brands need to grasp that certain standards remain exceedingly stringent.

Designers also have enormous challenges, as they need to have a multifaceted team working with them to support decisions, to make products more circular. The need for training was highlighted.

Opportunities for Joint Action

A change of mentality in the value chain regarding eco-design is necessary, given that decisions that are made upstream of the value chain impact the work conducted downstream, particularly about the end-of-life of materials.

Therefore, the following activities can be developed:

- Encourage and support the mapping of entire supply chains to facilitate transparency and to enable stakeholders to gain insights into the entire process, which is crucial for implementing eco-design effectively.

- Facilitate cross-value chain collaboration and learning sessions by promoting knowledge-sharing workshops to train designers in making the best choices for designing textile pieces, including the sharing of the current best practices already in place.

- Develop a decision support platform, based on an impact calculator for the product being designed, helping designers to make informed choices for minimizing environmental impacts.

- Develop a list identifying the easiest materials to recycle and their respective applicable recycling technologies, with the goal to promote the use of recycled materials and repairable components in textiles, also considering longevity by selecting durable materials.

- Ensure that the use of recycled materials does not compromise the durability of the product, and connect to real recycling partners to ensure the materials are truly fit for recycling.

- Promote training about the Digital Product Passport, which will be mandatory in the European Union and whose objective is to provide information on the characteristics of products (CIRPASS Project).

- Promote the certification of textile products produced, through the application of standards, such as: Recycled Claim Standard (RCS) and Global Recycled Standard (GRS).

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:

- Minimum required content of recycled fibres in procurement of new textile products;
- Recycling or reuse of textiles from workwear/uniforms;
- Optimized methods for collection of textile waste.

The surveys showed great interest among public buyers to improve their capabilities for procurement of circular and innovative solutions. The incorporation of recycled fibers in new textile products and the recycling or reuse of textiles from workwear/uniforms were the topics that gained more interest.
The participants also showed great interest on the topics of prevention, separation of textiles for reuse and recycling, better pre-sorting, behavioural change in order to extend the life-time of textile products (like workwear/uniforms) and the inclusion of repair services in the contracts.
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.

Extended Producer Responsibility

The establishment of take-back programs, and Extended Producer Responsibility (EPR) policies, can ensure that producers take the responsibility over the end-of-life phase of the products they place on the market.

These policies can promote sustainable materials and eco-friendly production techniques by offering incentives and supporting the producers who adopt environmentally responsible practices. Such support may include financial assistance for research and development of sustainable alternatives and eco-design initiatives.

Implementing EPR policies across international markets requires strong international cooperation and coordination among governments, industry stakeholders, and regulatory bodies. Achieving consensus on EPR standards and regulations at the international level can be challenging, given the diverse regulatory frameworks and varying levels of commitment to sustainability across different regions.

Ensuring that producers comply with the regulations can also be challenging, especially when there are no effective enforcement mechanisms in place. EPR policies can also impose financial burdens on producers, particularly smaller businesses, as they take financial responsibility for managing the collection, sorting and recycling of their products. This may result in increased production costs, potentially impacting the competitiveness of smaller producers in the market.

EPR must contribute to achieving circular economy goals and leveraging sustainable and circular businesses. Incorporating repair systems within the EPR model can foster consumer engagement and empowerment, encouraging individuals to take an active role in maintaining and repairing their textiles.

Also, to incorporate consumer convenience into repair systems is essential for widespread adoption. User-friendly digital platforms that streamline textile repair scheduling can greatly enhance accessibility for consumers.

These advancements might promote new markets and job opportunities in the repair and refurbishment sectors. Overall, this not only contributes to a reduction in textile waste, but also promotes a culture of responsible consumption, sustainable living, and the growth of a more sustainable and resilient textile industry.

By leveraging digital technologies and user-centric interfaces, the textile industry can create a more accessible and convenient repair ecosystem that aligns with the evolving preferences and expectations of modern consumers.

In this way, it is believed that EPR will help to ensure that textile waste is collected separately, so that it does not end up mixed with other waste or in the environment.

Given that this is a topic that requires concerted policies, it was discussed during the workshops that there should be harmonized regulations for the entire EU (including the products coming into the EU market from non-European countries), and monitoring the system put into practice should require common reporting strategies. It was considered relevant that all stakeholders in the value chain must be involved and, that is also important to provide structured training and clear information about EPR systems.

Opportunities for Joint Action

- Gather existing information in a detailed way to compare the existing systems and share the knowledge for the other actors to design the EPR systems for textiles.
- Promote training on the subject so that stakeholders can monitor the volumes they place on the market and also comply with the legislation that is going to be mandatory.
- Study the possibility of the integration of repair systems into EPR models to extend textile lifespan and to reduce waste.
- Provide clear guidance to customers on how to care for and preserve their textile products helping them maintain their products in the best quality for as long as possible. It is crucial to encourage companies to communicate these instructions and recommendations.
- Create a platform where services for textiles repair are available, being easy to schedule these kinds of services, according to the region and types of products to repair.
- Promote repair cafes for textiles so that citizens can learn how to recover and reuse their clothing.

