Interreg Baltic Sea Region

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CIRCULAR ECONOMY
BALTIPLAST

# Best Practices in Innovation and Management of Plastic Materials Across the Baltic Sea Region

## BALTIPLAST: Baltic Approaches to Handling Plastic Pollution under a Circular Economy Context

**Deliverable 1.1**

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## 1. INTRODUCTION

Plastic production and consumption in Europe have increased significantly, leading to the contamination of water resources, and posing risks to both human and environmental health. This increase in plastic waste has the potential to inflict harm on the entire environmental ecosystem in the Baltic Sea Region (BSR). Despite the urgent requirement to decrease plastic usage in urban settings, numerous local authorities might lack the necessary knowledge and resources to implement effective solutions for managing the issues associated with plastic waste. The current rates of plastic recycling and reuse in the BSR are notably low, and there is a need to invest in innovative sorting and recycling methods.

The BALTIPLAST project (funded by the Interreg Baltic Sea Region Programme 2021–2027, with total budget of 4.27 million EUR) is a joint initiative dedicated to tackle plastic pollution in the Baltic Sea Region. The project strategically targets the reduction of plastic pollution, with a specific emphasis on minimizing single-use plastics, improvements in plastic packaging practices, and introducing innovative collection and treatment systems at the municipality level.

Recognizing the crucial role of local governments and municipalities in mitigating the impact of plastic waste, the BALTIPLAST project focuses on empowering these entities to actively contribute to waste reduction efforts. Local governments are instrumental in implementing measures to reduce the volume of plastic waste, particularly in the realms of plastic packaging. Their responsibilities extend to efficient collection and sorting systems for generated plastic waste, paving the way for enhanced recycling and processing capabilities. This collaborative effort is instrumental in advancing the principles of the circular economy throughout the Baltic Sea region.

Under Activity GoA.1.1, the project set out to document and consolidate information pertaining to the diverse solutions currently adopted or planned for implementation by local governments. The objective is to create a repository of effective best practices aimed at promoting the prevention and reduction of plastic waste in the Baltic Sea Region. The mapping of best practices provides a comprehensive and organized way to understand, share, and implement successful approaches to tackle plastic pollution in the Baltic Sea Region. The collected best practices have been thoughtfully categorized into three main groups: strategic, soft, and technical solutions.

**Strategic Solutions:** encompassing overarching policies and guidelines, strategic solutions lay the foundation for effective plastic waste management. This includes the formulation of long-term plans, regulatory frameworks, and collaborations between local governments to foster a unified approach to plastic waste reduction.

**Soft Solutions:** focusing on community engagement and awareness-building, soft solutions emphasize the importance of education and behavioural change. These initiatives aim to enhance a sense of responsibility and environmental consciousness among residents, promoting sustainable practices and reducing the demand for single-use plastics, its collection and recycling.

**Technical Solutions:** addressing the practical aspects of waste management, technical solutions involve the implementation of advanced technologies and infrastructure. This includes implementation of effective separate collection and sorting schemes, the deployment of efficient recycling facilities and innovations in plastic packaging to enhance recyclability.

By systematically organizing these solutions, the BALTIPLAST project not only provides a valuable resource for local governments but also fosters a collaborative environment where best practices can be shared and adapted across the Baltic Sea Region. Through these concerted efforts, the project envisions a significant reduction in plastic waste, paving the way for a more sustainable and resilient future for the region.

## 2. METHODOLOGY

The methodological approach for Go A.1.1 involves a systematic and comprehensive data collection on strategic, soft, and technical solutions employed or planned for use by local governments in the BSR to address plastic pollution. The data was collected through a questionnaire distributed to project partners covering six countries across the Baltic Sea Region: Estonia, Latvia, Lithuania, Germany, Sweden, and Finland.
In total 20 municipalities have been addressed, and 74 best practices were collected (Figure 1).

Figure 1: Analysed countries and municipalities

### 2.1 Data collection

The data collection was categorized into three main groups: strategic, soft and technical solutions.
The 'Strategic level solutions', refer to the legal framework for plastic prevention and reduction at the municipal level. 'Soft measures' encompass non-compulsory, non-infrastructure, low-investment, and low-effort strategies that can be easily implemented to reduce plastic pollution within municipal entities and businesses. These measures are often referred to as 'low-hanging fruits' due to their relative ease of implementation. 'Technical solutions' refer to measures that aim to: 1) Eliminate single-use plastic

(removal at the source). 2) Implement technical solutions for the collection and recycling of plastic packaging. 3) Explore innovative material solutions (e.g., the use and handling of bioplastic packaging, etc).

The case studies were sought to provide insights into successful initiatives and practices that have been implemented in pilot municipalities to address plastic pollution. The focus was on identifying measures that are practical, feasible, and have demonstrated positive outcomes in mitigating the impacts of plastic waste.

The following parameters were considered during data collection: type and title of the measure, spatial extension, stakeholder groups involved (only for soft measures), a brief description of the measure, costs of implementation and maintenance, key lessons learned, and references (Table 1).

The questionnaires used in the study are presented in Annex I.

Table 1: Data collection parameters

| **Type and title of the measure** | **Spatial extension** | **Stakeholder groups only for soft measure** | **Costs of implementation (only for soft and technical measures)** | **Key lessons learnt** | **References** |
|---|---|---|---|---|---|
| Strategic, soft or technical. "Name of the document or measure" | Municipality, National, Regional or International | Scientists, Policy makers, Waste managers, Environmental /Coastal managers, Public or other | For establishment: <1000 EUR, 1000 – 10 000 EUR, >10 000 EUR. For maintenance (per month): <500 EUR, 500 – 1000 EUR, >1000 EUR | (a)Results achieved so far; (b)Successes and positive lessons (what work(s)ed well); (c)Problems and challenges (what didn't work so well) | Links Citations |

**2.2 Analyses of the data**

This analysis involved evaluating the number of respondents and countries surveyed, assessing the number of case studies per country, and categorizing the strategic, soft and technical solutions into different types based on the classification framework outlined in Table 2.

Table 2: Classification of strategic, soft and technical solutions

| **Type of solution** | **Classification** | **Description** |
|---|---|---|
| Strategic | Strategies and action plans | Documents that outline the municipality's vision, goals, and specific actions for preventing and reducing plastic waste |
| | Local rules and regulations | Waste management regulations for cities, along with guidelines on how to organize waste handling at the |

| | | |
|---|---|---|
| | | municipal level |
| | Commitments, guidelines, other | Guidelines and commitments developed by municipality to provide clear instructions for plastic prevention and reduction (e.g. green public procurement guideline of the city that includes criteria for plastic reduction, guidelines for food delivery operators, guidelines for event organisers, guidelines for toxic free preschools etc); |
| Soft | Solutions for plastic waste prevention/reduction | ✓ Awareness Campaigns<br>✓ Educational Campaigns<br>✓ Educational Programs |
| | Solutions for plastic collection/treatment | ✓ Awareness Campaigns<br>✓ Educational Campaigns |
| Technical | Solutions for plastic waste prevention | Technical solutions for waste prevention encompass a set of technologies, systems, and approaches designed to reduce the generation of waste at the source or improve the efficiency of resource use, ultimately minimizing waste production |
| | Solutions for recycling and re-use | Technical solutions for recycling and reuse refer to specific methods, technologies, and processes that are employed to effectively collect, process, recycle, and reuse materials, products, or components, with a focus on sustainability and resource efficiency. |

Furthermore, the costs of implementation and maintenance were evaluated to determine the relative affordability of different measures. By collecting these best practices, the study aimed to understand the challenges faced during implementation, identify potential areas for improvement, and facilitate knowledge transfer between municipalities.

The SWOT analyses were conducted to evaluate the strengths, opportunities, weaknesses, and threats of the proposed solutions (Table 3).

Table 3: The SWOT analysis parameters

| | |
|---|---|
| **Strengths:** These are the internal positive attributes and characteristics that give an initiative an advantage. Strengths can include resources, capabilities, expertise, and any factors that contribute to a competitive advantage. | **Opportunities:** Opportunities are external factors or circumstances that an initiative can leverage to its advantage. These are positive trends or developments that can be harnessed for growth or improvement. |
| **Weaknesses**: Weaknesses represent internal aspects that are detrimental or could be improved. Identifying weaknesses helps address areas that require enhancement or development to become more effective. | **Threats**: Threats are external factors that can potentially harm or hinder an initiative. They are challenges or risks that need to be identified and addressed to mitigate potential negative impacts. |

The collected data was analysed to identify trends, effective strategies, and challenges associated with implementing these measures. The findings from this study will contribute to the understanding of

successful approaches in mitigating plastic pollution and provide recommendations for future interventions in the Baltic Sea region and beyond.

