Comparative analysis of policies to promote the separation, sorting and recycling of plastics waste at partners' territories

PLASTECO
Interreg Europe

European Union
European Regional
Development Fund

Auvergne
Rhône-Alpes
Énergie Environnement

PLASTECO – SUPPORTING EU REGIONS TO CURB PLASTICS WASTE AND LITTERING

2020

TABLE OF CONTENTS

1 INTRODUCTION

Plastics and microplastics (MPs) waste leakage into the environment is a common phenomenon [1]; issues due to plastics in the terrestrial and aquatic environments are becoming much more widely understood, as a serious pollutant which demands a great deal of time and money to clean up [2].

PLASTECO "Supporting EU regions to curb plastics waste and littering" aims to support participating territories to take steps for the necessary transition towards a "new plastics economy". PLASTECO focuses on advancements in waste management, eradication of single-use plastics from regional value chains, and spurring growth through innovation and cover the areas of waste management, public procurement, funding and investments, secondary raw materials and awareness raising. PLASTECO brings together 8 partners form 8 EU countries, supporting them in their effort to benefit from the momentum of the EU plastics strategy and achieve their goals in terms of protecting the environment, increasing resource efficiency, alleviating health effects, and boosting innovation, through joint policy learning efforts and exchanges of experiences.

This report is the final deliverable of Activity 1.2 "Comparative analysis of policies to promote the separation, sorting and recycling of plastics waste at partners' territories". The scope of this research work is to identify and comparatively analyse policies to promote the separation, sorting and recycling of plastics wastes at partners' territories. The comparative analysis of policies will provide partners with evidence useful for revising waste management plans, increasing investments, and stimulating growth through the proliferation of waste management businesses.

The study seeks to address the following questions:

1. Which are the most effective proven policies to promote the separation, sorting and recycling of plastics wastes in the EU? What are the key features?
2. What are the main issues encountered prior and during the implementation of policies?
3. What benefits have these policies delivered?
4. Can these policies be easily replicated in other areas?

The report is structured as follows:

- Chapter 2 presents key information on plastic waste management: the characteristics of plastics waste once released into the environment, the definition

and characteristics of separation, sorting and recycling processes, the value chain of plastics, and the key stakeholders.

- Chapter 3 presents an overview of existing EU policies relevant for separation, sorting and recycling of plastic wastes.
- Chapter 4 focuses on the methodological approach of this study. More specifically, it presents the study objectives, the guidance for the data collection and the evaluation criteria for the selection of the most effective policies.
- Chapter 5 presents the findings of the report analysis. Specifically: (i) a short description of all collected policies sent by PLASTECO partners, (ii) descriptive results after data analysis, (iii) a comparative analysis of all policies regarding benefits, issues and transferability potential and (iv) ten effective policies to promote the separation, sorting and recycling of plastics.
- Chapter 6 summarizes the key conclusions of the report offering also recommendations for policy interventions.

2 THEMATIC BACKGROUND

This chapter presents the characteristics of plastics waste once released into the environment. In addition, the definition and characteristics of separation, sorting and recycling processes are presented, as well as the value chain of plastics and key actors.

2.1 PLASTIC USAGE AND ITS EFFECTS ON ENVIRONMENT

Plastics is the term commonly used to describe a wide variety of synthetic or semi-synthetic materials used in a wide range of applications. Plastics, including wood, paper, or wool, are organic materials. Natural products such as cellulose, carbon, natural gas, salt and, of course, crude oil are the raw materials used to make plastics [1]. In general, plastics are inexpensive, lightweight and durable materials that can be easily moulded into a wide range of products [3].

The term “plastic” comes from the Greek word “plastikos” which means that it is suitable for moulding. It refers to the malleability or plasticity of the material during production, which enables it to be cast, pressed, or extruded into a variety of shapes-such as films, fibres, sheets, pipes, bottles, containers, etc [1].

It can be said that plastic is a significant and omnipresent material in our economy and daily lives. It has multiple functions that help address a variety of our society's challenges. Lightweight and innovative materials save energy and reduce CO_2 emissions in vehicles or aircraft. High-performance insulation materials help us to save on energy charges. Furthermore, plastics help ensure food safety in packaging and reduce food waste. Additionally, bio-compatible plastic materials combined with 3D printing, can protect human lives through medical innovation [2].

Fig. 1. Plastic material [1].

The majority of the currently used plastic packaging is made from limited fossil resources. Production of plastic packaging causes environmental impact, while proper use of these packaging can minimize product losses and thus mitigate the much more negative environmental impacts of product losses._Wrongly discarded plastic products have a negative impact on the environment as

they only degrade very slowly, creating problems in our oceans. Fortunately, recycling technologies for plastic waste are now emerging, enabling the reuse of these materials as a package or utensil in a second life [4].

Fig. 2. Plastic waste in water environment [5].

Sources of plastic wastes

In general there three sources of plastic wastes: (i) Municipal Solid Waste (MSW), (ii) Commercial and Industrial Waste (C&IW), and (iii) microplastics in waters. It should be noted that most policies target MSW. Figure 3 shows the scope of these waste streams according to their origin (municipal waste, and commercial and industrial waste) and method of collection. Microplastics are not depicted in this Figure.

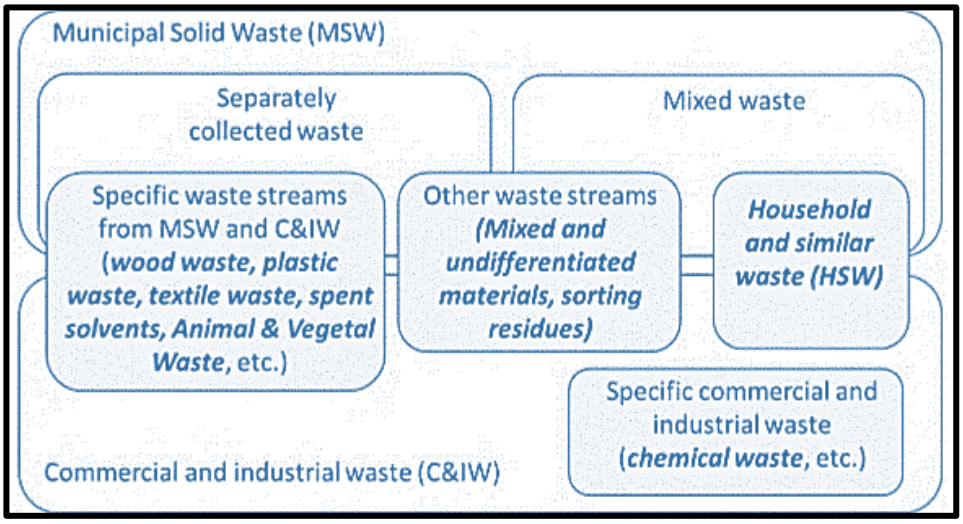


Fig. 3. Sources of plastic wastes [6].

2.2 PLASTIC SEPARATION- SORTING- RECYCLING: DEFINITION AND CHARACTERISTICS

It should be noted that it is a common phenomenon in the literature, separation and sorting to have the same (or similar) meaning. However, these two terms are presented as two independent waste management processes in this document. The first term ("separation") refers to the separation at source and the second one ("sorting") to the manually or automatically sorting of materials in recovery facilities or mechanical biological treatment systems.

Plastic Separation

In a waste management process, the most preferred option is to minimize the amount of municipal and industrial waste generated while the least option is landfilling [7]. Waste separation at source (taking place at home, office, villa, restaurant or even large-scale festivals) is a crucial component in the concerted effort to diverse waste from landfills and to maximize the recovery of recyclables**.** Source separation also increases the rate of biological treatment of food waste [8].

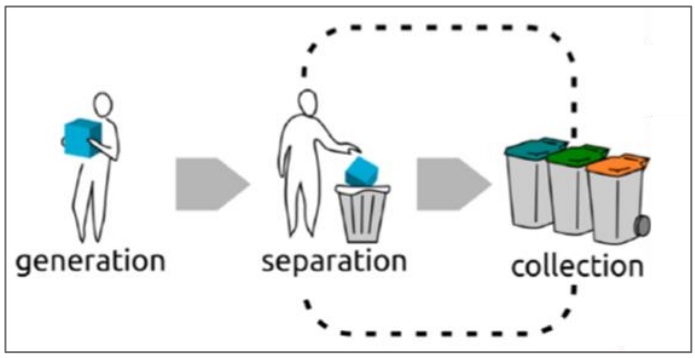


Fig. 4. Separation process [7].

More specifically, separating solid waste at source means separating solid waste by different types of waste such as recyclable waste, residual waste and bulky / garden waste. The separate waste is collected on a fixed schedule every week. Wastes can be divided into 2 groups:

(i) **Organic waste** is transferred to a transfer station for solid waste sorting, and then to a biodegradable solid waste treatment plant. There it is divided further, to be sent either to composting facilities or to anaerobic digestion facilities, where biogas can generate energy.

(ii) **Dry waste** is sent to a transfer station for solid waste sorting, and then to a solid waste recycling plant. Waste that is not recyclable will be sent to a landfill. Eventually, the main target is that instead of landfilling most of that waste, it will be used for the production of energy and/or fuel.

Fig. 5. Different bins for waste separation at source (source: Vectorstock.com).

Figure 5 illustrates a waste separation system. Each colour corresponds to a different type of disposal materials. For instance, all type of plastics should be disposed to the orange bin. However, plastic wastes could be further separated at source but this still is not a common practise.

Plastic Sorting

Sorting is the first step in plastic waste recycling after collection (see Fig. 7). This process prepares materials intended for recycling. Depending on its nature, sorted plastic waste will be processed directly on the site of the recycling company responsible for receiving it or be taken to a specialist recycling centre.