Textile Traceability and Transparency in the Value Chain

A textile traceability system offers several key benefits for sustainability and social responsibility. It promotes transparency within the textile supply chain, allowing consumers to make informed choices about the products they purchase. This transparency enhances trust and accountability between manufacturers, retailers, and consumers. By tracking the entire lifecycle of textiles, from the sourcing of raw materials to manufacturing, distribution and end-of-life stage, a traceability system enables companies to identify areas for the improvement of their sustainability practices. It also ensures that textiles meet specific standards and regulations, guaranteeing the quality and safety of the products. This is essential for maintaining consumer trust and ensuring that the textiles are produced under ethical and environmentally responsible conditions.

By ensuring a traceability system for textiles in compliance with social responsibility standards, it is possible to promote fair wages and safer working conditions, supporting workers well-being and community welfare.

Implementing traceability systems is feasible for high-value products and is driven by legislative requirements and brand motivations. However, the challenge lies in the complex supply chain dynamics, where raw materials are sourced, produced, and transported across different regions.

Opportunities for Joint Action

- Promote innovation, research and development activities to foster collaboration between the different stakeholders, aiming the traceability of textiles.
- Study technologies to improve traceability of textiles, such as blockchain or RFID (Radio Frequency Identification), placing in contact the industries and the technological centres.

- Promote the adoption of standards by the industry for the traceability of textiles.

- Provide training on transparency and legislation regarding greenwashing, highlighting the need for evidence to support green claims. This includes preparing for the Digital Product Passport and ensuring compliance with upcoming regulations.

- Support companies in mapping their supply chain beyond their instant suppliers, offering training on various quality and social certifications, assisting in creating a code of conduct, and promoting its implementation throughout the supply chain.

Textile Collection and Collection Infrastructures

To enable the later valorization and recycling of textile waste, it is crucial to ensure that the collection step is carried out in an integrated and organized manner. This should be done in accordance with common guidelines for collection conditions and infrastructures, aligned with the subsequent needs for sorting and recycling.

Understanding the different destinations of waste, at the level of waste separated for valorization, from economic activities and households, and ending up in mixed waste, is important to grasp what happens in the three regions.

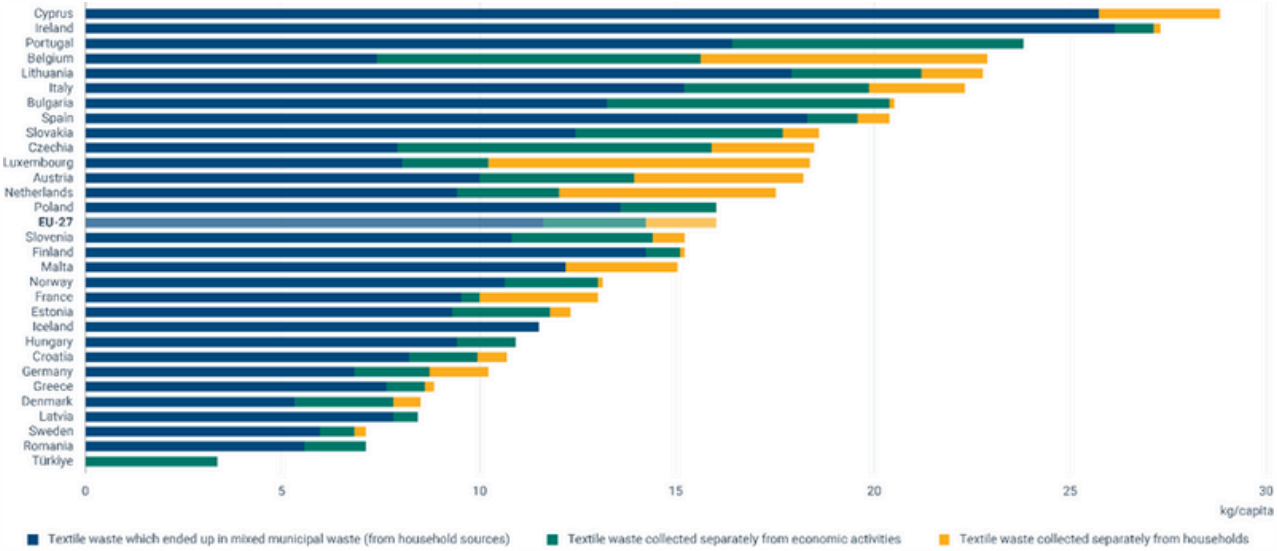


Image 1 - Generation of textile waste in 2020, in kg per capita (Source: ETC CE Report 2024/5)[8]

Based on image above, Portugal, Belgium, and Denmark show different approaches for managing textile waste. In Portugal, most of the textile waste ends up in mixed municipal waste, with a small fraction collected separately from both economic activities and households. Belgium demonstrates a better balance, with a significant portion of textile waste collected separately from households and a considerable amount from economic activities. Denmark, although showing a higher proportion of textile waste collected separately from economic activities, still has a large fraction ending up in mixed municipal waste. Compared to Portugal and Belgium, Denmark has a better performance regarding the production of textiles per capita.