## 3. STRATEGIC SOLUTIONS

Strategic level solutions for plastic prevention and reduction, as well as its recycling, at the municipal level encompass a comprehensive set of measures, including legal frameworks, action plans, guidelines, and certifications to address the challenge of plastic waste. A total of 25 examples from various municipalities for strategic solutions were collected (Table 4).
Collected data has been grouped into:

- **Strategies and action plans** that contribute to plastic waste prevention and reduction (e.g. Action plan for sustainable use of plastics in Västerås 2022-2025, Helsinki littering prevention measures, Tallinn waste plan – marine litter reduction);
- **Local rules and regulations**;
- **Guidelines** developed by municipality to provide clear instructions for plastic prevention and reduction (e.g. green public procurement guideline of the city that includes criteria for plastic reduction, guidelines for food delivery operators, guidelines for event organisers, guidelines for toxic free preschools etc.);

Table 4: Summary of strategic level solutions for plastic prevention, reduction, and recycling, collected from partner countries.

| Country (municipality) | Strategies and action plans | Local rules and regulations | Guidelines, commitments |
|---|---|---|---|
| **Germany** (Kiel, Fehmarn, Tübingen) | 1 | | 2 |
| **Sweden** (Uppsala, Västerås | 1 | | 1 |
| **Finland** (Helsinki, Espoo, Pori, Turku) | 4 | | 3 |
| **Estonia** (Tallinn) | 1 | 2 | 1 |
| **Latvia** (Valmiera, Daugavpils) | | 2 | |
| **Lithuania** (Kaunas, Utena) | 2 | 5 | |
| **TOTAL** | **9** | **9** | **7** |

### 3.1 Strategies and action plans

These are overarching documents that outline the municipality's vision, goals, and specific actions for preventing and reducing plastic waste. There are examples of strategies and action plans collected from Sweden (Västerås), Germany (Kiel), Finland (Helsinki, Pori), Estonia (Tallinn).

- In February 2023, the city of Västerås in Sweden adopted the Action Plan for Sustainable Use of Plastics in Västerås 2022-2025. The goal of this document is to ensure that no plastics containing harmful substances or unnecessary plastic materials are present in the city's operations. Additionally, it aims to create conditions for sustainable plastic use within the municipality of Västerås. The primary target group for this plan is municipal administrators and city employees.

*Additional information:*
https://www.vasteras.se/download/18.a216001869c95671a1f71d/1678104113511/Handlingsplan%20f%C3%B6r%20en%20h%C3%A5llbar%20plastanv%C3%A4ndning%202022-2025.pdf [in Swedish].

- In Germany, the city of Kiel became certified as Zero Waste City in February 2023. To achieve the status of a 'Zero Waste Certified City,' Kiel developed a Zero Waste Concept. This comprehensive plan incorporates more than 100 waste reduction measures specific to Kiel. These measures encompass various areas, including waste system transformation, private households, educational institutions, public administration, as well as commerce, trade, and events. As a result, Kiel aims to achieve an average reduction of 15 percent of the total amount of waste per capita per year by 2035 and to halve residual waste by 2035.
  *Additional information:*
  https://www.kiel.de/de/umwelt_verkehr/zerowaste/schwerpunkte/oeffentliche_verwaltung.php [in German].

- The city of Helsinki, Finland, has adopted several actions plans towards prevention and reduction of plastic waste:
  The Baltic Sea Action Plan was initiated in 2008. The first Action Plan covered the years 2008-2013, the second covered 2014-2018, and the third spanned from 2019 to 2023. A fourth Action Plan is currently under development. The Baltic Sea Action Plan has been created through collaboration between the Cities of Helsinki and Turku, along with NGOs and stakeholders, for the 2019-2023 period. The primary focus of the Action Plan is to protect the Baltic Sea. The target groups include various sectors within the Cities and their public utilities, as well as the Baltic Sea Challenge network. The Cities also encourage others to develop their own Baltic Sea Action Plans to contribute to the preservation of the sea.
  *Additional information:* http://www.itamerihaaste.net/en
  http://www.itamerihaaste.net/files/2087/Baltic_Sea_Action_Plan_Helsinki_Turku_2019-2023_ENG_210x210_FINAL_290119_WEB.pdf [in English].

✓ In 2020, the city of Helsinki adopted the Roadmap for Circular and Sharing Economy. The City of Helsinki's Roadmap for Circular and Sharing Economy is one of the 147 actions outlined in the Carbon-neutral Helsinki 2035 Action Plan. The Roadmap encompasses 31 measures that are associated with four main focus areas. One of the topics addressed in the roadmap is the reduction of plastic consumption and the increased utilization of recycled plastics.
*Additional information:* https://www.hel.fi/static/kanslia/Julkaisut/the-city-of-helsinkis-roadmap-for-circular-and-sharing-economy.pdf [in English].

✓ To tackle the issue of littering, the Environmental Services of Helsinki's Urban Environment Division initiated a Litter Management Action Plan. This plan brings together various stakeholders and operators within the City of Helsinki to collaboratively address littering from 2022 to 2025. The objective of the Litter Management Action Plan is to gather innovative ideas for practical measures to reduce litter, address the escalating problem of litter and its adverse impacts on the environment and health, increase awareness and understanding of litter-related issues, and provide guidance for efforts to minimize litter. Some of the measures are designed to assess the litter situation and the necessity for action, enabling more effective updates to future programs addressing litter.

*Additional information:*
https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-27-21.pdf [in Finnish].

- City of Pori, Finland, has an ongoing process about Circular economy roadmap, that will have multiple actions to promote circular economy and sustainable development and on preventing and reducing plastic waste. One of the measures on the road map is to establish an interdisciplinary group on reducing plastic waste and litter, and as an action for the group to produce an action plan to reduce plastic waste and litter. The document was adopted by the end of summer 2023. The interdisciplinary group and the action plan to reduce waste and litter by the end of 2024. The road map will have up to 100 actions in three different categories: Sustainable Know-How, Sustainable Life and Sustainable Green Growth. Each category will have actions on reducing and recycling waste. The interdisciplinary group of office holders to reduce waste and litter in the area of the City of Pori will have as actions e.g.: marine litter monitoring, organising voluntary work cleaning events, setting goals for reducing harm on e.g. snow clearing facilities, storm drain and urban water runoff facilities, setting and regularly emptying public garbage cans, general cleaning of the environment, awareness raising on public audience and on businesses, and intervening on illegal garbage dropping.
  *Additional information:* https://www.pori.fi/tiekartta [in Finnish].

- In May 2022, Tallinn adopted its Waste Management Plan for 2022-2026, which focuses on promoting waste prevention, increasing separate collection and recycling of waste, and enhancing overall waste management. The plan also places a significant emphasis on supervision, supporting the implementation of circular economy principles, and raising awareness among citizens. Various action plans were adopted within this framework, with one specifically targeting the prevention and reduction of marine litter. The primary target groups for the Waste Management Plan and its associated action plans include public sector organizations, businesses, and local residents. The action plan comprises five objectives, with one specifically addressing plastics: limiting the use of single-use products. The expected results by 2026 is a reduction in the usage of disposable products, especially plastics, resulting in a decrease in the overall amount of waste generated from these products.
  *Additional information:* https://www.tallinn.ee/et/keskkond/tallinna-mereprugi-tegevuskava [in Estonian].

- In Lithuania, city of Kaunas and Utena adopted waste prevention and management plans:

✓ On the 12 of September 2023 Kaunas municipality adopted Kaunas City Municipality Waste Prevention and Management Plan for 2021-2027. The Plan consists of the following main parts: an overview of the current state of waste prevention and management; a strategy for waste prevention and management; a Waste Prevention and Management Action Plan, including measures to prevent the use of single-use plastics.
*Additional information:* https://www.kaunas.lt/wp-content/uploads/sites/13/2023/10/KAUNO-MIESTO-SAVIVALDYBES-ATLIEKU-PREVENCIJOS-IR-TVARKYMO-2021-2027-M.-PLANAS.pdf [in Lithuanian].

- ✓ On the 28 of September 2023, Utena District municipality adopted Utena District Municipality Waste Prevention and Management Plan for 2021-2027.
  *Additional information*: https://uratc.lt/wp-content/uploads/2023/10/Patvirtintas-planas-Utenos.pdf [in Lithuanian].

**3.2 Rules and regulations**

Waste management regulations for cities, along with guidelines on how to organize waste handling at the municipal level, have been widely adopted across partner countries in the Baltic Sea Region. Some cities have implemented these rules to organize environmentally friendly events, including the prohibition of single-use plastics. Examples of such cities include Tallinn, Estonia, and Utena, Lithuania.

- In 2019, Tallinn implemented a ban on the use of single-use plastic dishes, cups, and cutlery in its public events, allowing only compostable dishes. In spring 2023, the Tallinn City Council (Estonia) introduced new regulations concerning public events and the use of single-use dishes. These regulations were adopted in two parts: the waste management regulations at: https://www.riigiteataja.ee/akt/410062014054?leiaKehtiv [in Estonian] and the regulations for organizing public events in Tallinn at: https://www.riigiteataja.ee/akt/410062014016?leiaKehtiv [in Estonian].
  Commencing from June 1, 2023, all public events in Tallinn, accommodating up to 30,000 visitors per day until December 31, 2023, and subsequently all public events, irrespective of visitor numbers, are mandated to exclusively serve food and drinks in reusable containers and use reusable cutlery. Disposable straws and cocktail garnishes that are not made of plastic (including bio-based plastic), oxidatively degradable plastic, or biodegradable plastic are permissible. This regulation aligns with the Waste Management Plan's objectives, emphasizing the reduction of waste generation, the promotion of reuse, and the encouragement of separate waste collection.