The sorting of plastics for recycling is guided by the ASTM International Resin Identification Coding [9], which identifies the plastic resin from which the product is made. Since there are many categories of materials and many processes, varying according to the type of product, different sorting methods can be identified (see Fig. 6):

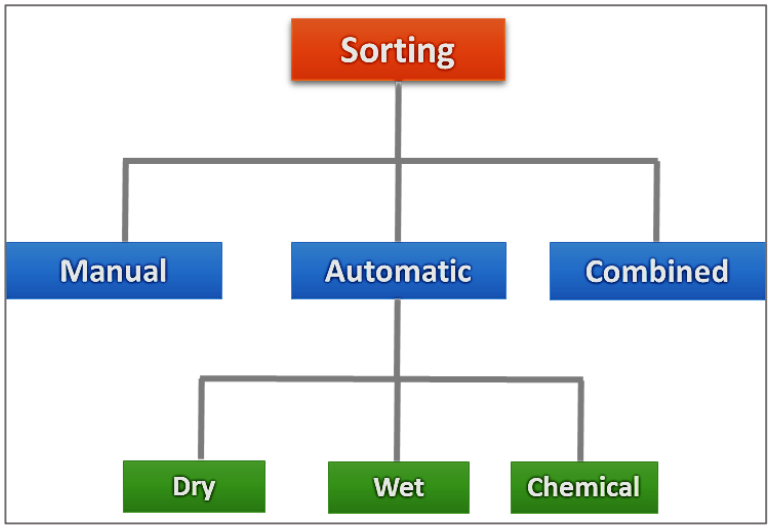


Fig. 6. Different types of sorting [10].

Plastic Recycling

Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products.

- **Materials recovery**

Recovery of materials requires material-processing activities such as mechanical recycling, chemical (feedstock) recycling or biological (organic) recycling [11]. These methods aid in the conversion of waste plastic into lower or same grade plastic materials and/or raw materials.

Mechanical recycling

Mechanical recycling is the dominant form of material recovery through the processing of plastic waste into secondary raw material or products without significantly changing the chemical structure of the material [11]. Such processing favors the recycling of thermoplastics such as PET, PE, PVC and PP, but is not applicable to thermoset polymers such as unsaturated polyesters or epoxy resins due to their permanent crosslinking during manufacture [12]. Mechanical processing typically involves the following five stages as depicted in Figure 7 and listed in Table 1. A waste is considered as recycled when all presented recycling steps are fulfilled.

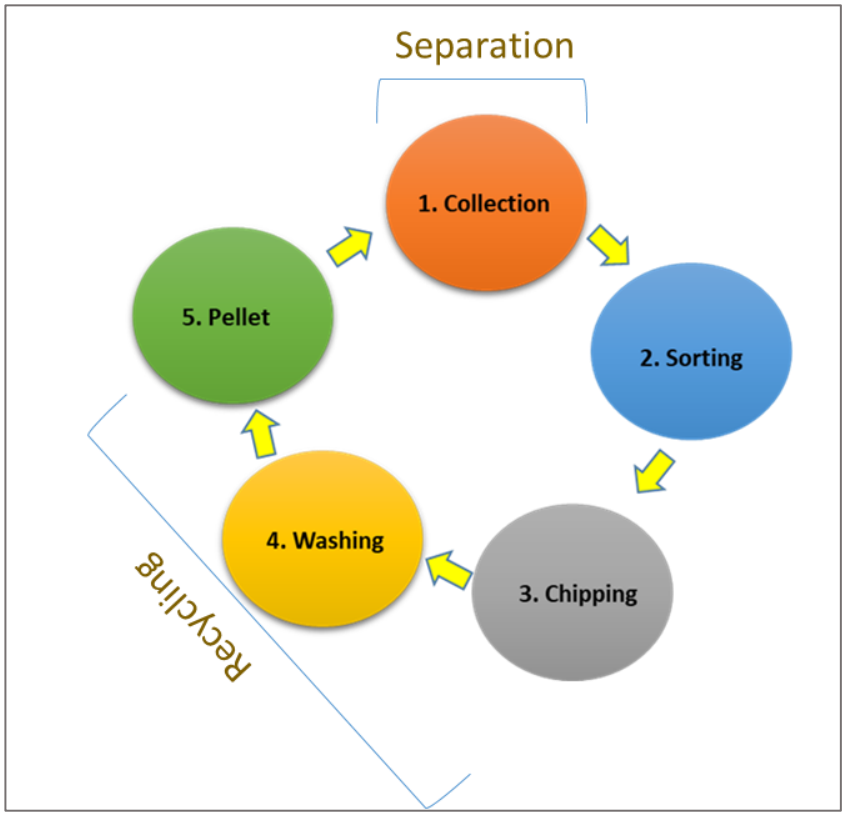


Fig. 7. Overview of the plastic recycling process [13].

It should be also noticed that after the completion of step 5 we need to find a market for recycled plastic.

Table 1. Stages of mechanical recycling.

Stages	Description
Collection	Recycling facilities gather recyclable materials from municipal waste collections, specialised
Sorting	Collected plastic is sorted, typically manually, according to its plastic resin code, some optical sorting
Chipping	Sorted plastics is passed through a chipper which consists of cylinder of blades that cut plastic down to a predetermined grill size
Washing	Melted chips are washed to remove any contaminants (dirt, glue, paper labels, product remnants etc.). A wash is also typically performed using an Alkaline, cationic detergent in water at elevated temperatures for short periods.
Pelleting	Cleaned and chipped plastic is put through an extruder which melts the chips and shapes them into pellets, ready for reuse into new items.

Chemical (feedstock) recycling

Chemical or feedstock recycling involves transforming waste plastics into raw materials by modifying the chemical structure of the polymer [11]. This can be achieved by cracking, gasification or depolymerisation processes but excludes energy recovery or incineration.

Biological (organic) recycling

Biological or organic recycling involves the microbiological treatment of biodegradable plastic material under aerobic (composting) or anaerobic (digestion) conditions [11, 14].

2.3 PLASTICS VALUE CHAIN

The global value chain of plastics (see Fig. 8) extends from the extraction of raw materials for plastics production to final disposal of the plastic- or plastic containing products [15]. Consumers and industries who use plastic products are key actors who can influence and put pressure on plastic producers and processors based on their consumption choices [15]. Furthermore, running across the entire value chain national and international governmental bodies as well as other nongovernmental institutions can be found. These can influence all parts of the plastic value chain through different measures (for instance by implementing legislation, setting targets or applying pressure on the involved actors).

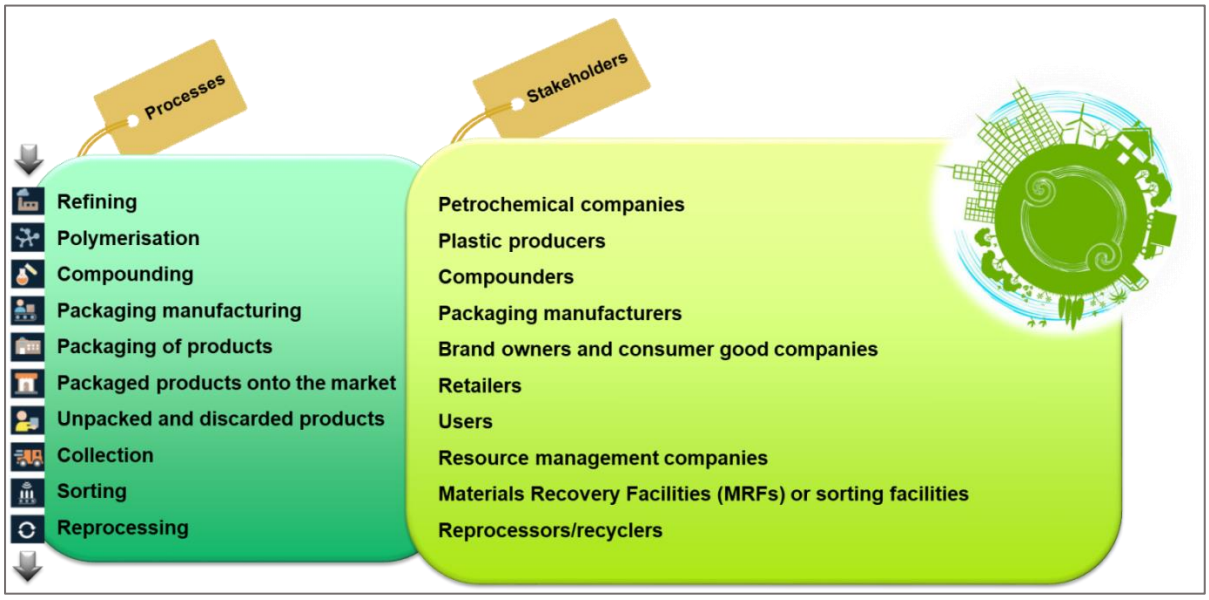


Fig. 8. Processes and stakeholders in the value chain of plastics (focus on the plastic manufacturers producing plastic packaging).

As a potential way for our society to increase prosperity, the circular economy is gaining increasing attention while reducing demands on finite raw materials and minimizing negative externalities. Such a transformation includes a fundamental approach that involves moving beyond incremental improvements to the existing model and developing new frameworks for collaboration [16].

While the new plastics system has many benefits, it has drawbacks that become more evident by the day. A staggering 32% of plastic packaging leaves collection systems, creating significant economic costs by reducing the productivity of vital natural systems such as the ocean and clogging urban infrastructure. The cost of such after-use externalities for plastic packaging, plus the cost associated with greenhouse gas emissions from its production, is enormous exceeding the plastic packaging industry's profit pool. In future, these costs will have to be covered [16].