Regarding the collection of textiles, there are some barriers that can be highlighted:

- Differences in legislation between countries and lack of clarity in legislation, particularly regarding the definition of materials that can be reused and textile waste;
- Absence of an EPR system that works correctly towards the circular economy for textiles;
- Lack of data relating to existing volumes of textiles that have potential to be managed.

To ensure convenience and accessibility for consumers, it is crucial to communicate that some containers are suitable for all textiles, whether for reuse or recycling purposes. While placing street containers might pose challenges, engaging with citizens to understand their views on reusability can aid in efficient material sorting. Platforms to sell used clothes have impacted the quality of reusable clothing, thus building trust in the container system is paramount. Separating materials based on their potential for reuse or recycling and addressing the difficulties in sorting are key areas of focus for optimizing collection infrastructures, since the regions have different points of view in these matters.

Differentiating infrastructures based on the type of textile input might not be practical, as a final screening is inevitable. Consumer behavior often leads to a mix of materials in containers, suggesting a business model that collaborates with brands, retailers and distributors could streamline the process. Similar materials end by being deposited in both containers, indicating the need for a unified approach for the collection infrastructure.

The need for having clear legislation and definitions is a key finding and a priority for all the three regions.

Understanding and quantifying material flows is essential in designing efficient collection models. Defining the distinction between textile waste and reusable textiles is also crucial for effective implementation.

Opportunities for Joint Action

- Promote a larger network of containers for the collection of textile waste.
- Promote the collection of textile waste in large areas, such as supermarkets, shopping malls and schools.
- Add relevant information to product labels so consumers know how to properly discard textiles, like what happens with packaging waste instructions. It is essential to raise awareness and educate consumers on managing the end-of-life of their textiles
- Implement gamification platforms to engage consumers, offering incentives and benefits to increase their reuse and recycling efforts.

Textile Sorting

Textiles sorting is an intensive activity, because textiles must be collected, sorted based on materials, colors, quality and possible destinations. The pre-sorting process (where buttons, zippers and other are removed) is done manually today.
Regarding textile sorting, several challenges are presented:

- Effective pre-sorting by residents, distinguishing between reusable and non-reusable textiles, and public education also pose challenges and are crucial to optimize collection systems and enhancing reuse rates;

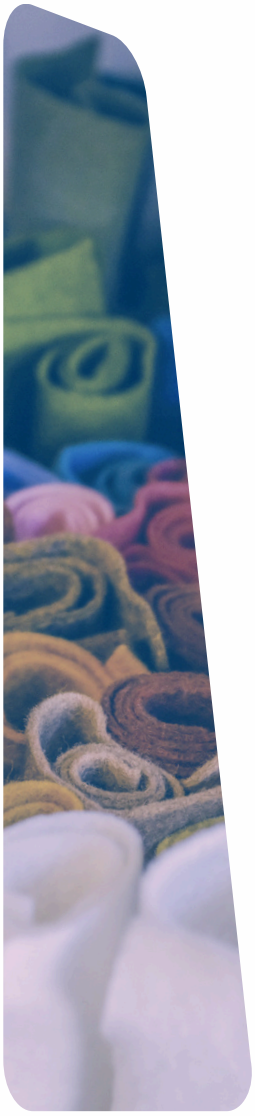
- The sorting process is not cost-effective, since it is labor-intensive;
- Textiles are constituted by several materials and blends, making it difficult to sort for recycling;
- Identifying components like buttons, metallic accessories, and variations in geometry (disruptors) also pose challenges for recycling;
- The multi blend fractions/fibers are difficult to be identified by the different scanning technologies;
- Existing automation technology for color detection has limitations, particularly when influenced by factors like humidity;
- There are difficulties in identifying the finishings and treatments used on textiles, as they are not easily detectable. Therefore, it is necessary for suppliers to provide all information and technical specifications;
- Labels are not always providing accurate information and are often cut by the users. This poses a challenge for obtaining information, like the constitution of the textile items, having the need to implement the Digital Product Passport;
- Despite being easy to identify large volumes of textile waste, it is difficult to find post-consumer waste streams with stable qualities, putting recycling efficiency into question.

It can be highlighted that the collection for sorting, the quality volumes of textiles collected and the investment in more advanced sorting technologies are essential for processes to be more efficient, thus promoting the circular economy in the sector.

Opportunities for Joint Action

- Foster collaboration between companies and research centres to ensure widespread distribution of sorting centres and access to advanced textile identification devices.
- Invest in advancing automation technologies for fiber and color detection, such as for mono-materials used in sports textiles
- Some technologies exist for identification and removal of buttons, zippers and other, but manual pre-sorting remains the dominant way to ensure the next steps for recycling. Initiatives to automate these processes on a large scale should be considered.