- In Lithuania, the cities of Kaunas and Utena have adopted waste management plans and regulations. The waste management plans primarily focus on waste prevention, recycling, and awareness raising. The regulations govern the procedures for the collection, transportation, sorting, disposal, storage, and accounting of municipal waste.
  Utena district introduced rules for organizing events in public places within the Utena district municipality in June 2021. These rules outline the process for organizing both commercial and non-commercial events in public areas within the municipality. In an effort to reduce environmental pollution caused by single-use plastics, the Utena district municipal council has prohibited the use of single-use plastic containers for serving food and beverages, including bowls, plates, straws, drink containers, cutlery, and more, during public events.
  *Additional information:*
  - ✓ For Kaunas: https://www.kaunoratc.lt/wp-content/uploads/2023/01/Kauno-regiono-ATP-SPAV-apimties-nustatymo-dokumentas_2023_01_10.pdf [in Lithuanian].
  - ✓ For Utena: https://www.e-tar.lt/portal/lt/legalAct/SAV.518904/asr https://www.e-tar.lt/portal/lt/legalAct/3955a9e0d8f311eb9f09e7df20500045 [in Lithuanian].

- In Latvia, the city of Valmiera has adopted a binding regulation No. 51, titled "Valmieras novada pašvaldības domes 26.05.2022. saistošie noteikumi Nr. 51", concerning household waste management in the Valmiera region. The purpose of this binding regulation is to ensure the

proper organization of waste management in the municipality, with a focus on the residents' interests. It aims to reduce waste generation at its source and promote the management of household waste, its reuse, processing, and regeneration through various means.
In Daugavpils city, binding rules for waste management were adopted in 2014. Additional regulations were adopted in 2018 for the "Inter-municipal Waste Management Organization of Southern Latgale." These regulations are designed to help the organization's clients understand how, where, and when waste will be collected, as well as details about associated fees, among other things.
*Additional information*:

- ✓ For Valmiera: https://likumi.lv/ta/id/334618-par-sadzives-atkritumu-apsaimniekosanu-valmieras-novada [in Latvian].
- ✓ For Daugavpils: https://likumi.lv/ta/id/265991-atkritumu-apsaimniekosanas-noteikumi-daugavpils-pilsetas-pasvaldiba [in Latvian].
  http://www.aadso.lv/30052018082314.pdf [in Latvian].

**3.3 Guidelines, commitments, other**

Different efforts have been made by partner countries across the Baltic Sea Region to promote waste prevention and reduce waste generation, including efforts to address plastic waste. These efforts involve the implementation of strategic level solutions, such as commitments and procurement research, as seen in Espoo, Finland. They also include the development of guidelines in cities like Fehmarn and Tübingen, Germany. Additionally, local networks and agreements have been established in Uppsala, Sweden.

- In late 2020, the city of Espoo, Finland, signed the Circular Cities Declaration. The primary objectives of this declaration include integrating circularity principles into urban planning, infrastructure, and asset management procedures, utilizing public procurement to stimulate the market for circular products and services, implementing economic incentives, and exploring opportunities to use fiscal measures aimed at encouraging circular economic and social behavior. It also aims to foster a local regulatory framework that supports and encourages secondary raw material markets, repair, reuse, and sharing schemes.
  Furthermore, as part of the Closed Plastic Circle project, research on procurement has been conducted. This research investigated which procurements by large cities in Finland significantly contribute to the circular economy of plastic materials.
  *Additional information:* https://www.espoo.fi/en/news/2023/03/circular-economy-2022 [in English];
  https://www.espoo.fi/en/kestava-kehitys/closed-plastic-circle-pilots-practice [in English].

- ✓ Another project has been implemented in the city of Turku: the 'More Sustainable and Chemical-Safe Procurement for Daycare Centers and Schools – VARKE project.' This project investigates products and materials used in the construction of schools and daycare centres. The decisions made during the procurement process can influence chemical safety in the early childhood education environment.
  The aim of the project is to promote the development of public procurement towards greater sustainability and chemical safety. The project also aligns with the implementation of the Green Deal agreement on early childhood education procurement.

- In February 2023, the city of Fehmarn, Germany, adopted a statement outlining measures to combat unnecessary single-use waste. The city's strategy for addressing plastics includes: Promoting the use of reusable to-go packaging in the catering industry through financial grants and support campaigns. Imposing a local excise tax on disposable packaging. Prohibiting the purchase of disposable packaging in public procurement. Mandating that public events use reusable packaging. Enforcing mandatory deposits on single-use plastic bottles and beverage cans. In 2023, the city continues its efforts by developing a "waste avoidance concept," introducing plastic-free vacation rentals, launching campaigns against microplastics in cosmetics, and prohibiting the use of disposable tableware at public events on city property.
  *Additional information:* https://www.fehmarn.de/en/sunny-island/fehmarn/about-fehmarn [in English].

- The city of Tübingen in Germany has implemented a Waste Avoidance Concept, focusing on solutions for problematic waste components. The city supports restaurants that transition from disposable to reusable packaging by providing financial subsidies of up to 75 percent for the purchase of reusable tableware and commercial dishwashers. They are also imposing taxes on the distribution of non-reusable packaging for takeaway meals and beverages, with the goal of reducing the city's annual expenditure by 700,000 EUR on plastic waste removal. Through these measures, the city takes a significant step toward achieving Zero Waste status.
  *Additional information:* https://www.tuebingen.de/en/ [in English].

- In 2010 in Swedish city Uppsala, “The Uppsala Climate protocol” was adopted. Members of the Climate Protocol have initiated several projects, among them Climate-efficient plastic procurement. Participating organisations worked together to minimise use of plastics, to increase recycling of plastic packaging etc.
  *Additional information:* https://klimatprotokollet.uppsala.se/om-klimatprotokollet/in-english/[in English].

- Sparked by the designation of Tallinn as the European Green Capital in 2023, the Mayor of Tallinn signed a decree in April 2023 establishing Guidelines for Organizing Sustainable Events. These guidelines encompass recommendations for event planners across various categories, including Materials and Purchases, Catering and Water Use, Waste Management, Transport, Energy and Resource Efficiency, and Communication and Impact on the Venue. This guide is mandatory for all city authorities and their partners when organizing conferences, seminars, receptions, charity or entertainment events, competitions, performances, trade events, or any similar gatherings of people hosted by city institutions. Furthermore, all other event organizers are strongly encouraged to follow similar guidance.
  *Additional information:* https://greentallinn.eu/innovation/keskkonnasobralike-urituste-juhend/ [in Estonian].

**Conclusions and SWOT analyses**

All BSR partner countries participated in research and shared examples of implemented measures through regulations, action plans, strategies, commitments, and guidelines to prevent and reuse waste, including plastic waste.

The Baltic States (Estonia, Latvia, Lithuania) have regulations in place, such as national waste management plans and waste management rules implemented by municipalities, to promote the prevention, reuse, and recycling of various types of waste, including plastic.
Northern countries (Germany, Sweden, Finland) have adopted more advanced action plans for plastic reduction, as seen in cities like Västerås and Helsinki.

Table 5: SWOT analysis of the strategic measures:

| | |
|---|---|
| **Strengths** *(What are the strong points of described initiatives? What is working well?):*<br><br>• These regulations and action plans are designed to address the significant environmental impact of plastic pollution, particularly in coastal areas and marine ecosystems within the Baltic Sea Region.<br>• Baltic Sea Region countries frequently collaborate on these plans, recognizing that plastic pollution is a transboundary issue. Joint efforts increase the effectiveness of the solutions.<br>• Many of these plans emphasize the importance of public awareness and education campaigns, which can lead to behavior change and greater acceptance of new regulations.<br>• They promote resource efficiency, encouraging the use of recycled materials and supporting the circular economy, which minimizes waste and conserves resources. | **Opportunities** *(What external opportunities are available for these initiatives to grow or improve?):*<br><br>• These regulations can drive innovation in green technology, encouraging the development of eco-friendly products, recycling methods, and sustainable alternatives to plastic.<br>• The growing awareness of environmental issues can lead to greater public support and engagement in plastic reduction efforts, strengthening the impact of these regulations.<br>• Implementing circular economy practices and sustainable solutions can create new economic opportunities and jobs within the region**.** |
| **Weaknesses** *(What are the weaknesses or areas where initiatives fall short?):*<br><br>• Implementing new regulations and changing behaviors can face resistance from businesses and consumers, which may hinder the smooth adoption of these measures.<br>• Ensuring compliance with these regulations can be challenging and resource-intensive, especially in cases of cross-border regulations.<br>• The economic impact of these regulations may affect businesses, potentially leading to increased costs and potential economic challenges. | **Threats:** *(What external threats or challenges could impact the success of these initiatives?):*<br><br>• The impact of these regulations on global markets, trade, and international relations could lead to unintended consequences and potential trade disputes.<br>• The economic costs associated with implementing and enforcing these regulations may be perceived as burdensome by some sectors, potentially causing economic challenges.<br>• The effectiveness of these regulations can be limited if neighbouring regions or countries do not implement similar measures, leading to potential leakage of plastic pollution across borders**.**<br>• In certain municipalities (i.e. in Helsinki) there might be an overflow of different action plans already in place. This leads to resistance towards new action plans and fatigue in terms of implementing all the different measures. |

Overall, while there are challenges and potential economic impacts, the proposed legal regulations and action plans in the Baltic Sea Region have substantial strengths, including a comprehensive approach, cross-border collaboration, and the potential for innovation and economic benefits. These strengths position the region well to address plastic waste and promote sustainability.
In the strategic framework, some elements, especially in addressing sustainability and pollution prevention may require a combination of both action plans and regulations. For instance, regulations might be necessary to set a baseline, while action plans provide a flexible framework for ongoing improvement. Action plans can be updated and revised to accommodate new information, technologies, or changing priorities. Regulations, being more formal and legally binding, may require a more extensive process to make amendments. Action plans are generally perceived as easier to implement because they often rely on collaboration, stakeholder engagement, and voluntary commitments. Regulations, especially stringent ones, may face resistance and might be more challenging to implement, requiring robust enforcement mechanisms. Action plans may demand extensive collaboration, communication, and outreach efforts, while the implementation of regulations might require resources for monitoring, enforcement, and potential legal proceedings.
The choice between action plans and regulations depends on the specific circumstances, the nature of the issue, and the desired outcomes. Often, a combination of both approaches may be the most effective strategy, leveraging the strengths of each to achieve comprehensive and sustainable results.