Rethinking and enhancing the functioning of such a complex value chain requires greater commitment and collaboration from all its key players, from plastics producers to recyclers, retailers and consumers. It also requires innovation and a shared vision to drive investment in the right direction. The plastics industry is very important to the European economy, and increasing its sustainability can bring new opportunities for innovation, competitiveness and job creation.

Table 2. Mapping of relevant stakeholders of the plastics value chain [16, 17].

Processes	Stakeholders
Refining	Fossil-based: **Petrochemical companies** distil crude oil in different fractions, of which the naphtha fraction is the main feedstock for plastics production. This fraction is cracked into monomer building blocks. Renewably sourced: Different chemical processes (e.g. bio-refineries) are used to convert biomass or greenhouse gases into the same or different monomers as the ones derived from fossil feedstock
Polymerisation	**Plastic producers** combine a large number of monomers to form polymer chains in a chemical process, called polymerisation. The type of monomers and the structure of the resulting polymer define the polymer's characteristics

Processes	Stakeholders
Compounding	**Compounders** prepare plastic formulations by mixing and/or blending polymers and additives into process-ready pellets.
Plastic products manufacturing	**Plastic manufacturers (or plastic producers)** design and manufacture plastic items, for instance plastic packaging
End products manufacturers	**Brand owners and consumer good companies** for instance package their products or goods.
Retailer	**Retailers for instance** put packaged goods onto the market
User	**The user** for instance in the case of plastic packaging unpacks the product or good and most often discards the packaging. Often collection bins combine plastic packaging with other, plastic and non-plastic, after-use materials.
Collection	**Resource management companies** collect (often mixed) consumer as well as commercial after-use materials. This is done through curbside collection, bring systems, deposit systems, etc.
Sorting	After-use materials collected for recycling go to **Materials Recovery Facilities (MRFs) or sorting facilities** where they are sorted in various fractions (e.g. plastics by type, paper, glass, ferrous metals, non-ferrous metals, organics, rest fraction). The after-use plastic types that have been separated out are baled for recycling.
Reprocessing	**Reprocessors/recyclers** conduct some additional sorting steps. Afterwards (in the case of mechanical recycling) the material is shredded, cleaned, dried, sometimes sorted by color and compounded to be eventually re-granulated into process-ready pellets again

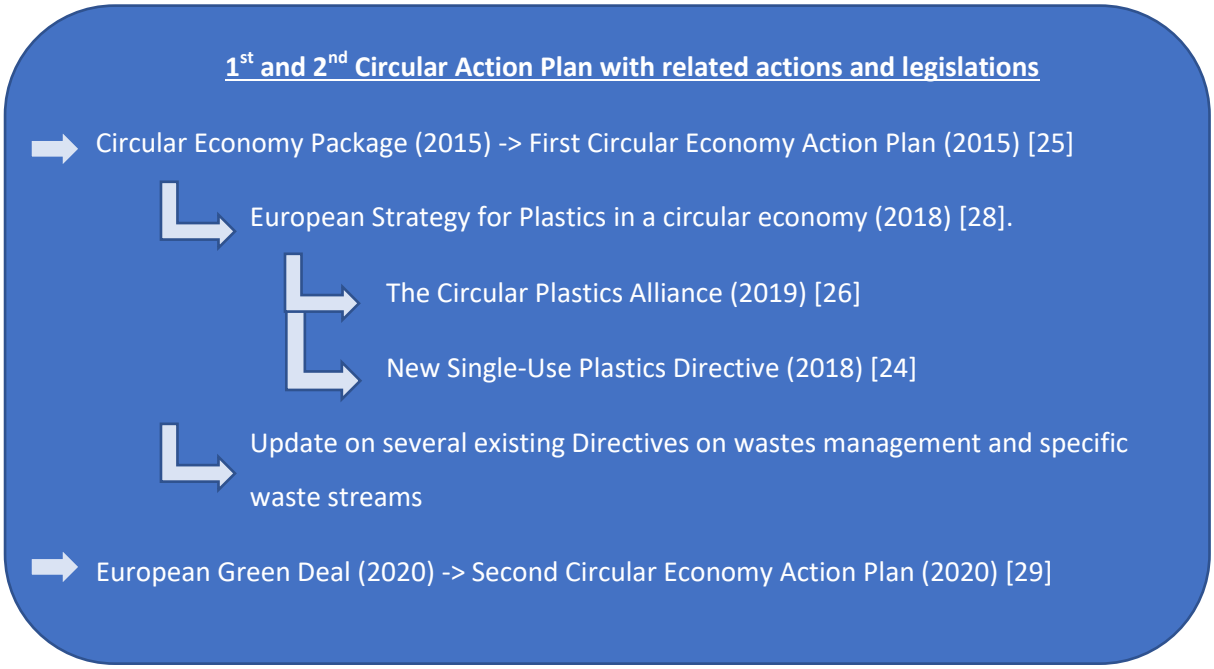
3 EUROPEAN POLICIES ON PLASTIC WASTE

This chapter contains an overview of existing policies on separation, sorting and recycling of plastic wastes.

Since 2015, European policies on plastics are based on the EU strategy on plastics which is part of EU Circular Economy Action Plans. The first plan, in 2015, derived from the Circular Economy Package, and the second plan, adopted in 2020, is one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth.

These action plans introduce several policies focusing or having an impact on plastic waste management. All kind of policies are used: regulatory instruments, informative instruments, financial instruments, voluntary agreements or market-based instruments.

The main plastic policies are summarised in the figure below and described in more details in the next paragraphs.



3.1 FIRST CIRCULAR ECONOMY ACTION PLAN (2015)

The First Circular Economy Action Plan contained 54 actions which have all been delivered or implemented. It led to the update on several existing Directives on wastes management and specific waste streams, and the adoption of the European Strategy for Plastics in a Circular Economy.

➢ **Update on several existing Directives on wastes management and specific waste streams**

The revised legislative framework on waste has entered into force in July 2018. It sets clear targets for reduction of waste and establishes an ambitious and credible long-term path for waste management and recycling.

The Commission has reviewed key targets under the Waste Framework Directive, the Landfill Directive and the Packaging and Packaging Waste Directive.

Core elements of the revised Directives include [25]:

- A common EU target for recycling 65% of municipal waste by 2030;
- A common EU target for recycling 70% of packaging waste by 2030;
- A binding landfill target to reduce landfill to maximum of 10% of municipal waste by 2030;
- A ban on landfilling of separately collected waste;
- Promotion of economic instruments to discourage landfilling;
- Simplified and improved definitions and harmonised calculation methods for recycling rates throughout the EU;
- Concrete measures to promote re-use and stimulate industrial symbiosis –turning one industry's by-product into another industry's raw material;
- Economic incentives for producers to put greener products on the market and support recovery and recycling schemes.

List of the main updated Directives:

1) **New 2018 Waste Framework Directive 2018/851, amending previous Directive 2008/98/EC**

Directive (EU) 2018/851 [23] makes amendments to Directive 2008/98/EC on waste which provides the legislative framework for the collection, transport, recovery and disposal of waste. In the revised Directive, the European Commission has confirmed the strategic importance of waste prevention, also in the context of the circular economy, and has especially highlighted the field of plastic waste prevention as a specific priority [20].

This Directive makes amendments in order to:

- increase targets for preparing for re-use and recycling of waste;
- add a number of new definitions;
- change cease to be waste conditions and requirements;
- set out exemptions for separation of waste collection;
- update record keeping requirements.

Targets

This Directive adds the following three new targets regarding the preparing for re-use and the recycling of municipal waste:

- 55% by weight by 2025;
- 60% by weight by 2030;
- 65% by weight by 2035.

2) **New 2018 Landfill waste Directive 2018/850 amending previous Directive 1999/31/EC**
3) **New 2018 Packaging and Packaging Waste Directive 2018/852, amending previous Directive 1994/62/EC**
4) **New 2018 Directive (EU) 2018/849, amending previous End-of-Life Vehicles Directive 2000/53/EC and previous Waste Electrical and Electronic Equipment Directive, 2012/19/EU**

➢ **European Strategy for Plastics in a Circular Economy**

The objective of the European Strategy for Plastics in a Circular Economy is to transform the way plastics and plastics products are designed, produced, used and recycled. The actions help to ensure that by 2030, all plastics packaging should be recyclable. To achieve its ambitious vision, the Strategy foresees actions to improve the economics and quality of plastic recycling; to curb plastic waste and littering; to drive investments and innovation; and to harness global action.

Single-Use Plastics Directive, 2019/904

The Single-Use Plastics Directive [24] will impact plastic food-contact materials and articles through, among others, a ban on certain single-use plastics, increased collection goals for plastic packaging, extended producer responsibility schemes, and design requirements for beverage containers.

Article 5 of the Directive sets restrictions in Member States on placing in the market single-use plastic products mentioned at "Annex Part B" and products made from oxo-degradable plastic:

(1) Cotton bud sticks

(2) Cutlery (forks, knives, spoons, chopsticks)

(3) Plates

(4) Straws, except if they fall within the scope of Directive 90/385/EEC or Directive 93/42/EEC

(5) Beverage stirrers

(6) Sticks to be attached to and to support balloons, except balloons for industrial or other professional uses and applications that are not distributed to consumers, including the mechanisms of such sticks;

(7) Food containers made of expanded polystyrene, i.e. receptacles such as boxes, with or without a cover, used to contain food which:

(a) is intended for immediate consumption, either on-the-spot or take-away,

(b) is typically consumed from the receptacle, and

(c) is ready to be consumed without any further preparation, such as cooking, boiling or heating, including food containers used for fast food or other meal ready for immediate consumption, except beverage containers, plates and packets and wrappers containing food;

(8) Beverage containers made of expanded polystyrene, including their caps and lids;

(9) Cups for beverages made of expanded polystyrene, including their covers and lids.