- Invest in “preparation for recycling” companies, promoting a finer sorting of the products and materials.
- Improve communication with raw material suppliers to obtain accurate information on material origins, which is also relevant for the digital material passport.
- Increase support and provide resources to small-scale industries to enhance sorting practices.
- Educate and communicate with citizens and small producers, emphasizing the importance of proper waste segregation



Textile-To-Textile Recycling

Today, most textile recycling constitutes in downcycling, where textile waste is mechanically recycled to be used in other applications such as insulation or filling.

Pre-consumer waste can include unsold inventory and excess production. Post-production waste refers to the offcuts and trimmings, as remaining pieces from garment assembly. Lastly, post-consumer waste are the textiles that have been used and discarded, from clothing to household textiles. Although pre-consumer waste, such as overstocks and surplus inventory, present recycling challenges, due to finishes and treatments, post-consumer waste poses even greater challenges.

However, textiles have the potential to be recycled to obtain new fibers. One potential market opportunity lies in the recovery of materials for the same purpose, as a high value recycling, enabling the transformation of components into new products. This circular approach can foster a sustainable market for recycled textiles and encourage a shift towards more environmentally friendly practices, especially for mono-material products.

Nowadays, mechanical recycling is the most used technology and chemical recycling mostly targets synthetic products. Nevertheless, the presence of elastane in most materials presents a significant challenge, necessitating innovative approaches for its removal or treatment.

Thus, it is possible to highlight several challenges for the textile-to-textile recycling:

- Textile products are very different between each other, with several colors, different fibers and compositions;
- Post-consumer recycling poses more challenges than pre-consumer and post-production recycling, due to its possible contamination levels, material diversity and variable quality;
- There is the need to develop more the chemical recycling techniques and scaling up pilot projects.

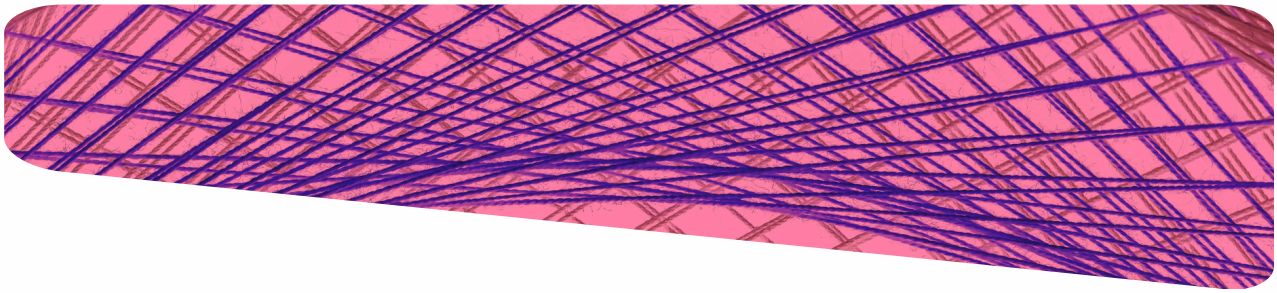
While mechanical recycling processes with post-production textile waste are well-established and effective, the post-consumer processes are still in early stages. Also, there are limitations regarding mechanical recycling ability to recreate products exactly as they were. Despite the limited mechanical recycling capacity in Portugal, with few facilities in place, the focus remains on enhancing customer-centric recycling options and promoting a mono-material approach for improved sustainability.

In addition to this, it is still difficult to understand what the market direction is and the main trend to follow in terms of chemical recycling.

Opportunities for Joint Action

- Expand the infrastructure of mechanical recycling facilities, with a focus on high-value recycling and post-consumer textile waste, to improve capacity and customer-centric recycling options.
- Monitor and adapt to emerging trends in chemical recycling technologies to align with market demands and sustainability goals.
- Develop transparent systems across the value chain to ensure traceability and verify environmental impacts of recycled textile products.

- Advocate for the adoption of standards and certifications (e.g., Recycled Claim Standard, Global Recycled Standard) to promote sustainable practices in recycling of textiles.



Recycling Textiles for Non-Textile Applications

Since most textiles are not suitable for textile-to-textile recycling, the recycling of textiles for other applications is also a necessary part of the circular economy. For example, the automotive sector can benefit from the use of recycled textiles for manufacturing car interiors, seat covers, and insulation materials, promoting sustainability and contributing to the reduction of waste in the automotive industry.

Recycled textile materials can also find applications in the construction sector for producing sustainable insulation materials, carpets, and upholstery, as well as in the home furnishings industry for creating eco-friendly bedding, curtains, and upholstery fabrics. It can also be used by the textile and fiber manufacturing sectors as feedstock for producing new yarns, fabrics, and fibers, fostering a circular economy approach and minimizing the industry's environmental impact.