## 4. SOFT SOLUTIONS

The described soft solutions/measures involve:

1. Preventing and reducing single-use plastic.
2. Improving the collection and treatment system for plastic waste, particularly plastic packaging.

Soft solutions are defined here as non-compulsory, non-infrastructure, low-investment, and low-effort measures that can be implemented easily and refer to social and behavioral change.
These measures are aimed at addressing single-use plastic reduction and prevention, as well as improving plastic waste collection and treatment within municipal entities such as schools, kindergartens, and other public administration entities at the local level, but also within households and general public.

Most of the soft measures provided by partners included awareness and educational campaigns, as well as educational programs for different stakeholders. While these concepts are related, they serve somewhat different purposes.

**Awareness Campaigns** were primarily intended to inform or draw attention to specific plastic-related issues. These campaigns used various media and communication channels to convey simple message or idea, often aimed at reaching a broad audience without providing in-depth information.
**Educational Campaigns** were designed to offer more comprehensive information and understanding about plastic issues. Their goal was to provide a deeper understanding of the problem, often equipping the audience with knowledge and tools to address it effectively. These campaigns used a variety of materials, workshops, seminars, and resources to deliver detailed information and empower people to take informed actions in a relatively short time frame.
**Educational Programs** were even more systematic and comprehensive, involving structured courses, classes or training sessions. These programs were typically ongoing or long-term, with a curriculum or syllabus outlining what participants learnt over an extended period.

Table 6: Number of examples on soft solutions for single-use plastic prevention and for plastic waste collection and treatment implemented in pilot municipalities.

| Country (municipality) | Measures for: prevention/reduction | collection/treatment |
|---|---|---|
| **Germany** (Bonn) | 1 | |
| **Sweden** (Västerås, Stockholm) | 4 | 3 |
| **Finland** (Espoo, Pori, Helsinki, Turku) | 3 | 3 |
| **Estonia** (Tallinn) | 4 | |
| **Latvia** (Valmiera, Daugavpils) | 3 | |
| **Lithuania** (Kaunas, Utena) | 2 | |
| **General solutions** (applicable across multiple municipalities and countries) | 1 | 3 |
| **TOTAL** | **18** | **9** |

A total of 27 examples from various municipalities, along with more general solutions implemented across countries to prevent single-use plastic and improve plastic waste collection and treatment, were presented (Table 6). The majority of these examples relate to prevention and reduction measures. 23 examples were presented from different municipalities, and 4 initiatives (Let's Do It, Baltic Sea Day, Nordic Coastal Cleanup, and the Eco-Schools program) had a broader approach.

### 4.1 Soft solutions for plastic prevention/reduction

#### *4.1.1 Awareness campaigns for general public*

- In Helsinki, Finland, awareness campaign "Bites made of plastic" used colorful stickers on city manhole covers to combat littering by raising awareness about waste sources. It targeted misconceptions about waste disposal and littering, particularly cigarette butt disposal in rainwater wells, where stormwater flows directly into watercourses without treatment. Employing a positive influence approach and the "nudging" technique, the campaign made stormwater wells, trash bins, and ashtrays more visible with playful colors, stickers, and signs. Fish-themed imagery on well covers illustrated waste's journey into the sea. Information at waste disposal points addressed littering issues and provided practical tips. This adaptable campaign caters to urban and public settings, reaching diverse audiences, including those less informed about marine litter. It is also suitable for tackling littering concerns in lake areas.
  *Additional information:* https://pidasaaristosiistina.fi/tyomme-vesilla-ja-maissa/ymparistoprojektit/mahanpuruja-muovista/ [in Finnish].

- A similar campaign called "The Sea Starts Here" has been implemented in Tallinn, Estonia. It addresses the issues of cigarette butts affecting water and soil. In the summer of 2020, more than 1,000 rainwater drainage holes were marked in the fifteen largest cities and ports in Estonia to inform citizens about the dangers of cigarette butts entering the Baltic Sea.
  *Additional information:* https://www.merialgabsiit.ee/en/ [in English].

- During the Valmiera city festival in Latvia, an integrated environmental awareness campaign took place. Tips for celebrating in an eco-friendly manner were communicated through video and

various written channels, including the municipal website, social media, local media, and leaflets. Regarding plastic management, the following recommendations were provided: reduce plastic waste by using your own items, return containers, avoid single-use plastics, and segregate waste on-site (PET bottles in yellow-lid bins, glass bottles in black-lid bins, and disposable items in green-lid bins). Additionally, a plea was made to refrain from releasing helium balloons due to environmental and animal welfare concerns.
*Additional information:* https://www.valmieraszinas.lv/videi-draudzigi-padomi-valmieras-pilsetas-svetku-apmekletajiem/ [in Latvian].

- In Tallinn, Estonia, several awareness campaigns have been conducted to highlight the consistently high quality of tap water. Consumers are encouraged to prefer tap water as a beverage both at home and when dining out. In 2021, an opportunity for young people to participate in the advertising competition 'The Conviction' was created. During this competition, students from grades 6 to 12 designed advertisements to persuade their parents, friends, and other students that drinking tap water can contribute to the environment, their health, and their wallets. Throughout the competition, advertising campaigns were developed to encourage choosing tap water over bottled water, aiming to reduce the environmental footprint of water production and the amount of plastic and waste. The top four advertisements created during the competition were printed as outdoor advertising posters by Tallinna Vesi and displayed on the company's social media accounts.
  "We Serve Tap Water" is another example of a campaign in cafes and restaurants in Tallinn. It encouraged eateries in the capital to provide tap water as a beverage option and, as a recognition, add a sticker to their door.
  *Additional information:* https://tallinnavesi.ee/sotsiaalne-vastutus/kampaaniad/ [in Estonian].

- Another example from Valmiera Municipality, Latvia, is a public awareness campaign called "Drink Ours!" initiated and conducted by the public water management company. The campaign encouraged the general public to drink tap water instead of bottled water.
  *Additional information:* https://www.valmieraszinas.lv/valmieras-udens-uzsak-akciju-dzer-musejo/ [in Latvian].

- A similar campaign was conducted by the water management company "Utenos vandenys" and Utena Municipality, Lithuania. They joined the national campaign "Drink Water from the Tap" and invited all residents of the Utena district, as well as companies and restaurants, to participate in this initiative. The primary goal of this campaign is to promote the consumption of healthy, plastic-free tap water and discourage the use of plastic bottles.

- General tips for the public on reducing plastic consumption, along with more specific guidelines for various stakeholders promoting sustainable plastic use, can be found on the website of the municipality of Västerås, Sweden.
  *Additional information:* https://www.vasteras.se/plastbanta [in Swedish].

*4.1.2 Educational campaigns for general public*

- In Espoo, Finland an exhibition titled "The Story of Plastic" was held at ten locations in 2021 and 2022. This exhibition explored various aspects of plastic use, encompassing its life cycle, products created from recycled plastic, urban-focused recycled plastic items, and interactive self-reflection

exercises. Furthermore, a corresponding online brochure, "The Story of Plastic," was published last year in three languages. The exhibition was created as part of 'The Story of Plastic – From Waste to Product' project, led by the City of Espoo and the LAB University of Applied Sciences.
*Additional information:* https://www.espoo.fi/en/city-espoo/espoo-story/sustainable-espoo/sustainable-espoo-projects/story-plastic-waste-product#story-of-plastic-exhibition--21701 [in English].

- Another interesting exhibition, featuring educational videos and learning materials, can be found in Pori, Finland. It is called "The Journey of Plastic" and is designed for all citizens, with a particular focus on children and young people. The exhibition took place at the local museum, Luontotalo Arkki (the natural history museum of the city of Pori), from 2019 to 2022, free of charge. The exhibition included, among other things, five informative posters, artwork made from plastic waste, and plastic art workshops. Other schools and libraries have the option to borrow the exhibition from 2019 onwards.
*Additional information:* https://www.pori.fi/muovinmatka [in Finnish].

- Another travelling exhibition and educational program funded by the city of Tallinn, Estonia is "Let's Go to Zero". The goal of this initiative is to illustrate the nature of waste, the magnitude of the problem, and to offer environmentally friendly solutions to the average consumer. One of the highlighted topics in the exhibition is also the reduction of single-use plastic in our everyday life. The exhibition is open to visit in Tallinn until the end of November 2023 and will then be in different cities of Estonia until the end of 2024.
*Additional information:* https://www.lahmenulli.ee/ [in Estonian].

- The campaign in Bonn, Germany, aimed to raise awareness of avoiding daily plastic waste, targeting consumers using single-use plastics. It emphasized the impact of plastic bags on the environment, promoting the shift to reusable materials. Focusing on school children and individuals, the campaign sought to foster an eco-conscious mindset and reduce plastic waste in the Rhine River. It achieved this through engaging, creative activities that made participants rethink their plastic consumption habits. The key message was that small actions can make a big difference in tackling plastic waste. The campaign introduced the "Dirt Angel", encouraging people to switch from conventional plastic bags to reusable ones provided on the spot. It also distributed refillable bottles with anti-plastic waste messages to school children and involved them in painting waste bins to discourage dumping in the Rhine River.
*Additional information:* https://www.connective-cities.net/fileStorage/Veranstaltungen/Dialogveranstaltung_Hamburg_Plastik_2019/Dokumente/Good_Practice_Presentation_Bonn.pdf [in English].