Circular Plastics Alliance

Presented in 2019, the Circular Plastics Alliance [26] is also part of the European Strategy for Plastics in a circular economy [28].

Make plastics more circular decreases plastic pollution. This is a priority for the EU. Recycling more plastics is vital. The Circular Plastics Alliance [26] gathers public and private stakeholders in the plastics value chains to promote voluntary actions and commitments for more recycled plastics. The Circular Plastics Alliance wants to ensure that 10 million tonnes of recycled plastics are used to make products in Europe in 2025.

3.2 SECOND CIRCULAR ECONOMY ACTION PLAN (2020)

In 2020, the European Commission has adopted a new Circular Economy Action Plan - one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth.

The new Action Plan introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value. This new Action Plan, which is also linked with the EU Industrial Strategy, presents measures to [29]:

Make sustainable products the norm in the EU:

The Commission will propose legislation on Sustainable Product Policy, to ensure that products placed on the EU market are designed to last longer, are easier to reuse, repair and recycle, and incorporate as much as possible recycled material instead of primary raw material. Single-use will be restricted, premature obsolescence tackled and the destruction of unsold durable goods banned.

Empower consumers:

Consumers will have access to reliable information on issues such as the reparability and durability of products to help them make environmentally sustainable choices.

Focus on the sectors that use the most resources and where the potential for circularity is high:

The Commission will launch concrete actions on:

- **packaging** – new mandatory requirements on what is allowed on the EU market, including the reduction of (over)packaging

- **plastics** – new mandatory requirements for recycled content and special attention on microplastics as well as biobased and biodegradable plastics
- **textiles** – a new EU Strategy for Textiles to strengthen competitiveness and innovation in the sector and boost the EU market for textile reuse
- **construction and buildings** – a comprehensive Strategy for a Sustainably Built Environment promoting circularity principles for buildings
- **food** – new legislative initiative on reuse to substitute single-use packaging, tableware and cutlery by reusable products in food services
- **electronics and ICT** – a 'Circular Electronics Initiative' to have longer product lifetimes, and improve the collection and treatment of waste

Ensure less waste:

The Commission will explore setting an EU-wide, harmonised model for the separate collection of waste and labelling. The Action Plan also puts forward a series of actions to minimise EU exports of waste and tackle illegal shipments.

3.3 OTHER RELEVANT EU INITIATIVES

Resource Efficient Europe

The Europe 2020 Flagship Initiative "Resource Efficient Europe" aims "to support the shift towards a resource efficient and low-carbon economy that is efficient in the way it uses all resources [22]. The aim is to separate our economic growth from resource and energy use, reduce CO_2 emissions, enhance competitiveness and promote greater energy security." The strategy states that "At EU level, the Commission will work to establish a vision of structural and technological changes required to move to a low carbon, resource efficient and climate resilient economy by 2050 which will allow the EU to achieve its emissions reduction and biodiversity targets. This includes disaster prevention and response, harnessing the contribution of cohesion, agricultural, rural development and maritime policies to address climate change, in particular through adaptation measures based on more efficient use of resources, which will also contribute to improving global food security."

Lead Market Initiative

DG Enterprise and Industry has launched a policy to drive six lead markets, bringing the European Commission, Member States and industry together [22]. Of particular interest from a plastics

perspective are the bio-based products and recycling markets. The programme develops policy initiatives under four broad themes: standardisation, labelling and certification; legislation; public procurement; and complementary actions. The recycling programme aims to, for example, set up eco-innovation projects to develop new recycling techniques and support best practice networks.

4 METHODOLOGICAL APPROACH

4.1 STUDY OBJECTIVES

The scope of this research work is to identify and comparatively analyse policies to promote the separation, sorting and recycling of plastic waste at partners' territories. The comparative analysis of policies will provide partners with evidence useful for revising waste management plans, increasing investments, and stimulating growth through the proliferation of waste management businesses.

Project partners collected evidence on the aforementioned policies with a focus on their regional and national territories. Each documented policy (see the form at Annex A) was assessed individually so as to proceed to a ranking. The "best" (most effective) policies to promote the separation, sorting and recycling of plastics wastes are presented in this report – that which scored the highest in all metrics in aggregate.

The study seeks to address the following questions:

I. Which are the most effective proven policies to promote the separation, sorting and recycling of plastics wastes in the EU? What are their key features?
II. What are the main issues encountered prior to and during the implementation of these policies?
III. What benefits have these policies delivered?
IV. Can these policies be easily replicated in other areas?

4.2 DEFINITION OF THE 5 POLICY MEASURES

A **policy** is a deliberate system of principles for decision-making and rational outcomes. A policy is a declaration of intent and is implemented as a protocol or procedure. Policies are generally adopted by a governance body within an organization. Policies can assist in both subjective and objective decision making [19]. The term may apply to government, private sector organizations and groups, as well as individuals. Policy can also refer to the process of making important strategic decisions, including defining and choosing different alternatives, such as initiatives or spending priorities, based on their effect. Policies can be understood as political, managerial, financial, and administrative mechanisms arranged to reach explicit goals [19].

This subchapter presents five types of policy measure (regulatory, market based, financing, voluntary and informative).

1. Regulatory instruments are mandated by law and cover, for example, bans, prohibitions and standards [20].

At European level, Regulations are legal acts that apply automatically and uniformly to all EU countries as soon as they enter into force, without needing to be transposed into national law. They are binding in their entirety on all EU countries [21]. Directives require EU countries to achieve a certain result, but leave them free to choose how to do so. EU countries must adopt measures to incorporate them into national law (transpose) in order to achieve the objectives set by the directive. National authorities must communicate these measures to the European Commission [21].

2. Market-based instruments are instruments for policymakers who wish to address environmental issues and achieve environmental objectives by encouraging targeted changes in business practices and consumer behaviour [20]. Taxes and fees, subsidies and extended producer responsibility, and deposit refund schemes are known market-based instruments. If well-designed, they could also give rise to revenue for supporting national budgets as well as eventually acting as a means of reducing the reliance on labour-related taxes.

3. Voluntary agreements usually refer to agreements that are not the result of an exclusively political decision-making process but the outcome of negotiations between social partner organisations and other relevant stakeholders [20]. Since the 1990s, the EU has been developing a new regulatory policy, which increasingly puts emphasis on the use of such alternative instruments that are complementary to traditional legislation.

4. Financial instruments are a different kind of measure. Public and private investment can support the implementation of regulatory as well as market-based instruments [20]. Different forms of investments can support various stakeholders and be applied to several stages of the plastic product's life cycle. Development of infrastructure for plastic waste recycling, provision of funding for research and development and new businesses are considered to be financial instruments.

5. Informative instruments that can smooth the exchange of information among the plastics value chain and influence the behaviour of targeted stakeholders can contribute to plastic waste separation, sorting and recycling [20]. Awareness and education, as well as environmental labelling

are identified tools that public authorities can implement to achieve that purpose and they are all reflected in the measures planned by the countries.

4.3 DATA COLLECTION

Related policies to promote the separation, sorting and recycling of plastics waste were collected with the contribution of all PLASTECO project partners through: (i) desk research and (ii) information provided by each partners' regional stakeholder group. Desk research involved collecting, sorting and synthesizing relevant information and data from previous research and documentation. Annex A presents the questionnaire sent to all project partners.

4.4 EVALUATION OF POLICIES

The 35 collected policies were evaluated based on 4 criteria "Relevance", "Impact", "Problems encountered" and "Transferability potential" to identify the 10 most effective policies. Annex C presents the total evaluation score of all collected policies. The scoring system is of course subjective since information is partially missing for many policies, and since it is also based on the understanding and feeling of the writer.

Table 3. Evaluation criteria.

Criteria	Description
Relevance	This criterion measures the extent to which the identified policy is suited to the topic of this study that is "effective (proven) policies to separate, sort and recycle plastic wastes". More specifically, determines if the documented policies are in alignment with the case research objectives.
Impact	This criterion identifies the benefits that the documented policy delivered. The policy should have achieved results that are measurable and well documented.
Problems encountered	This criterion assesses the dimension of main socio-economic and political problems or other difficulties that have blocked the successful adoption or/and execution of policy.
Transferability	This criterion evaluates if the documented policies could be applicable to other EU regions.

5 FINDINGS

This section presents: (i) a short description of the 35 collected policies sent by PLASTECO partners, (ii) descriptive results after data analysis, and (iii) a comparative analysis of all policies regarding common challenges, benefits, and their transferability potential.

5.1 SHORT DESCRIPTION OF ALL COLLECTED POLICIES

The following Table 4 presents a brief description of all policies collected by PLASTECO partners.

Table 4. Brief description of all 35 policies collected.