Implementing specialized processing and treatment techniques can modify the physical and chemical properties of recycled textiles to enhance their suitability for non-textile applications. Incorporating reinforcing agents and additives, such as binders, resins, or fillers, can enhance the structural integrity and durability of recycled textiles, making them more suitable.

Conducting comprehensive testing and quality assurance measures to assess the mechanical, thermal, and acoustic properties of the adapted recycled textiles ensures that they meet the stringent standards and performance criteria of non-textile applications. Rigorous testing protocols can validate the suitability and reliability of recycled textiles for diverse industrial and construction applications.

Opportunities for Joint Action

- Establish technical standards for using recycled textiles in automotive, construction, and furniture sectors, defining quality criteria and performance standards.
- Promote research and development to enhance processing techniques for recycled textiles, improving durability and adaptability for non-textile applications.
- Allocate resources for testing and certification programs to validate the performance of recycled textiles in various applications, ensuring regulatory and environmental compliance.
- Collaborate with stakeholders to encourage the adoption of recycled textiles through marketing strategies, incentives, and educational campaigns, with an important role for the government in driving demand for these recycled raw materials also by implementing incentives, bonuses, or mandating for a minimum percentage of recycled content in textiles.

Priority Actions for Circular Transformation In The Textile Sector

After surveying the priorities of the three regions, as well as the common challenges encountered along each link in the value chain, two workshops were held to determine which topics required special attention and which actions could be developed to respond to them.

Considering the feedback from the participants, it was concluded that topics related to the sorting and recycling of textiles were the most relevant for the actors who participated.

Therefore, a final workshop was held in which existing sorting and recycling solutions were presented and in which the actions that should be carried out to enhance sorting and recycling were prioritized.

The results obtained are below, presenting the actions organized in order of priority, with 1 being the highest priority and 5 being the lowest priority.

Textile Sorting

1. Establish standardized sorting protocols across the industry;
2. Foster collaboration between municipalities, industries and research institutions to develop innovate sorting techniques;
3. Implement automated sorting solutions to reduce reliance on manual labor;
4. Develop advanced technologies for pre-sorting;
5. Implement a combination of manual and automated sorting.

Textile Recycling

1. Increase public awareness and education on the importance of textile recycling;
2. Promote circular design principles to facilitate recyclability;
3. Enhance recycling technologies to handle a wider range of textile materials and blends effectively;
4. Establish pilot projects to test and scale innovative recycling methods in real-world settings;
5. Collaborate with other industries to explore new applications for recycled textiles in various sectors, such as construction and automation.

Thus, regarding textile sorting, the actions that gathered the most support were:

1

Action 1: Establish standardized sorting protocols across the industry

Steps for Implementation

Implementation of this action requires steps to:

Carry out benchmarking to understand which sorting techniques are the most innovative/optimal and how different product categories are sorted in practice;

Develop protocols according to the different existing sorting techniques – manual and automatic, and semi-automatic;

Develop protocols in collaboration with the remaining links in the value chain, including government bodies and certification bodies;

Conduct training actions for all employees involved, highlighting best practices to follow in sorting procedures and effectively transitioning materials from sorting facilities to recycling companies, thus building a strong value chain for specific recycling processes, and to comply with the established sorting protocols;

In order to complete the previous actions, it is necessary for the materials to be pre-sorted by consumers and deposited in the containers indicated for this purpose. Therefore, conditions must also be created for consumers to deposit textiles in appropriate locations, carrying out actions that promote behavioral change.

Actors and roles

Consultancy companies

Carry out benchmarking of existing sorting techniques in the EU and elsewhere, considering various factors, such as the type of materials sorted and their main characteristics; technologies used; reliability of the data obtained, among others.

Collection companies

Involve textile collection companies, to understand which infrastructures are most suitable for the collection of textiles and which enable the obtaining of higher quality materials. This way, it is possible to understand what can be done upstream so that sorting protocols are more easily developed and implemented.

Sorting companies

Understand the technical challenges encountered when sorting materials, namely which material compositions require more attention and what can be done to improve and optimize the textile sorting processes.

Sorting Technology Suppliers

Understand which sorting technologies exist and which ones can be better developed, so that processes are optimized and give rise to standard protocols to be used by the sorting companies.

Certifying bodies

Support the development of standard protocols, considering existing certifications, whose methodology can be adapted for the development of protocols.

Clusters and sectoral associations

Dissemination of standard protocols to its associates, especially companies in the textile value chain.
Establishment of collaborative partnerships between interested parties, through the creation of technical working groups for the development of standard protocols.
Development of matchmaking activities.
Communication with interested parties, namely government entities.

Public and government entities

Ensure alignment between established protocols and existing legislation.
Development of public policies that enhance the use of the developed protocols.
Participation in public-private partnerships.
Support through government financing mechanisms.

Consumer

Interact with the rest of the textile value chain, so that it can be guaranteed that textiles are deposited in the correct locations and arrive at separate sorting centers as intended, thus contributing to the activation of protocols for their subsequent sorting processing.