*4.1.3 Educational campaigns for municipality' workers, schools and kindergartens*

- The "Plastic Diet" campaign in Västerås, Sweden was an awareness-raising initiative that included educating all employees, conducting an inventory and exchange of plastic items used in school canteens and domestic science classrooms, eliminating shoe covers in preschools, and removing plastic cups from restrooms in City Hall. The campaign also involved the production of flyers containing 10 tips on reducing plastic usage, as well as other communication materials.
*Additional information:* https://www.vasteras.se/plastbanta [in Swedish].

- A similar initiative was implemented in Utena Municipality, Lithuania, to reduce the consumption of single-use plastic. Various measures were put in place, including the installation of refillable liquid soap dispensers in municipal buildings, the elimination of plastic bags in waste bins, and the introduction of containers for sorting plastic waste. Additionally, municipal entities such as schools, kindergartens, and museums have pledged to refrain from using single-use dishes. Museums have also discontinued the use of plastic shoe covers.

- In Daugavpils City Municipality, Latvia, municipal workers are encouraged to use their own dishes, mugs, and cutlery, with the aim of reducing the use of single-use plastics. Similar awareness initiatives have been implemented in various project municipalities, for example, in Estonia, Germany and Finland.

- To reduce plastic usage, particularly single-use plastics, in the elderly care sector, the City of Stockholm, Sweden, has focused on both the procurement process and influencing user behavior among management and employees, primarily in nursing homes. The pilot project at the Väderkvarnen elderly care home successfully decreased single-use plastic consumption by adopting reusable alternatives. The care home also eliminated the use of shoe covers and fabric softeners, resulting in significant resource savings, waste reduction, and a positive impact on the climate and environment. Employees and residents expressed higher satisfaction levels post-project, creating a genuine win-win situation.
  *Additonal information:* https://leverantor.stockholm/aldreomsorg/hallbar-aldreomsorg/ [in Swedish].

*4.1.4 Educational programs for schools and kindergartens*

Due to the comprehensive nature of educational programs, they typically included topics related to both single-use plastic prevention and plastic waste treatment. Therefore, this section includes examples from both focus areas.

- The Eco-Schools program has been implemented in numerous countries, including municipalities in Finland, Sweden, Estonia and Latvia.
  This program offers a straightforward seven-step framework, empowering young individuals to effect change within their schools, kindergartens, local communities, and beyond. Since 1994, millions of young people worldwide have followed these seven steps, earning a prestigious Eco-Schools Green Flag for their efforts. Schools align their initiatives with three or more of the Ten Eco-Schools Topics, which break down global issues like climate change, biodiversity loss, and plastic pollution into manageable themes, encouraging young people to contemplate environmental improvements in their schools and daily lives.
  *Additional information:* https://vihrealippu.fi/en/; https://hsr.se/gronflagg [in Swedish]; https://www.tallinn.ee/et/keskkond/rohelise-lipu-taotlemine-ja-hindamine [in Estonian]; https://ekoskolas.lv/ [in Latvian].

- In Tallinn, Estonia, the environmental education program “Developing the habit of preventing and reducing waste generation, reusing and recycling and sorting waste by type” promotes waste reduction, recycling, and responsible waste collection among kindergarten and school children. In the academic years 2022-2024, a total of 1,290 lessons will be conducted in Tallinn's educational institutions, involving approximately 32,100 children. Additionally, 40 public events

will be held in Tallinn over two years, with an estimated 3,000 children participating. The program targets children aged five to seven in kindergartens and first to third graders in schools. Each 45-minute lesson provides educational materials for colouring, environmental tasks, and puzzles, teaching waste segregation and reducing environmental impact.
The program aims to cultivate environmental awareness, instilling waste reduction, proper waste sorting, and the fundamentals of a circular economy, addressing marine litter issues. It aligns with national curriculum standards for preschools and elementary schools and is a part of the European Green Capital Year program, promoting environmental consciousness.
*Additional information:* https://www.tallinn.ee/en/news/tallinn-nurseries-and-schools-teach-children-how-reduce-waste#:~:text=From%20the%20beginning%20of%20the,kindergartens%20and%20schools%20in%20Tallinn [in English].

*4.1.5 Educational programs for households*

- "Masters of Minimization" is a Swedish initiative by the Västra Götaland region, offering an 8–12-month challenge to households across Sweden. The program aims to raise awareness of waste management and promote waste reduction. It's conducted in collaboration with local municipalities.
  Participants take part in a free program focused on waste prevention in their daily lives, structured around five thematic blocks covering sustainable consumption, food waste, hazardous waste, sharing economy, and textiles. Each block commences with a kick-off meeting featuring educational activities like lectures, films, and workshops. Participants are presented with challenges to modify behaviors and reduce household waste, with continuous support through digital channels.
  The program included three weigh-ins as benchmarks: before, midway, and upon completion. Outstanding households received diplomas from a jury recognizing their achievements.
  *Additional information:* https://www.minimeringsmastarna.se/ [in Swedish].

**4.2 Soft solutions for plastic collection/treatment**

Numerous soft solutions for plastic collection and treatment include initiatives for litter collection on land in marine environments, including the single-use plastic and plastic packaging litter. These initiatives could be considered as awareness campaigns, since they draw attention to the very concrete problem of plastic littering. Several litter collection initiatives were implemented at the national level rather than the municipal level. However, due to their extended impact, they are also included in this report.

*4.2.1 Awareness campaigns for general public*

**Land-based litter collection**

- In Estonia, the cleaning initiative 'Let's Do It' started in 2008, mobilizing over 50,000 people to clean up the entire country, and they successfully collected over 10,000 tons of trash in just five hours. This campaign is based on the initiative of volunteers to clean up the environment, with contributions not only from companies engaged in waste management but also from private businesses, local self-governments, politicians, and cultural representatives. Garbage collection takes

place in suburban areas, parks, woodlands, riversides, and other urban areas that are rarely handled by municipal services.
*Additional information:* https://www.teemeara.ee/en [in English].
This initiative is carried out in many Baltic Sea countries; for example, in Latvia (https://talkas.lv/) and Lithuania (https://mesdarom.lt).

- The 'Garbage Collection Days' is a campaign conducted in several Swedish municipalities. These events take place annually in collaboration with schools, children's and youth associations, and are designed as practical exercises that connect to sustainable development education. The campaign is organized by the Keep Sweden Tidy Foundation.
  *Additional information:* https://hsr.se/skrapplockardagarna [in Swedish].

- Another cleaning initiative organized by the Keep Sweden Tidy Foundation in numerous Swedish municipalities is called "All of Sweden Pick Up Trash" and is conducted in conjunction with World Cleanup Day.
  *Additional information:* https://hsr.se/hela-sverige-plockar-skrap [in Swedish].

**Collection of Marine plastic litter**

- Baltic Sea Day is celebrated annually on the last Thursday in August with various rallies and events in nearly all countries bordering the Baltic Sea. The objective of the day is to encourage people to appreciate the unique sea that belongs to us all and to take concrete actions that benefit the sea. Activities also include collecting marine litter from different coastal locations.
  *Additional information:* https://itameripaiva.fi/en/ [in English].

- The Nordic Coastal Cleanup brings together people from across the Nordic countries to help protect the coastlines from litter. Nearly 200,000 people have participated in this movement to date, including municipalities in Finland and Sweden. It's worth noting that up to 88% of the collected marine litter consists of plastic.
  *Additional information:* https://nordiccoastalcleanup.com/ [in English].

- Helsinki, Finland, boasts 130 kilometers of open Baltic Sea shoreline. The SATAKOLKYT project, initiated by concerned youth, encourages residents of all ages to join in cleaning it up. A simple beach trip becomes a powerful environmental action. Since its 2019 launch, thousands have eagerly participated in this city-wide clean-up. Individuals, friends, work groups, school classes, or any group can engage. An interactive map on Satakolkyt.fi tracks cleaned and untouched beaches, while libraries provide grabbers and garbage bags for convenient clean-up.
  *Additional information:* https://satakolkyt.fi/en [in English].

Another section for plastic waste collection and treatment includes various educational projects, workshops, or similar initiatives aimed at providing information, resources, and tools to help people sort and recycle plastic properly.

*4.2.2 Educational campaigns for general public and schools*

- Annually, as part of European Researchers' Night, Sweden engages its schools and the general public in a citizen science project known as a "mass experiment." In 2022, the 'Plastic Experiment'

project took place, comprising two parts. In the first part, participants of all ages contribute to a survey of plastic waste in Sweden's natural environment. They choose one of four nature types, collect plastic waste along a 100-meter stretch, weigh it, and sort it into different plastic categories. The results are reported through a digital tool. Older school students have the option to perform a plastic determination in the second part. They use a determination key to test plastic properties in water, oil, and during combustion. The results contributed by participants will undergo analysis and potentially be published in a scientific journal. Researchers will investigate various factors associated with the collected data.
*Additional information:* https://forskarfredag.se/researchers-night/mass-experiments/the-plastic-experiment-2022/ [in English].