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Voluntary agreement	2010	The aim of separate lightweight packaging collection is to collect as much material as possible with as little impurities as possible for high-quality recycling.	Municipal wastes	Regional	Austria
Innovative Separate Waste Collection System for Public Space	Regulatory, Voluntary agreement	2019	The main objective for introducing improved waste separation stations in public places is to raise awareness and approach the issue of littering.	Municipal wastes	Local	Austria
Lesson Plan on Plastics	Informative	2020	The main target of the lesson plan is awareness-raising for the comprehensive topic of plastic and for the prevention of plastics waste.	Municipal wastes	Regional	Austria
Implementation of municipal waste advisors	Regulatory, Voluntary Agreement	1986	The main focus of the work of municipal waste advisers is on awareness building, public education of the population on separate waste collection, waste prevention, re-use, and sustainable consumption within the local or regional context.	Municipal wastes	National, Regional	Austria
Ecotax applied to all transport bags	Market based, Financial	2009	The purpose of introducing Ecotax is to reduce the use of plastic packaging by discouraging free distribution and encourage the manufacture of bags made of biodegradable or recyclable materials.	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	National	Romania

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Landfill tax/contribution for the circular economy	Market based, Financial	2013	The policy aims to avoid disposing of recyclable waste in landfills and limiting landfilling to the necessary minimum, preventing or reducing as far as possible negative effects on the environment from the landfilling of waste.	Municipal wastes, Commercial & Industrial wastes	National	Romania
Selective collection campaigns	Informative	2014	The purpose of these campaigns was to promote the IWMS project implemented in the respective county, with emphasis on the existing separate collection modalities.	Municipal wastes	National	Romania
The penalty paid by packaging producers and OTRs	Regulatory, Financial	2008	This instrument was introduced to stimulate producers of packaging and packaged products to meet the objectives of recycling / recovery, being in fact a penalty. Also aims to increase the separate collection rate including and stimulate the prevention of waste generation.	Commercial & Industrial wastes	National	Romania
AURADECHET	Financial	2013	The aim of this policy is: ▪ To help companies to invest in new exemplary equipment and solutions for sorting and / or recycling waste; ▪ To grid the territory with waste disposal/collection facilities dedicated to professionals.	Commercial & Industrial wastes	Regional	France

Policy	Type	Year	Short description	Type of waste	Coverage	Country
ORPLAST "Objective PLASTic Recycling"	Market based, Financial	2015	The aim of this policy is: ▪ To stimulate the demand for recycled plastics by encouraging plastic manufacturers to develop their supply chains, and to make their clients aware of the existence of such feedstocks; ▪ To maintain a decent price for the regenerated resins versus virgin resins in participating to the extra costs of these resins.	Commercial & Industrial wastes	National, Regional	France
Coordinated regional policies to improve plastic wastes management	Regulatory, Voluntary Agreement, Financial	2017	These coordinated regional policies aim to improve plastic wastes management.	Municipal wastes, Commercial & Industrial wastes	Regional	France
Sindra	Informative	2000	The main objectives of Sindra are the following: ▪ Provide local public authorities with a tool to help them in waste management and prevention. ▪ To enable each local authority to be in line with the others, to create complementarities and synergies to achieve economies of scale. ▪ To enable waste management professionals to make themselves known, to participate in a better knowledge of waste management in the territories and to develop partnerships with various stakeholders.	Municipal wastes, Commercial & Industrial wastes	Regional	France

Policy	Type	Year	Short description	Type of waste	Coverage	Country
PET Baltija	Financial	2018	The operations undertaken by the company are aimed at transforming "PET Baltija" in the most advanced and performing PET recycling company in Northern Europe.	Municipal wastes, Commercial & Industrial wastes	National	Latvia
Nature and Technology Park "URDA"	Informative	2018	The education centre was established to provide theoretical and practical knowledge on waste management and environmental protection, from kinder garden to university research, supporting education activities within the whole Vidzeme region and Latvia.	Municipal wastes	National, Regional Local	Latvia
Ziemeļvidzeme Regional Waste Management plan 2014-2020	Regulatory, Voluntary Agreement, Financial, Market-based, Informative	2014	The main objectives of the region's waste management are related to: ▪ Stimulating the public opinion in order to minimize the generation of waste; ▪ Strengthening the operation of the regional waste management centre; ▪ Returning as much and as high-quality as possible secondary raw materials to the economy, ensuring a more consumer-friendly range of collection infrastructure networks and services; ▪ Improving the quality of recyclable resources by treating them for recovery.	Municipal wastes, Commercial & Industrial wastes	Regional,Local	Latvia

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Zaļa Josta - Producers responsibility scheme for packaging	Market-based	2002	The goal of the agreement is to contribute to a society in which entrepreneurs take responsibility and care for the collection and recycling of used packaging, including plastics.	Municipal wastes, Commercial & Industrial wastes	National	Latvia
Plastica Seconda Vita	Regulatory, Market based	2004	▪ Create and promote a market for recycled plastics and monitor how, when, where and how much they are used; ▪ Develop waste reduction policies and enhance recycled polymers; ▪ Make consumers and industrial users confident in this material through a strong, transparent and reliable certification, acknowledged by the Italian Accreditation Body (Accredia); ▪ Show that waste collection and recycling are useful and effective in transforming wastes to resources.	Municipal wastes, Commercial & Industrial wastes	National	Italy
Circular Economy Observatory	Voluntary agreement, Informative	2018	The main objective of this policy is to share the framework of the situation, problems and possible solutions, with a view to develop the circular economy and the energy transition.	Municipal wastes, Commercial & Industrial wastes	Regional	Italy

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Reverse RPET Nudge System	Market based, Voluntary Agreement	2018	The system doesn't provide a caution for the return of empty bottle, but an incentive like fidelity card. So the system is based on "nudge philosophy" and the consumer is involved with a spontaneous gesture not quite obliged like a caution system.	Municipal wastes	National	Italy
ECOTASSA	Market based	2012	▪ Reduction of the quantities of waste sent to landfills ▪ Achievement of optimal waste recovery performance by plants that want to obtain the "ecotax" ▪ Use of the tax for environmental purposes and in particular for projects to reduce waste, combat illegality and environmental remediation.	Municipal wastes	Regional	Italy
Plastica Consapevole	Informative	2019	Palazzo Lombardia hosts about 3000 people, and receives hundreds of guests daily so the main objectives are: ▪ Increase people's awareness on conscious and reduced use of disposable plastic ▪ Reduce the production of plastic wastes ▪ Increase the use of tap water instead of buying mineral water in bottles from vending machines.	Municipal wastes	Regional, Local	Italy

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Rivending Project	Market based, Voluntary Agreement	2019	The RiVending project is an example of a virtuous value chain of mechanical recycling and is also potentially scalable and exportable for many types of plastic products for short term applications, thus becoming a model that is bound to provide interesting volumes of selected secondary raw materials in the future.	Municipal wastes	National, Regional	Italy
Increase of the price-environmental fee of the thin plastic bags	Regulatory, Market based	2018	The immediate goal of the increase in plastic bag price was the reduction of plastic waste (by discouraging consumers to use plastic bags and use reusable bags instead). The indirect goal is to raise the awareness of the general public for the detrimental effect of plastics waste on the environment.	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	National	Greece
"In my cup" project	Market based, Financial, Voluntary agreement	2019	Every day 1.000.000 single-use plastic cups are consumed in Greece and very few of these are recycled. The rest of them end up in the landfills and in the ocean. By changing slowly and steadily the consumers' daily habits, the amount of plastic waste can be significantly reduced.	Commercial & Industrial wastes, Microplastics in waters	National	Greece

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Municipality of Lipsi	Market based, Voluntary Agreement	2014	The basis behind this integrated policy is to reduce waste, to encourage recycling, to raise environmental awareness for citizens and to promote the island as an environmental friendly touristic destination.	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	Local	Greece
Say no to plastic straws	Market based, Informative	2018	The aim of the SeaChange Greek Islands program is to contribute to the change of our relationship with the sea. To motivate and to understand the value of the environment, to maintain the beauty of pristine nature, to work together to protect our most important asset and to make multi-level interventions on the islands for the protection of marine environment.	Commercial & Industrial wastes	Regional	Greece
Rewarding Recycling	Voluntary agreement, Financial	2016	▪ Reduce the final disposal of packaging waste by encouraging its recycling in order to reduce energy consumption and consumption of primary raw materials ▪ Encourage initiatives and the separation of waste at source ▪ Prevent the generation of recycling residues using new technologies.	Commercial & Industrial wastes	National	Greece

Policy	Type	Year	Short description	Type of waste	Coverage	Country
"Münchner Einwegverbot": "Munich Prohibition on one-way"	Regulatory	1991	The main objective is to collect (and afterwards recycle) also recyclable products which are not related to packaging. This effort should increase the overall recycling rate and should avoid products' burning.	Commercial & Industrial wastes	Local	Germany
Stop of financial support on artificial turf pitches containing microplastic by the ministry of Baden-Wurttemberg	Financial	2021	The main objective is to reduce microplastics in water.	Reduction of microplastics in water bodies	Regional	Germany
Municipal packaging tax in the city of Tübingen	Financial	2021	The main objective is to reduce the amount of single-use packaging and single-use tableware including cutlery by introducing a tax. Single-use packaging and single-use tableware should be taxed with 50 cents and single-use cutlery with 20 cents.	Municipal wastes	Local	Germany
Introduction of the Recycling Bin ("Wertstofftonne") in Augsburg	Regulatory, Voluntary Agreement	2020	The main objective is to collect (and afterwards recycle) also recyclable products which are not related to packaging. This effort should increase the overall recycling rate and should avoid products' burning.	Municipal wastes	Local	Germany

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Waste classification, sampling, and analysis	Regulatory, Informative	2015	The overall goal of the project is the exchange of experience and knowledge transfer regarding the implementation of European legislation in the field of waste in Bulgaria.	Municipal wastes, Commercial & Industrial wastes	National, regional, local	Bulgaria
Perpetuum Mobile Albena Co-digestion of kitchen and agricultural waste	Market-based	2012	The project was focused on improving resort's resource efficiency, energy diversification, cost effectiveness, food quality and waste management.	Municipal wastes, Commercial & Industrial wastes	Local	Bulgaria
Plovdiv declared war, "Paper war"!	Market based, Informative	2017	The goal of the campaign is to enhance young people's commitment towards proper waste management and to show how our daily habits affect the environment. It targets children in school age, since responsible behavior needs to be educated as early as possible. "Paper war" is aimed at popularization of the idea for preservation of the environment through separating, sorting and recycling of the generated waste.	Municipal wastes	Local	Bulgaria
Municipal Enterprise "Sofia Waste Treatment Plant"	Market based, Financial	2015	Main objective is to treat all municipal waste of Sofia in an ecological, economically efficient and sustainable manner in accordance with all EU and national regulatory measures and with care for people and nature.	Municipal wastes, Commercial & Industrial wastes	Local	Bulgaria

5.2 DESCRIPTIVE RESULTS OF ALL COLLECTED POLICIES

This section presents the descriptive results of all 35 policies collected. It should be noted that some policies fall under more than one categories (e.g. a policy is both regulatory and market-based).