2 Action 2: Foster collaboration between municipalities, industries and research institutions to innovate sorting techniques

Steps for Implementation

The following action could involve the establishment of a textile observatory, whose main function will be to promote collaboration between the various interested parties, through the sharing of good practices, information and knowledge. This action is already being initiated in Portugal.

The textile observatory can contribute to:

Collect data and quantities of textiles that are placed on the market, collected for sorting, effectively sorted and sent for recycling. Such activity is beneficial so that the best sorting techniques can be studied taking into account the volumes of textiles collected;

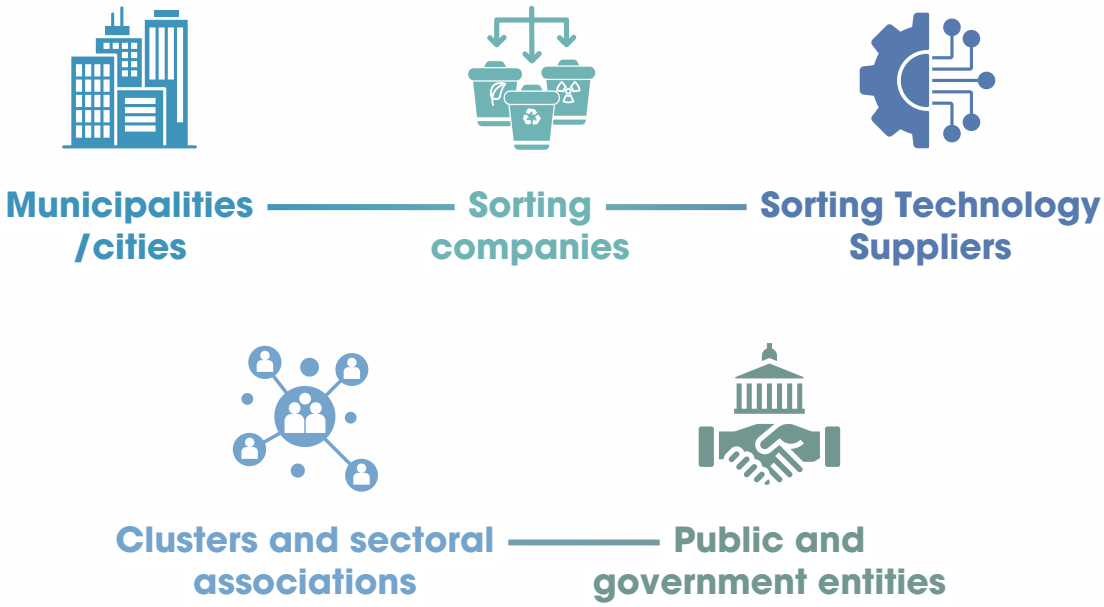
Promote the carrying out of characterizations of textiles collected in the respective sorting centers, so that the best sorting techniques can be applied, taking into account the characteristics of the materials;

Promote the sharing of good practices between the various actors in the value chain, especially sorting centers, research and development centers, universities and technology suppliers;

Conduct matchmaking initiatives, which bring into contact entities that need support to develop innovative solutions and those that can offer these services;

Promote co-creation workshops that culminate in the development of innovative ideas for textile sorting.

Actors and roles



Municipalities/cities

Support in the collection of data regarding the quantities of textiles collected for sorting.
Participate in sessions to share good practices, adapting, if necessary, collection services, to promote better sorting of collected textiles.

Sorting companies

Support the quantification of materials that actually reach the sorting centers and that can be recycled.
Support in identifying of gaps and challenges related to textile sorting and sharing the existing good practices.
Availability to invest in new technologies that can improve process efficiency.

Sorting Technology Suppliers

Make existing knowledge available about the best available sorting technologies.
Availability to participate in matchmaking processes and collaborative workshops that encourage the emergence of innovative ideas for textile sorting.

Clusters and sectoral associations

Creation of networks, including municipalities, industry, research centers & universities and public and government entities.
Development of matchmaking and co-creation programs.
Support in the dissemination of results throughout the textile value chain.

Public and government entities

Support in providing data, particularly relating to the quantification of textiles placed on the market, collected for sorting and effectively recycled.
Ensure alignment between the results obtained and existing public policies.
Development of public policies that promote better sorting of textiles.
Participation in public-private partnerships.
Support through government financing mechanisms.

Regarding textile recycling, the actions that gathered the most support were:

3 Action 3: Increase public awareness and education on the importance of textile recycling

Steps for Implementation

Implementation of this action requires steps to:

Build a broad and concerted communication campaign that highlights the need for better textile management and contributes to an increase in the collection of end-of-life textiles for recycling;

Bring together the actors in the value chain, in a task force, that works on the main message of the communication campaign, the target audiences and the materials to be developed;

Disseminate the communication campaign and the respective materials developed, through different channels, physical and digital, involving public and private entities, so that it reaches a large part of the population;

Carry out a consumer perception study and monitor their behavior throughout the campaign dissemination period and afterwards. Ensure that these actions are supported by incentives from legal bodies to effectively encourage and sustain positive consumer behavior changes.