- In Espoo, Finland recycled plastic workshops are being organized for the general public. These workshops provide citizens with the opportunity to familiarize themselves with and actively participate in the plastic recycling process. The workshops take place within the confines of a craft workshop, creating a more intimate setting compared to large industrial facilities. Anyone interested can join these workshops to create new plastic items using shredded waste plastic, with the guidance of experienced professionals.
*Additional information:* https://www.espoo.fi/en/news/2023/02/get-grip-on-plastic-give-useless-plastic-item-new-lease-life-bringing-it-library-collection-point-or [in English].

- Another interesting example from Espoo, Finland includes the organization of thematic days/weeks dedicated to plastic sorting in three schools. To support this initiative, a concise and practical idea book was developed to assist other schools in implementing similar sorting activities. Consequently, there has been a gradual increase in plastic sorting initiatives within schools. These activities are part of 'The Story of Plastic – From Waste to Product' project, led by the City of Espoo and the LAB University of Applied Sciences.
*Additional information:* https://www.espoo.fi/en/news/2022/10/plastic-material-circulates-espoos-schools [in English].

Table 7: SWOT analysis of the soft measures:

| **Strengths** *(What are the strong points of described initiatives? What is working well?):* | **Opportunities** *(What external opportunities are available for these initiatives to grow or improve?):* |
|---|---|
| • Relatively low cost.<br>• Many of these campaigns involve local communities, schools, and kindergartens, fostering a sense of collective responsibility and environmental awareness.<br>• The campaigns employ a variety of approaches, including exhibitions, videos, interactive workshops, and communication through multiple channels, catering to different audiences and learning preferences.<br>• Shift in environmental behavior (for example, increased usage of reusable bottles and shopping bags).<br>• Enhanced sorting practices. | • The success of these local initiatives offers the opportunity to scale them up and replicate them in other regions and municipalities, contributing to a broader reduction of plastic waste.<br>• These campaigns may influence policymakers to implement regulations and policies that support reduced plastic usage and waste management.<br>• As more individuals and communities become environmentally conscious, there is an opportunity for a ripple effect that extends beyond plastic waste reduction to other |

| | |
|---|---|
| • Clean beaches from plastic litter. | sustainable practices. |
| **Weaknesses** *(What are the weaknesses or areas where initiatives fall short?):*<br><br>• Too long period for educational programs can be a challenge, as people may lose interest or engagement may decrease over time.<br>• While these campaigns have the potential to reach a significant portion of the population, not all members of the public may be reached due to variations in participation, awareness, and access to information.<br>• The concrete effects (how much single-use plastic was reduced, for example) of campaigns and other awareness-raising measures are hard to quantify, making it difficult to estimate their real impact.<br>• Some campaigns, especially exhibitions and interactive workshops, may require substantial resources in terms of time, money, and personnel. | **Threats:** *(What external threats or challenges could impact the success of these initiatives?):*<br><br>• Future pandemics could lead to an increase in the use of single-use plastics (e.g., single-use gloves in healthcare).<br>• Pandemics can also reduce engagement in awareness and educational campaigns.<br>• Potential cessation of funding (e.g., for a specific project).<br>• Counterarguments or resistance to change from vested interests in the plastic industry can pose a threat to the effectiveness of these campaigns.<br>• Some members of the public may remain indifferent to or skeptical of the environmental messages, making it difficult to achieve widespread behavior change. |

The soft measures implemented in BSR municipalities included various actions, primarily aimed at creating a positive shift in human behavior towards consuming less single-use plastic, recycling plastics, collection of plastic litter, and providing an education/communication process for moving towards zero plastic emissions.

Understanding human needs and preferences is crucial when developing campaigns to raise awareness of the issues surrounding plastic waste. Campaigns designed to address this issue must tailor their messaging and strategies to resonate with diverse audiences, fostering meaningful engagement and inspiring tangible actions toward sustainable practices and plastic waste reduction.

The impact of such awareness initiatives is not always immediately evident and may be delayed, as people tend to cling to old habits, and change occurs gradually. However, these campaigns are essential for fostering a long-term shift in attitudes and behaviors, laying the groundwork for sustainable practices and environmental stewardship over time.

## 5. TECHNICAL SOLUTIONS

Technical solutions involve a set of measures to 1) eliminate single use plastic (removal at the source); 2 collect and recycle plastic packaging; 3) come up with innovative material solutions.

The definition of technical solutions turned out to be quite a whirlwind for the pilot municipalities. The municipality does not directly deal with the development of technologies, but may be involved in financing, testing and their implementation. At the same time, all municipalities are involved in providing solutions for waste collection, sorting and further handling, including plastic waste and packaging waste.

The use of technical measures is directly linked to soft measures, such as informing the population and preparing instructional materials, making it challenging to distinguish between them. Additionally, the implementation of technical solutions is often expensive and time-consuming, especially when compared to soft solutions. Consequently, only a limited number of technical solutions have been proposed or implemented in the pilot municipalities. Furthermore, in some municipalities included in the study, no examples of technical solutions have been presented. While undoubtedly present in various capacities, including waste collection, sorting, and handling, explicit instances of technical solutions remain undisclosed in certain municipalities under examination.

Table 8: Number of examples on technical solutions for waste prevention and for recycling/reuse implemented in pilot municipalities.

| **Country (municipality)** | **Technologies for:** | |
|---|---|---|
| | **prevention/substitution** | **recycling/reuse** |
| **Germany** (Hamburg, Eitting, Koblenz, Augsburg) | 2 | 3 |
| **Sweden** (Västerås and other municipalities) | | 1 |
| **Finland** (Helsinki) | 1 | 1 |
| **Estonia** (Tallinn) | 1 | 4 |
| **Latvia** (Valmiera, Daugavpils) | 2 | 1 |
| **Lithuania** (Kaunas, Utena) | 2 | 4 |
| **TOTAL** | **8** | **14** |

A total of 22 examples of technical solutions for waste prevention, or recycling/reuse were presented (Table 8). About two thirds of them are related to recycling/reuse of plastic waste. Such examples were presented for all pilot municipalities.

### 5.1 Technical solutions for waste prevention/substitution

- Kaunas and Utena are among the six Lithuanian cities where the CupCup environmental initiative operates. CupCup is a reusable packaging solution for events, festivals, cafés, and other places to take food away. CupCup's goal is to provide reusable cups for coffee shops, festivals, and other events to transition to closed-loop business models and reduce the amount of waste, including plastic, generated.
  *Additional information:* https://cupcup.lt/ [in Lithuanian].

- The Hamburg-Bergedorf District School (GSB), Germany, tackled plastic waste generated during "to-go" breaks. They initially tried the "FairCup," made of recyclable plastic but unpopular due to its design. The school district then adopted the "ReCup deposit cup" with a visually appealing design. This reusable and recyclable cup reduced plastic waste effectively. Users deposit a euro credited to a chip and return cups to the school restaurant for convenience. Lids are available for purchase at 1.30 euros, prompting users to reconsider their necessity and encourage reuse. GSB's approach compels students and staff to be conscious about minimizing plastic waste.
  *Additional information:* https://sts-bergedorf.de/schulleben/08/2019/ein-bisschen-greta-an-der-gsb/ [in German].

- A company within the Technological University of Hamburg (TUHH) focuses it's efforts on the development, production and refinement of the so called "traceless" material. The traceless material can be a coating applied to paper to give it plastic-like properties, while making it bio-degradable and compostable. The company is looking to create packaging that can be used for food packaging and plastic coating for seeds and fertilizers to limit the exposure of foods to conventional plastics products. The traceless material is made from leftovers from food production such as grain residues and beer production. Preliminary composting tests revealed that traceless plastic was completely degraded in regular compost in two months while the conventional plastic bag was completely intact. The product still needs extensive testing to make sure that it is practical for everyday use as a substitute for conventional plastics packaging.
  *Additional information:* https://www.tuhh.de/tuhh/en/tu-hamburg/newsroom/traceless [in English].

- The pilot project in Tallinn's Old Town, Estonia, involves testing the use of reusable food packaging and cutlery return containers with the aim to substitute and reduce single use packaging and containers. Conducted by Ringo Eco OÜ, the project assesses user engagement and the potential for litter issues at seven distinct Old Town locations over one month. These containers are available for both citizens and tourists. Ringo's reusable packaged food is being sold in various Old Town restaurants and food shops. The pilot aims to determine whether there are challenges related to litter being discarded near the containers and to gauge the activity of garbage bin usage at these seven locations.
  *Additional information:* https://ringo.eco/en/ [in English].

- The City of Helsinki, the City of Lahti, Aalto University and Watec Oy implemented a joint project Hulakas related to urban water management and the cost effective measures for reduction of the total load of harmful substances at the catchment area level in a dense urban environment. The project aimed to identify the qualitative risk points of urban stormwater and the particle size distribution of solid matter including microplastics moving with stormwater and the importance of different grain size classes for the binding of harmful substances that determines the functionality of the well-specific stormwater filtration method in removing various harmful substances. The proposed solution involves installing newly designed well-filters in all wells throughout the city to cleanse stormwater of solids, garbage, and harmful substances, such as tire grit and microplastics, without the need for expensive excavation work. The Filtro well-filter recycles tire grit from artificial turf fields, removes microplastics from street and urban stormwater, and prevents water pollution.
  *Additional information:* http://www.itamerihaaste.net/tyomme/hankkeemme/hulakas [in English];
  http://www.itamerihaaste.net/files/2852/Huleveden_laadun_riskitarkastelu_kunnille_2023.pdf [in Finnish]; https://www.watec.fi/tuotteet/p/filtro [in Finnish].