Type of policies

The sample size consisted of 35 cases collected by all project partners. Out of 35 collected policies, 16 policies were Market-based, 13 Financial, 12 Voluntary agreements, 10 Informative and 10 Regulatory (see Figure 9). 13 out of 35 were of one type (1 regulatory, 3 market-based, 4 financial, 5 informative, 1 voluntary agreement), while all others were mixed, incorporating at least one more type.

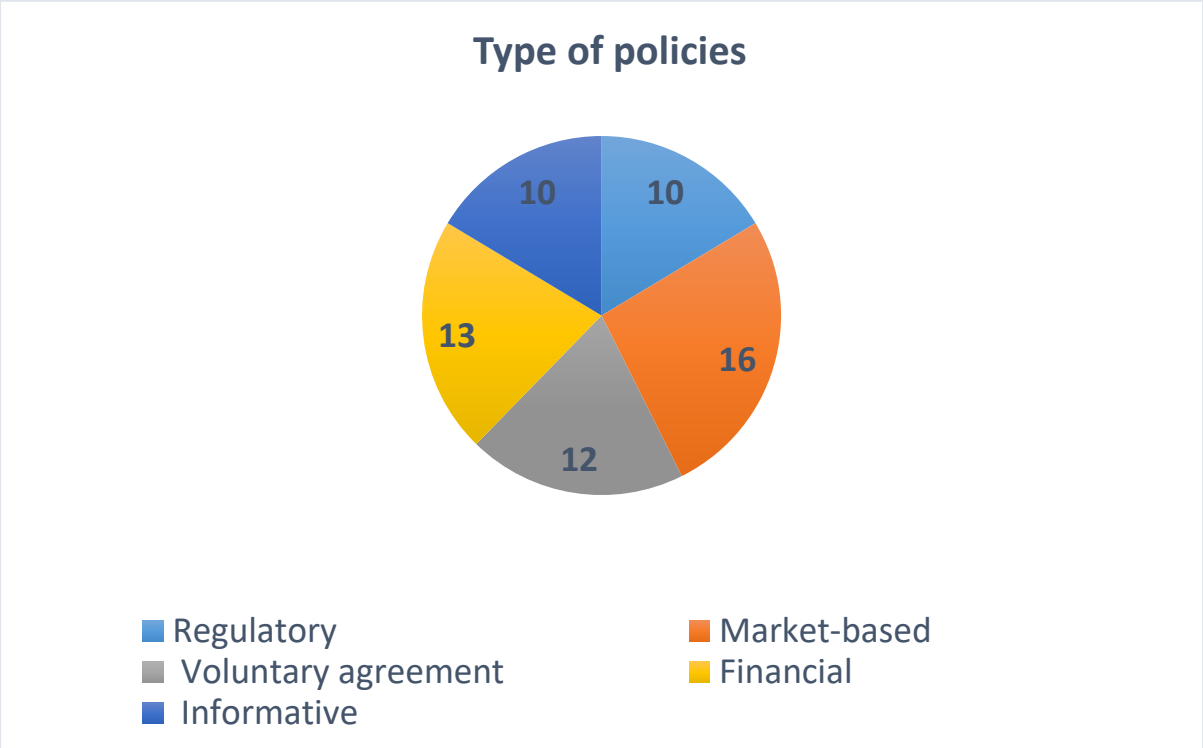


Fig. 9. Number of policies collected according to their type.

Geographical scale

Fig. 10 illustrates the different geographical scale collected policies belong. 17 policies are implemented at National level (i.e. 38%), 16 policies at Regional level (i.e. 35%) and finally 12 policies at Local level (i.e. 27%).

Since 22 policies are of more than one type (e.g. are regulatory and informative) and since most (25) policies are implemented on more than one geographical level (e.g. both national and regional), it

was impossible to find a correlation between the type of policy and its geographical scale. In any case, there is a more or less even distribution of types of policies per geographical level of implementation.

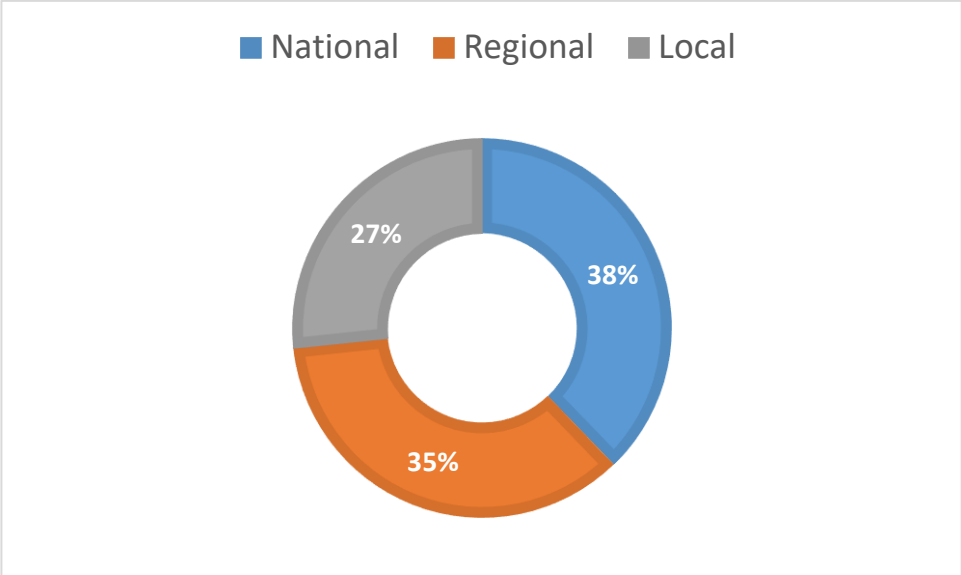


Fig. 10. Geographical scale of collected policies.

Type of waste

Fig. 11 presents the type of waste that collected policies address. Specifically, 27 policies address Municipal wastes, 20 policies address Commercial and Industrial wastes, whereas 4 policies address Microplastics in waters.

Municipal wastes were mostly addressed by regulatory, voluntary agreement and informative policies, while commercial and industrial wastes were covered mostly by market-based and financial types of policies. There was no correlation between the type of waste and the geographical coverage.

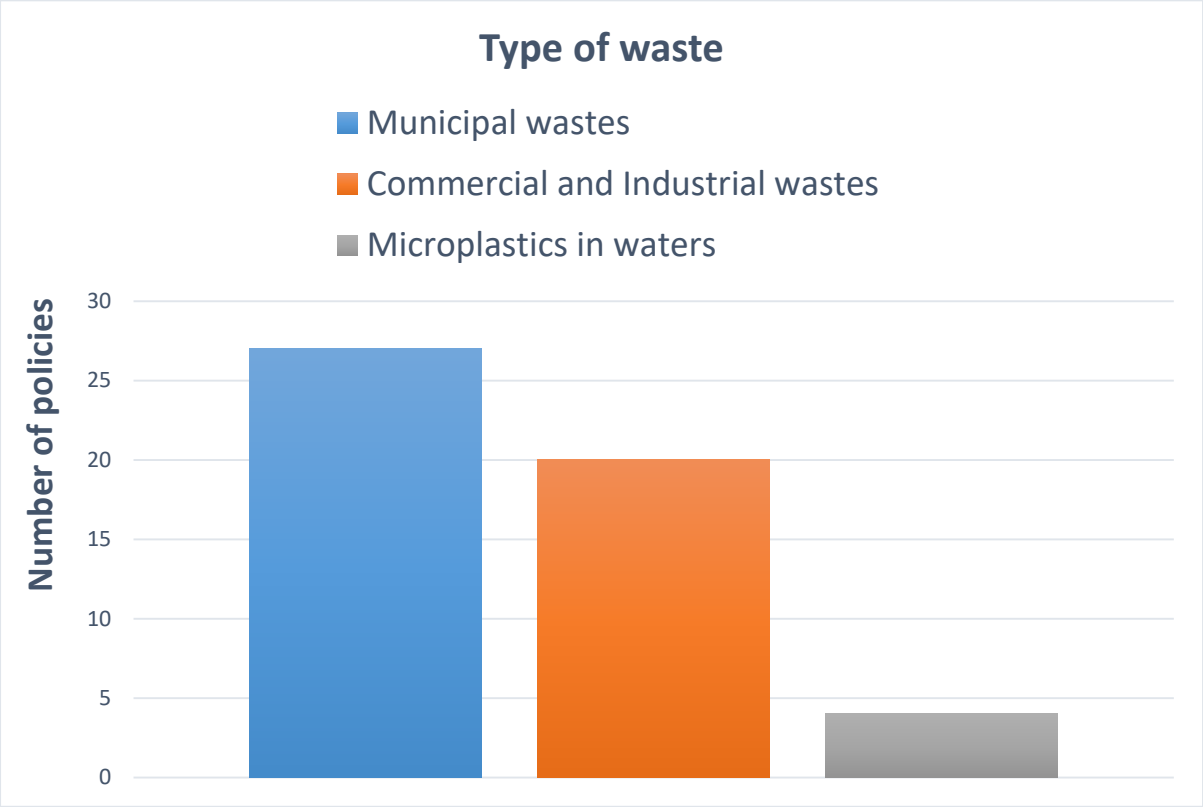


Fig. 11. Number of policies collected along with the type of waste addressed.