Actors and roles

Companies in the textile sector value chain

Companies specialized in marketing and communication

Clusters and sectoral associations

Public and government entities

Consulting/studies companies

Companies in the textile sector value chain

Active participation in the construction of the communication campaign, providing specialized human resources (marketing and communication department, awareness and education department).
Support in disseminating the communication campaign, through own means and already established partnerships.
Dissemination of the campaign internally, involving all employees and externally, including suppliers, partners and civil society.

Companies specialized in marketing and communication

Support in the development of communication campaign messages, target audiences, materials to be developed and best campaign dissemination techniques.

Clusters and sectoral associations

Dissemination of the campaign through its networks of associates and partners.
Support in carrying out awareness and education activities.

Public and government entities

Support in the dissemination of the communication campaign.
Support through financing mechanisms for the development and dissemination of the communication campaign.

Consulting/studies companies

Development of a consumer perception study throughout the communication campaign period and beyond. Selection and analysis of relevant behavioral indicators.

4

Action 4: Promote circular design principles to facilitate recyclability

Steps for Implementation

Implementation of this action requires steps to:

Select the best existing design practices that, when applied, facilitate the downstream recycling process, promoting recycling of higher quality and added value;

Build a good practice guide that includes simple rules, capable of promoting better design of textiles, considering the best options in terms of sustainability and circularity;

Based on the best practice guide, build a decision support platform, to facilitate collaboration between all players from the value chain. The platform should support stakeholders in calculating the circularity of each piece, considering the design decisions made, based on a series of previously selected indicators, namely characteristics and compatibility between materials.

Actors and roles

Recyclers

Share all the constraints (logistical, technical, technological, among others) that they encounter during the recycling process, considering the characteristics of the textiles that arrive at their facilities.
Support in defining good practices and sharing existing ones.

Designers

Share insights related to the design of textile pieces, main constraints, challenges and possible opportunities for improvement.
Availability to implement the best ecodesign practices in their prototypes and pieces.
Availability for training and for the usage of the developed platform.

Brands and retail

Availability and openness to support the dissemination of good design practices across their brands and stores.
Availability to train their employees on this topic.

Technology companies

Technological development of the decision support platform.

Consulting/studies companies

Benchmarking of databases to feed the decision support platform.
Support in defining the sustainability and circularity indicators to be used by the platform.

Clusters and sectoral associations

Dissemination of good practices and the decision support platform to its associates and partners.
Encouragement to use the developed guide and platform.

Public and government entities

Support in the dissemination of good practices.
Ensure alignment between the results obtained and existing public policies.
Development of public policies that enhance the ecodesign of textile products.
Participation in public-private partnerships.
Support through government financing mechanisms.

5 Action 5: Support public procurement of innovative solutions for circular economy within textiles

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 for the technology development and the testing of new solutions.
The solutions already in place could benefit through the application of public procurement of circular technologies, materials and techniques.
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

Within the scope of this action there are several steps to consider for implementation:

Minimum Required Content of Recycled Fibers

Emphasizing the importance of mandating a minimum content of recycled fibers in new textile products can significantly boost the demand for recycled textiles, encouraging manufacturers to incorporate more sustainable materials into their products. This was a key point of interest for most respondents, highlighting its importance across multiple regions. However, it is crucial to prioritize product longevity and quality overachieving the highest percentage of recycled content. A focus on durable products with even a modest percentage of recycled fibers may be more beneficial than striving for higher recycled content at the expense of product performance and lifespan. This balanced approach addresses sustainability while ensuring that textiles meet high durability standards.

Optimized Methods for Collection of Textile Waste

Effective collection systems for textile waste are essential for ensuring that materials can be efficiently recycled or reused. Public procurement policies should prioritize the development and implementation of optimized collection methods. This was frequently mentioned, indicating a broad consensus on its relevance.

Recycling or Reuse of Textiles from Workwear/Uniforms

Advocating for the recycling or reuse of textiles, particularly from workwear and uniforms, is crucial. Public procurement strategies should include criteria that facilitate the recycling and reuse of these textiles, reducing waste and promoting a circular economy. Many respondents highlighted this as a significant area of interest. Also, there are good examples already in place that could be shared and replicated.

Capacity Building and Best Practices Sharing

There is a clear need for capacity building among public buyers to improve their capabilities in seeking circular and innovative textile solutions. Sharing best practices and successful projects can support public buyers in implementing circular procurement processes more broadly and effectively. This need was underscored by survey results showing that while many respondents are aware of circular procurement, they lack the know-how to implement it broadly.

Inclusion of Repair Services in Procurement Contracts

Incorporating repair services within procurement contracts can extend the lifespan of textiles, reducing the need for new products and minimizing waste. This approach can be supported by defining criteria that promote the use of repair and refurbishment services. Some respondents also highlighted the importance of behavioral change to extend the lifetime of textiles.