- The examples from Latvia involve free taps for drinking water during larger city events installed by the municipality owned companies in Valmiera (seven free taps for drinking water) and Daugavpils (four seasonal water taps) city aiming to reduce the use of bottled water, including PET plastic bottles. Additionally, the company "Daugavpils udens" offers particular service for private persons or legal entities in Daugavpils by providing drinking water whenever necessary (to order a water barrel). There are also four seasonal free-standing water taps installed in Daugavpils city.

The solutions combine technical solution with soft measures – by drawings on the stand and social media posts, company promotes that tap water is clean and drinkable any day. Success is prevention of purchase of plastic bottles for single use and also the lesson learned alongside the technical solutions – that tap water is good for drinking, that its cheaper, safe and positive for the planet to re-use bottles for water.
*Additional information:* https://www.daugavpils.lv/pilseta/par-daugavpili/pilsetas-zinas/jaunaja-forstate-likvide-parravumu-udensvada-tiklos [in Latvian];
https://www.facebook.com/daugavpilsudens/posts/pfbid0mxDTtrM3TPHz748sbswR6E8C9eG8EzDGuKRJqu2hEJreHgLMhmbYm6nda5sxwXwFl [in Latvian];
https://www.facebook.com/daugavpilsudens/posts/pfbid02R8ZzomE9x73wV52wNi5ucwpbDvHCqqeTBsooLQSZUf51NhbbEk51JZL2zRC5FCdPl [in Latvian];
http://www.daugavpils.udens.lv/ [in Latvian];
https://www.valmierasnovads.lv/valmiera-pieejami-dzerama-udens-brivkrani-2/ [in Latvian].

**5.2 Technical solutions for waste recycling/reuse**

- An environmental service provider, PreZero, in Eitting, Bavaria, has recently established a newest sorting plant for lightweight packaging. The plant can effectively sort collected packaging material into 18 different plastic fractions. This is achieved through scans that can even identify black plastics, which are usually difficult to separate in traditional sorting facilities. Moreover, within each of the 18 fractions, the plant can further sort materials based on their colours, leading to a more precise selection process. These advanced capabilities are made possible by using state-of-the-art detection technology and innovative separation units that detect various properties and colours of these materials.
  *Additional information:*
  https://prezero.de/en/press/2022/prezero-nimmt-europas-modernste-sortieranlage-fuer-leichtverpackungen-in-betrieb [in English].

- Augsburg Municipality, Germany, aimed to reduce annual incineration of recyclable waste caused by citizens' improper recycling. About 1.5 tons of recyclables were burned due to disposal in residual waste bins. Augsburg partnered with local waste management company AWS to replace old bins with labelled waste collection bins. The introduction of the yellow bin for plastic, polystyrene, and hard plastics aimed to promote proper recycling behavior. Information through newsletters educated residents about correct recycling methods and the new bins. Augsburg implemented a strategy to enhance recycling behavior, including bi-weekly trash collection, waste prevention campaigns, and increased waste site visibility for the public.

- The Västerås and other communities in Sweden are looking for new technical solutions for collection and recycling of single use aprons in healthcare to make new aprons, that are delivered back to user. The solution has not yet been implemented.
  *Additional information:* https://vimeo.com/646052524/35fb7c7518 [in Swedish].

- In Helsinki a reusable takeaway packaging (dish), digital deposit and borrow system has been implemented in 60 restaurants in collaboration with Kamupak, Palmia Oy (previously owned as a public utility by the City of Helsinki). The aim is to reduce the amount of single use packages and related environmental impacts. The dish is returned to the manufacturer to be recycled as raw material when it has reached the end of its life cycle (ca 100 uses). Approximately 10 000 single-

use take-away packages in a year were saved with using KamuDishes. Moreover, KamuDish can reduce CO2 emissions up to 72-95 % compared to traditional take-away packaging.
*Additional information:* https://www.kamupak.com/ [in English].

- The city of Tallinn has implemented two projects to promote the separate indoor collection of packaging, including plastic packaging, paper and cardboard, bio-waste and mixed household waste since 2021, during which hundreds of sorting stations for schools, kinder gardens and city authorities have been acquired. The aim is to improve the collection of waste by type while raising at the same time people's awareness of how to sort waste. Waste sorting stations are made of waterproof plywood, which is easy to clean and maintain. In addition, the stations are produced based on circular economy principles, i.e. the product can be disassembled using hand tools and its parts can be replaced without damaging the product.
*Additional information:* https://www.tallinn.ee/et/uudis/tallinn-jagab-linna-asutustele-jaatmete-liigiti-kogumise-komplektid [in Estonian].

- The pilot project in Tallinn's Haabersti district, Estonia, involves apartment associations and packaging organizations testing packaging waste collection near homes. Currently, door-to-door collection doesn't include packaging waste in Tallinn. There are over 400 public packaging collection points providing that contains containers for plastic-metal, paper, and glass packaging. Citizens can dispose their packages for free. In this 6-month pilot, 15 apartment associations are involved to observe how waste collection changes when collection points are near apartment buildings. Twelve associations collect packages from nearby building points, while three use public collection points. The pilot collects data, including photos of bins, to assess waste changes. The collected information guides future decisions after the pilot's conclusion.

- Tallinn water supply installed 30 public drinking water taps for the summer season. The goal is to reduce the amount of single-use plastic bottles and enable their reuse. The nearest drinking water tap can be found using the map application.
*Additional information:* https://pealinn.ee/2023/05/29/tallinna-vesi-avas-tallinnas-ule-30-ava-liku-joogiveekraani/ [in Estonian].

- In cooperation with Filaret OÜ, the city of Tallinn installed 80 special smokestack collection bins in seaside areas, which help prevent smokestacks from entering the sea and recycle plastic waste. During the test period that took place a year earlier, nearly 11,000 cigarette butts were collected in just two months with 20 special litter boxes placed on beach areas.
*Additional information:* https://pealinn.ee/2023/08/07/tallinna-mereaarsed-alad-said-prugikastid-suitsukonide-kogumiseks/ [in Estonian].

- Daugavpils Municipality set up 170 waste collection points, i.e containers for sorting of packaging material (plastic, paper, can, metal). There is also a packaging deposit system in place in the municipality as well as all over Latvia with numerous collection places.
*Additional information:* https://skiroviegli.lv/#/ [in Latvian]; https://depozitapunkts.lv/ [in Latvian]; http://www.aadso.lv/ [in Latvian].

- The deposit of one-way glass, plastic (PET) and metal packaging system has been operating in Lithuania since 2016, including Kaunas and Utena municipalities. The system is established by Lithuanian beverage producers, importers and sellers, which manages the system activities in the

country. The deposit system covers beer, beer cocktails, cider, other fermented beverages, mixed alcoholic and non-alcoholic beverages, kvass, and all types of water, juice and nectars sold in glass, PET and metal (tin) packaging. Fruit wines and wine-product cocktails are part of the deposit system only when sold in PET and metal packaging. The approved value for the packaging deposit is 0,10 euro. A public institution is responsible for managing the system including the reverse vending machines and the manual collection points.
*Additional information:* https://grazintiverta.lt/en/about/69 [in English].

- Utena district municipality, Lithuania, implemented a waste sorting and separate collection system for plastic/metal waste, paper and glass waste. 237 such sites are installed in Utena city and region. Density: one such site is built for 171 inhabitants. The system contributes to the clean-up of the environment, including plastic pollution.
  *Additional information:* https://grazintiverta.lt/en/about/69 [in Lithuanian].

- Kaunas city, Lithuania, implemented a project for semi-subterranean and above ground municipal waste collection container sites for separation of wastes and to reduce the amount of space taken up by waste containers, as 60% of its collection capacity is underground. The system's capacity is large. Therefore, the containers can be emptied less often, which will save money and reduce environmental impacts from transportation, smell, etc.

- Several cities in Germany contribute to the testing of a new clumping agent to detect and remove microplastics and other micropollutants from the water source, e.g. wastewaters. This was created to be used as purifiers at municipal and industrial levels. A non-profit Greentech company that focused on purifying and eliminating microplastics and micropollutants in water ways has partnered with the city of Koblenz-Landau to further research and develop this product at the Landau-Mörlheim sewage treatment plant for more harmful particles existing in water sources. After detection of microplastics, the clumps are collected and then recycled, making this solution a circular process instead of a single sided solution to the problem of micro pollution, specifically microplastics in sewage.
  *Additional information:* https://www.pressebox.de/presscorner/firma/wasser-30-ggmbh/meldung/boxid/1123575/iframe/6465?language=all [in English];
  https://wasserdreinull.de/en/about-us/press/ [in English];
  https://www.eib.org/en/stories/plastics-water-pollution [in English].