Plastic management

Fig. 12 presents the plastic management processes the collected policies promote; 24 policies promote the recycling of plastics, 21 policies promote the separation of plastics, 20 policies promote the sorting of plastics and finally, 11 policies promote the uptake of recycled plastics.

The uptake of recycled plastics is mostly associated with regulatory, market-based and financial types of policies, while separation and sorting are mostly addressed by regulatory, informative, and voluntary agreements.

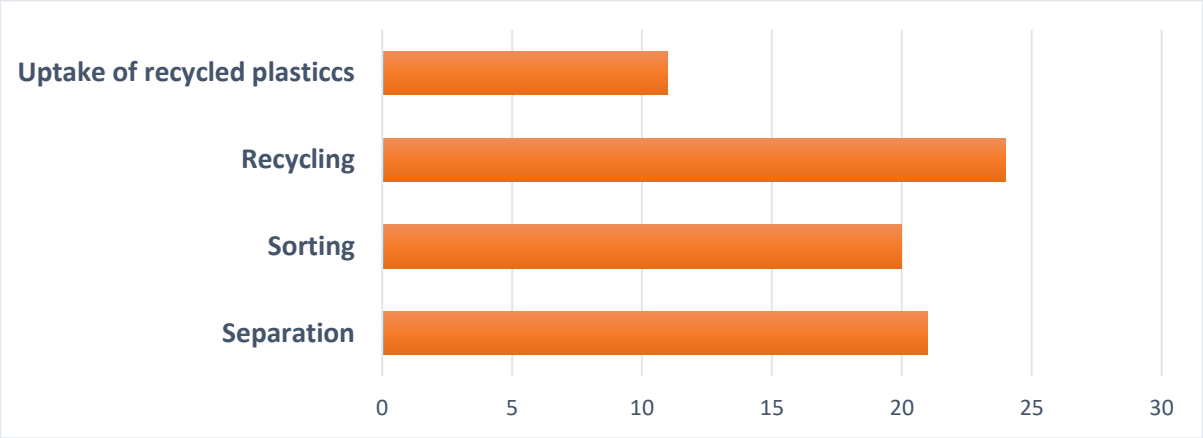


Fig. 12. Plastic management processes the collected policies promote.

Key stakeholders of the plastics value chain

A large variety of key stakeholders were listed in the case studies, with no evident pattern or singularity. Also the lack of explanation information on their role in the implementation and/or design of the policies makes it impossible to make a proper analysis.

5.3 COMPARATIVE POLICY ANALYSIS RESULTS

The comparative analysis of the 35 policies collected shows that the common challenges that emerge from the data are analogous to the ones identified in relevant literature and EU studies about plastic waste management. At the same time, however, there are significant differences among the 35 policies that should be taken into consideration when interpreting the results of this analysis.

First of all, each policy has been developed within a different Member State policy framework with a different outlook on the management of plastic waste. Although EU efforts tend to harmonise waste management frameworks, there are still considerable differences in actual implementation and priority areas. For example, the issue of illegal dumping and importing of plastic waste is prominent in discussions about plastic waste management in Bulgaria and Romania; the same cannot be said of Germany and Austria, where the uptake of recycled plastics by the market is a higher priority.

Secondly, collected policies are quite heterogeneous: in their level of implementation (national, regional, local), objectives (separation, sorting, recycling, uptake), type (regulatory, market-based, voluntary, financial, informative), and target groups (others address consumers and others the

industry). Thirdly, the collected policies vary in their implementation timeframe; some have been in place for over 30 years, while others have been introduced just this year. Newer policies do not have enough time to be evaluated properly, while older policies can appear without issues.

5.3.1 CHALLENGES AND ISSUES

Table 5 below presents all collected policies along with their problems, as identified by project partners.

Table 5. List of issues encountered during the implementation of the 35 collected policies.

Policy	Type	Type of waste	Country	Issues
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Voluntary agreement	Municipal wastes	Austria	For separate collection, extra resources (containers, space, workforce) must be provided. This is however, compensated in **monetary terms** by higher fees for the material. A further obstacle is the proneness for contamination of the packaging material due to lack of discipline among citizens.
Innovative Separate Waste Collection System for Public Space	Regulatory, Voluntary agreement	Municipal wastes	Austria	The most significant obstacle for the pilot project was the **costs** (collection containers were expensive because they were custom-made in small quantity). The accuracy with which the waste is separated decreased over time with version 1.0. However, it must be stressed that in the "waste separation system 1.0" there was only the possibility of separating three fractions. So, people were not able to perform the correct waste separation in the same way as they do it at home. This is only possible with the current "waste separation system 2.0" that enables the separation into 7 fractions. With system 2.0, a good selectivity could be maintained over time. Previously the municipal workers only had to empty one container, now they have to provide space for 7 different fractions separately on the often rather small collection vehicle. Therefore, a minor **adjustment of the workflow** was sometimes necessary.

Policy	Type	Type of waste	Country	Issues
Lesson Plan on Plastics	Informative	Municipal wastes	Austria	No severe problems were encountered. Funding had to be provided for all the tasks and operations mentioned before. Furthermore, a sound technical input for the creation of the pedagogical materials had to be provided by the client. From the application side of the lesson plans, motivation and personal interests of educators and students are critical aspects.
Implementation of municipal waste advisors	Regulatory, Voluntary Agreement	Municipal wastes	Austria	The main problems in the initial phase were a low willingness to provide additional **financial** means for the employment of waste advisers and only slowly did the employment of waste advisers spread beyond the borders of the region of Styria. In addition, other concepts were also pursued in other federal states during this period to achieve a more careful handling of waste. Initially, one of the biggest opponents of the employment of waste advisers were the private waste management companies, which feared that the quantities of waste would decrease and that pricing would become more complicated.
Ecotax applied to all transport bags	Market based, Financial	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	Romania	During the implementation of the Ecotax, there is **no data** regarding specific variation either in the number of manufacturers who put plastic bags and shopping bags on the market neither on the number of shopping bags and bags placed on the market. This might mean that the instrument has not reached yet its intended purpose, reducing the use of this type of packaging.

Policy	Type	Type of waste	Country	Issues
Landfill tax/contribution for the circular economy	Market based, Financial	Municipal wastes, Commercial & Industrial wastes	Romania	**No public records** yet.
Selective collection campaigns	Informative	Municipal wastes	Romania	One of the main problem encountered was **the lack of interest** of the population driven by the fact that approximatively half of the Romanians have the necessary infrastructure to make permanent selective collection. Due to this situation, they are not concerned with selective collection or recycling. The main excuses invoked by the respondents who do not select the waste were: the convenience, the ignorance, the fact that I do not know what the process of selective collection implies and the lack of confidence in the collection system.

Policy	Type	Type of waste	Country	Issues
The penalty paid by packaging producers and OTRs	Regulatory, Financial	Commercial & Industrial wastes	Romania	▪ The **value of the penalty** (2 lei / kg) is disproportionately large compared to the current costs of packaging waste management and 20 times the penalty paid by the local public administration authorities for not meeting the objective of reducing the amount of waste deposited; ▪ **Lack of inspection** and control activities regarding packaging and packaging waste carried out by the National Environmental Guard. ▪ The functional OTRs currently have a collection capacity that covers less than 10% of the local consumer goods industry. The recycling companies say that in Romania, in fact, much larger quantities are recycled than those officially registered, but there is **no mechanism by which all the information on the recycled quantities is centralized** and through which the traceability of the waste is established
AURADECHET	Financial	Commercial & Industrial wastes	France	The regional council has launched a similar scheme in 2019. The concertation with ADEME who was already running AURADECHET came late and some fields of action are eligible to both schemes. This lack of concertation leads to confusing for companies, and induces asynchronic co-financing that are a loss of time for our respective public bodies managing these subsidies twice for some projects.

Policy	Type	Type of waste	Country	Issues
ORPLAST "Objective PLASTic Recycling"	Market based, Financial	Commercial & Industrial wastes	France	The effective implementation of some projects that were selected for a grant, did not meet expectations. What companies finally achieve can be less ambitious than what they committed to do. The tool called "financial support scheme to the purchasing of regenerated resins" was not successful because companies that used it, did not increase significantly their amount of recycled plastics used.
Coordinated regional policies to improve plastic wastes management	Regulatory, Voluntary Agreement, Financial	Municipal wastes, Commercial & Industrial wastes	France	Regarding the SRADDET, the targets are ambitious and would impact many private and public actors. Therefore, it was difficult to get a consensus which was approved by the majority. Regarding the regional voluntary agreement between the Regional Council and the plastic production sector, it's still under construction.