These actions, identified through collaborative discussions and workshops, aim to leverage public procurement as a tool to foster a more sustainable and circular textile industry. By addressing these areas, public procurement can play a pivotal role in reducing textile waste, promoting the use of recycled materials, and supporting innovative circular solutions.

Actors and roles

Clusters and sectoral associations

Government entities

Public Buyers

Support in the adoption of new processes; search for innovative solutions, considering circularity criteria.

Innovative companies

Support in the development of innovative processes and products, as well as sorting and recycling technologies.
Participation in ideation and co-creation processes and workshops.

Public procurement strategists

Support throughout the value chain, particularly for public buyers, considering the legislation in place in each region.

Clusters and sectoral associations

Establish networks to promote good practices and knowledge transfer.
Facilitate collaborative, co-creation and matchmaking workshops between entities.

Government entities

Participate in co-creation processes, to ensure alignment between the results obtained and existing public policies. Development of public policies that promote the inclusion of circularity criteria in companies' decision-making processes.

How can the actions for the textile sector be funded?

- The consortium and the International Cleantech Network will develop proposals to implement these actions through relevant funding schemes. In example, Interreg Europe as well as region-specific Interreg programs can be utilized.
- Joint Interreg projects can for example 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. Additionally, calls within the European Built4People Partnerships will be considered for further development.
- 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.

Sign up here to show your commitment to taking action!

Appendix 1: Examples of Best Practices found in the regions studied

A series of best practices and inspirational cases have been identified from various private, public and research stakeholders in the Portuguese, Danish and Belgian ecosystems throughout the Project.

The following ones were presented in the workshops developed within the Project or actively contributed to the results obtained in this Action Plan. These have been listed to serve as inspiration for future initiatives and collaborations.

⇒ Valérius 360 Project (Portugal)

Established in 2017, Valérius 360 project aims to implement a circular fashion model.

The project implements best practices and processes to guarantee that every reusable jersey fabric that is produced, resulting either from their customers' textile waste or from their own manufacturing facilities may return to their recycling unit and get the chance to gain a new life – currently only as "reborn" jersey fabric, but soon also as cotton paper.

More info at: www.valerius360.pt

⇒ Recutex - Recuperados Têxteis Lda (Portugal)

Bearing in mind the constant upgrading of their infrastructures, technological innovation, flexibility and speed of response, Recutex bets and continually invests in the latest technology to guarantee the quality of their products.

Its production is based on recycled raw materials, which demonstrates the adoption of a culture of environmental concern ever since.

Their recycling process, depending on the purpose of the product, allows them to obtain high quality end products, or intermediate ones, with applications in many industries.

More info at: www.recutex.pt

⇒ TO-BE-GREEN (Portugal)

The TO-BE-GREEN solution allows the recovery of discarded clothing, uniforms and other home textiles, following the waste hierarchy and applying the principles of the Circular Economy.

According to the sorting and evaluation carried out on the materials delivered, the recovery flow is defined, which can be reuse and sharing, upcycling, recycling or, if they are damaged and have no potential for recovery, sending them to landfill.

More info at: www.to-be-green.pt

⇒ TMG Textiles (Portugal)

TMG Textiles is a business unit of TMG Group and presents itself with a strategic vision based on innovation, with respect for people and nature. Their mission is to deliver solutions to heighten the success of their clients, transforming knowledge into value. They provide each costumer with a customized service, from the textile design to the garment manufacturing, using digital tools.

More info at: www.tmg.pt

⇒ New Retex (Denmark)

New Retex is a Danish company that employs two robots to sort textile waste. These robots sort based on material composition and color identification using Near-Infrared (NIR) sensors and cameras, respectively.

Their scaled-up facility, operational since October 2023, operates without robot arms, using conveyors to sort.

More info at: www.newretex.com

⇒ Circular Economy Beyond Waste: Development of multiple-use textiles in healthcare through innovation procurement (Denmark)

Facilitated by the Center for Sustainable Hospitals, the project aims to replace disposable textiles with reusable textiles made from recycled or possibly renewable fibers that can be washed and used again. The goal is consume less resources, produce less waste, promote a better working environment, a better delivery security and better finances.

More info at: https://www.voresbaredygtighed.rm.dk/kom-godt-i-gang/projekter-og-cases/store-projekter/tekstilprojektet/

⇒ Ariadne Innovation – Ellie.Connect (Belgium)

Ellie.Connect is a digital ecosystem platform that aims to create a more sustainable and responsible textiles & fashion industry by promoting environmentally friendly practices, reducing waste and increasing transparency and accountability in the supply chain.

The platform brings together textile suppliers, designers, manufacturers, and all kinds of peers interested in sustainable textiles and fashion, and many resources are shared regularly.

More info at: www.ellieconnect.com

Projects with a focus on public procurement of innovation and/or circular solutions:

⇒ BRINC Project

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.

More info at: www.internationalcleantechnetwork.com/work-with-us/brinc/

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