Table 9: SWOT analysis of the technical measures:

| **Strengths** *(What are the strong points of described initiatives? What is working well?):* | **Opportunities** *(What external opportunities are available for these initiatives to grow or improve?):* |
|---|---|
| • Provide a solution for sorting of waste<br>• Promote reuse/recycling<br>• Shift in environmental behavior (sorting of waste at the location).<br>• Enhanced sorting practices.<br>• High engagement rates of wider public | • Advanced technologies for prevention, recycling, reuse.<br>• Providing economic incentives and more information for sorting<br>• Increased interest of producers, waste management operators, importers and other stakeholders<br>• Responsible product design to promote |

| | |
|---|---|
| | reuse/recycling<br>• Extended producer responsibility |
| **Weaknesses** *(What are the weaknesses or areas where initiatives fall short?):*<br><br>• Often quite costly<br>• Implementation of the measures require legal initiatives<br>• limited cooperation between the stakeholders in municipalities | **Threats:** *(What external threats or challenges could impact the success of these initiatives?):*<br><br>• Overall economic situation could impact the use of sophisticated technical measures<br>• Awareness and educational campaigns for sorting are not successful.<br>• Potential cessation of funding (e.g., for a specific project). |

Technical solutions implemented in or by the pilot municipalities appeared to be considerably more expensive compared to, particularly, the soft measures. Technical solutions for waste prevention often require rather large financial input for research, development, and implementation (tens of thousands to up to one million EUR) as well as for covering the expenses for the maintenance of the established systems/technologies. Municipalities are faced with the challenge of balancing the potential benefits of advanced technical solutions with the fiscal realities of implementation and maintenance costs, emphasizing the necessity for a nuanced and well-informed approach to waste prevention initiatives. As municipalities navigate the landscape of waste management, this financial insight becomes pivotal in shaping policies, prioritizing interventions, and fostering sustainability within budgetary constraints.

## 6. CONCLUSION

This benchmarking report emphasizes the need for a comprehensive approach to tackle use of single-use plastics and plastic waste challenges. Strategic measures lay the foundation for the entire framework. They provide the overarching direction and guidance needed to address the environmental impact of plastic pollution. Collaboration among Baltic Sea Region countries is a significant strength, demonstrating a commitment to tackling transboundary issues. These measures promote public awareness and education campaigns as a vital component of behavior change, while also encouraging resource efficiency and the circular economy. The impact of these strategic measures is broad, influencing the collective consciousness and direction of the community toward more sustainable practices.

Soft measures, including awareness campaigns and educational initiatives, are essential for fostering a sense of environmental responsibility and driving behavioral change. Their relatively low cost and community involvement make them accessible and effective tools for engaging a large portion of local population. While the immediate impact may be more subtle, the long-term effects of influencing attitudes and behaviors can be profound, creating a cultural shift towards sustainability.

Technical measures play a pivotal role in streamlining waste sorting, promoting reuse, and recycling, and enhancing waste management practices. Their focus on advanced technologies, economic incentives, stakeholder engagement, responsible product design, and extended producer responsibility provides innovative solutions for waste management. These measures have demonstrated the ability to lead to a behavioral shift and high engagement rates among the public.

The implementation of solutions/measures is successful if they are effective (for example, in reducing the amount of plastic waste and encouraging the reuse of plastic products) and appropriate (not causing major negative side effects). In addition, the measures must be accepted by people (indicating their readiness to implement them) and verifiable (e.g., through sorting and measuring the amount of plastic waste).

In conclusion, the integration of strategic, soft, and technical measures provides a well-rounded and multifaceted approach to address plastic pollution and promote environmental awareness. These measures collectively offer an opportunity to effect meaningful change by fostering environmental consciousness, reducing plastic waste, and enhancing waste management practices. The success of these initiatives can be a catalyst for broader adoption and replication, contributing to a more sustainable and eco-conscious future. However, it is crucial to remain adaptable in the face of future challenges and to seize opportunities for innovation and cooperation to achieve lasting positive impact.

**ANNEX 1**

**BALTIPLAST project**

## Go A.1.1: „Benchmarking the best practices of plastic management and innovation of plastic materials in the Baltic Sea Region".

***Short guidelines and template for collecting information in partner countries about best practices of single use plastic management, plastic packaging collection and innovation of plastic materials at different levels (strategic level, soft measures, technical measures).***

**Brief description**: The Go A.1.1 activity is focusing on benchmarking the existing best practices for the prevention and reduction of single used plastic, improvement of plastic packaging collection and treatment system, supporting of innovation of plastic materials.

The collection of the data should be conducted at different levels to support the development of strategic level, soft and technical solutions in municipalities.

The results of this activity will be used for further elaboration and development in GoA 1.2 harmonized strategic framework development (strategic level solutions), GoA 1.3 and GoA1.4 (soft measures and technical solutions) and GoA.1.5. Developing a set of solution for plastic consumption behavior change of inhabitants.

**Guidelines**: Each project partner has to fill-out the template provided in this document. Please fill one table per one example and duplicate the table for several examples. Please be focused on the best practices and provide at least 3 best practices for each level of solution (it can also be more). Idealy if we have each solution from different municipality, but if not possible you can provide all best practices from one municipality. In table please write your answers in cells with white background.

**Deadline for materials to be delivered**: May 9th, 2023

### 1. Strategic level solutions

With "Strategic level solutions" we mean the legal framework for plastic prevention and reduction conducted at municipal level:

- Strategies and action plans that contribute to plastic waste prevention and reduction (e.g. Action plan for sustainable use of plastics in Västerås 2022-2025, Helsinki littering prevention measures https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-27-21.pdf, Tallinn waste plan – marine litter reduction);
- Local rules and regulations;
- Guidelines developed by municipality to provide clear instructions for plastic prevention and reduction (e.g. green public procurement guideline of the city that includes criteria for plastic reduction, guidelines for food delivery operators, guidelines for event organisers, guidelines for toxic free preschools etc);

- Environmental certifications, education for sustainable development programme, or other educational programme for schools.

| |
|---|
| **1. Country, municipality:** |
| |
| **2. Type of the strategic solution** (strategy/action plan/roadmap; rules and regulations; guidelines etc)**:** |
| |
| **3. Title of the strategic document:** |
| |
| **4. Description of the document and its development process:** |
| 4.1 When the document was adopted:<br>4.2 By whom was the document developed:<br>4.3 Thematic scope and target groups of the document:<br>4.4 Objectives and targets (if relevant):<br>4.5 Main measures (short summary of the document content):<br>4.6 Main steps of developing the document:<br>4.7 Who was involved in the development process: |
| **5. Key messages and lessons learned:** |
| 5.1 Results achieved so far:<br>5.2 Successes and positive lessons (what work(s)ed well):<br>5.3 Problems and challenges (what didn't work so well): |
| **6. Link(s) and reference(s) to the document:** |
| |

## 2. Soft solutions

With "Soft measures" we mean non-infrastructure, low-investment, low-effort measures that can actually be implemented easily (the so-called "low hanging fruits") for single-use plastic and plastic packaging prevention and reduction at municipal entities (1. Schools and 2. Any other entity that belongs to public administration at local level).

*Example 1: Campaigns or other soft measures aimed at schools (e.g. not using single-use plastics in school excursions, or not using shoe covers when parents pick up their children at preschools).*

*Example 2: Soft measures to reduce SUP gloves in health care and preschools.*

*Example 3*: "Good housekeeping measures" at the municipal entity: e.g. avoiding plastic bags in waste bins in the municipal buildings, reducing plastic items in office materials, avoiding single-use plastic packaging of soaps, detergents etc (introducing refilling devices), banning single-use cups/dishes in kitchen/coffee places of the bureaus, banning plastic beverage bottles and/or cups – use tap water instead and/or sparkling device with glass ware…

| |
|---|
| **1. Country, municipality:** |
| |
| **2. Type of the soft solution** (awareness campaign, implementation of tools, prorgammes, etc.): |
| |
| **3. Title of the soft solution:** |
| |
| **4. Stakeholder group (schools, households, businesses):** |
| |
| **5. What type of plastic (food packaging, single-use plastic products, etc) this solution is addressing?** |
| |
| **6. Description of the soft solution (200-500 words)** |
| |
| **7. The costs of this measure (if available):** |
| 7.1 For establishment: under 1000 EUR (small), 1000 – 10 000 EUR (medium), more than 10 000 EUR (high):<br>7.2 For maintenance (per month): under 500 EUR (small), 500 – 1000 EUR (medium), more than 1000 EUR) (high): |
| **8. Key messages and lessons learned:** |
| 8.1 Results achieved so far:<br>8.2 Successes and positive lessons (what work(s)ed well): |

| |
|---|
| 8.3 Problems and challenges (what didn't work so well): |
| **9. Link(s) and reference(s) to the document:** |
| |

## 3. Technical solutions

With "Technical solutions" we mean measures to 1) eliminate single use plastic (removal at the source); 2) technical solutions for the collection and recycling of plastic packaging; 3) innovative material solutions (e. g. use and handling of bioplastic packaging, etc).

*Example 1: Prevention of plastic material in single use dry food packages by replacing it with biodegradable monomaterials.*

*Example 2: Designing packages to increase recyclability of materials, including plastics. Goal: To make separation and collection of the materials from single-use packages easier for the consumers or even automatic.*

| |
|---|
| **1. Country, municipality:** |
| |
| **2. Type of the technical solution** (prevention, re-use, recycling, use of innovative material): |
| |
| **3. Title of the technical solution:** |
| |
| **4. What type of plastic (food packaging, single-use plastic products, etc) this solution is addressing?** |
| |
| **5. Description of the technical solution (200-500 words)** |
| |
| **6. The costs of this measure (if available):** |
| 6.1 For investment:<br>6.2 For maintenance (per month): |

| |
|---|
| **7. Key messages and lessons learned:** |
| 7.1 Results achieved so far:<br>7.2 Successes and positive lessons (what work(s)ed well):<br>7.3 Problems and challenges (what didn't work so well): |
| **8. Link(s) and reference(s) to the document:** |
| |