Policy	Type	Type of waste	Country	Issues
Sindra	Informative	Municipal wastes, Commercial & Industrial wastes	France	No major problems were encountered during the implementation of the observatory but certain difficulties must be taken into account: ▪ Need to provide a simple survey questionnaire to ensure **proper data collection** ▪ Need to constantly adapt to the context that can evolve, particularly with new regulatory mechanisms that require adding new data to the observatory (e.g. if a new policy is implemented in the Region, new data can be added to the observatory to follow the development of this particular policy). ▪ Need to have the most detailed data possible (for each municipality and joint local authority) to adapt to changes in administrative entities.
PET Baltija	Financial	Municipal wastes, Commercial & Industrial wastes	Latvia	n/a
Nature and Technology Park "URDA"	Informative	Municipal wastes	Latvia	n/a

Policy	Type	Type of waste	Country	Issues
Ziemeļvidzeme Regional Waste Management plan 2014-2020	Regulatory, Voluntary Agreement, Financial, Market-based, Informative	Municipal wastes, Commercial & Industrial wastes	Latvia	The main problem of waste management companies which provide full scale services starting from collection till the landfilling of non-recyclable waste is the dependence from market conditions for prepared recyclables. At the beginning there were limited recycling possibilities for plastic in Latvia. The situation has changed with start-up operation of some plastic recycling enterprises in Latvia. Recyclables must be stored at the premises of Daibe center until the market shows an advantageous price policy.
Zaļa Josta - Producers responsibility scheme for packaging	Market-based	Municipal wastes, Commercial & Industrial wastes	Latvia	The recovery or recycling has to be confirmed with a confirmation from the recycling or recovery plant and recyclables prior to the recycling or recovery could pass several intermediator companies, who combined cargos of recyclables. It is difficult to trace back the initial cargo which was collected, sorted, and treated in Latvia for further recycling or recovery and to obtain a written confirmation of that particular cargo.
Plastica Seconda Vita	Regulatory, Market based	Municipal wastes, Commercial & Industrial wastes	Italy	Regulatory: non-harmonization on national and EU territory (including on food contact), poor or delayed GPP implementation; Cultural: perception of plastic as a material of lesser value; consumer awareness of the importance and benefits of recycled materials. Technical: availability of high-quality recycled and recycling difficulties for certain plastic waste fractions. Economic: fixed costs for recycling, disparities at European level (e.g. energy cost).

Policy	Type	Type of waste	Country	Issues
Circular Economy Observatory	Voluntary agreement, Informative	Municipal wastes, Commercial & Industrial wastes	Italy	No problems in the implementation of the plastic table.
Reverse RPET Nudge System	Market based, Voluntary Agreement	Municipal wastes	Italy	There are two substantial points of conflict: ▪ Conflict with the current waste management regulation which provides the obligation to supply municipal waste to the national plastic recycling consortium CONAI / COREPLA. This rule would therefore not allow CORIPET to be able to collect urban waste directly but must first find an agreement with the national consortium; ▪ The other conflict is with the national CONAI / COREPLA consortium itself, which collects the same type of plastic. This would risk having two inefficient collection systems that would not allow the European recycling targets to be achieved.
ECOTASSA	Market based	Municipal wastes	Italy	It is necessary to check the data declared by the plants that make the recovery percentage declarations. There is still low traceability on the materials produced by the recovery activities. The minimum recovery rates must be established on the basis of the actual technical potential of the recovery and it is not easy to estimate them.

Policy	Type	Type of waste	Country	Issues
Plastica Consapevole	Informative	Municipal wastes	Italy	There were not main problems during the implementation.
Rivending Project	Market based, Voluntary Agreement	Municipal wastes	Italy	Points of attention for the executive plan (after pilot): ▪ Organization of commercial activity across the territory (distributors) ▪ Organization of plastic collection activity weekly (distributors) ▪ Business model implementation
Increase of the price-environmental fee of the thin plastic bags	Regulatory, Market based	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	Greece	n/a
"In my cup" project	Market based, Financial, Voluntary agreement	Commercial & Industrial wastes, Microplastics in waters	Greece	No problems have been recorded.

Policy	Type	Type of waste	Country	Issues
Municipality of Lipsi	Market based, Voluntary Agreement	Municipal wastes, Commercial & Industrial wastes, Microplastics in waters	Greece	No problems have been recorded.
Say no to plastic straws	Market based, Informative	Commercial & Industrial wastes	Greece	No problems have been recorded.
Rewarding Recycling	Voluntary agreement, Financial	Commercial & Industrial wastes	Greece	No problems have been recorded.
"Münchner Einwegverbot": "Munich Prohibition on one-way"	Regulatory	Commercial & Industrial wastes	Germany	No problems are known with regard to this ordinance.

Policy	Type	Type of waste	Country	Issues
Stop of financial support on artificial turf pitches containing microplastic by the ministry of Baden-Wurttemberg	Financial	Reduction of microplastics in water bodies	Germany	This is not known, as the policy will come into force in January 2021.
Municipal packaging tax in the city of Tübingen	Financial	Municipal wastes	Germany	This is not known, as the policy will come into force in January 2021.
Introduction of the Recycling Bin ("Wertstofftonne") in Augsburg	Regulatory, Voluntary Agreement	Municipal wastes	Germany	The main problem is that the citizens may not throw these non-packaging waste of similar material in this new bin.
Waste classification, sampling, and analysis	Regulatory, Informative	Municipal wastes, Commercial & Industrial wastes	Bulgaria	No adequate entries are available for wastes.

Policy	Type	Type of waste	Country	Issues
Perpetuum Mobile Albena Co-digestion of kitchen and agricultural waste	Market-based	Municipal wastes, Commercial & Industrial wastes	Bulgaria	During the project implementation some difficulties were experienced. It was problematic to form the team because of the lack of local experts. Deficit for spare parts was also experienced. The meteorological conditions are still disturbing the process.
Plovdiv declared war, "Paper war"!	Market based, Informative	Municipal wastes	Bulgaria	A serious problem for the success of the campaign is the lack of engagement of the broad society concerning environmental issues caused by waste pollution.
Municipal Enterprise "Sofia Waste Treatment Plant"	Market based, Financial	Municipal wastes, Commercial & Industrial wastes	Bulgaria	The only thing missing in order to change the environment on a larger scale is the mass participation of people in it.

Despite the differences and the heterogeneity, comparison of data collected shows that there are common challenges that policy implementation faces independently of level, type, objectives, and region. These are:

Absence of proper data collection and monitoring mechanisms

The absence of proper data and monitoring mechanisms can be detrimental both to the effective implementation of current plastic waste management policies and to the development of further policies. This is a key challenge for public authorities because a lack of data mechanisms can stall the planning of new relevant policies and may lead to uninformed policy decisions. A crucial element of this challenge, particular to plastic waste management, is the traceability of recycled plastics; lack of data on the source, treatment, and quality of the recycled plastics severely hinders the uptake of plastics from plastic producers and converters and therefore the development of a robust market for secondary plastics.

Surprisingly, this challenge has been reported from most cases, covering all countries of the partnership; on the other hand, it is not surprising that it has been les reported from policies with a market-based character, since these policies are usually better equipped to provide data derived from market monitoring. Case studies reveal a widespread absence of proper monitoring mechanisms in all forms (especially in regulatory ones): lack of inspection from central authorities regarding packaging and packaging waste, absence of a mechanism to collect information on the recycled quantities, lack on data from single-use plastics, absence of public records in recycling initiatives, absence of traceability schemes or low traceability on the materials produced by recovery facilities.

Lack of public engagement

Lack of public engagement, especially in the field of waste management where policy effectiveness is directly linked with (the change of) consumer behaviour, can hinder the implementation of policies. Not surprisingly, informative instrument is the category of policies that reported this challenge the most. Data analysis revealed three reasons for the lack of public engagement in PLASTECO territories: a) the plastic as a material is considered of lesser value and subsequently consumers treat it as expendable, b) there is a lack of appropriate collection infrastructure, discouraging consumers from recycling plastic waste, and c) there is low awareness on the environmental issues caused by the landfilling of plastic waste.

Lack of adequate financing

Lack of adequate funds for policy implementation is a common challenge in virtually any field of policy implementation. In the case of plastic waste management, data analysis revealed that the main challenges are connected with a) the market for secondary plastics, which is still not mature enough, and b) the cost for recycling compared to landfilling. As it is to be expected, this type of challenge was common in policies with a financial, market-based, and/or regulatory character. However, it was the common challenge least mentioned in the data, which is not consistent with the overall EU situation, where the financing (or lack thereof) in the field of plastic waste management is one of the main issues in curbing plastic waste pollution.

Organisational challenges

Organisational challenges can be defined as the issues that emerge in policy implementation that pertain to poor planning on behalf of policy-making organisations. Data analysis revealed that lack of organisational capacities is a common challenge that policy implementation faces in the cases collected. The issues range from delays in EU policy implementation, to confusing design in the interface of waste separation systems, lack of expertise on the matter of plastic waste management, and funding schemes without clear objectives that lead to conflicts and double funding with poor results.

5.3.2 BENEFITS

The following table presents the benefits that collected policies delivered.

Table 7. Benefits that collected policies delivered and their transferability potential.

Policy	Country	Type	Benefits	Quantitative results
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Austria	Voluntary agreement	Through further separation, an increased sorting depth of recyclable material, i.e. lightweight packaging (plastics), and therefore higher quality recycling can be enabled.	The higher the sorting depth, the more homogeneous the packaging material is, the more suitable it is for material recycling, the lower the re-sorting effort and the more likely it is that packaging will be sent for high-quality rather than low-quality recycling. Presently mixed lightweight packaging from the yellow bin/yellow bag systems is only 25 - 26% recycled, while the recycling rate of single-sorted plastic packaging is 80% and higher.
Innovative Separate Waste Collection System for Public Space	Austria	Regulatory, Voluntary agreement	The main benefit is awareness-raising for waste separation and anti-littering. Moreover, the higher amounts of correctly separated waste, including recyclable materials such as lightweight packaging (i.e. plastics and composites), enable more and higher quality recycling of plastics due to the higher quality of input streams.	After the first period of use (waste separation system 1.0), two thirds less residual waste were obtained compared to the previous system (no separation, only residual waste) as the different fractions were collected separately. With the waste separation systems 2.0 a quality of separate collection that is comparable to that of the normal household collection has been achieved.
Lesson Plan on Plastics	Austria	Informative	The main benefit is awareness-raising for the ubiquitous topic of plastics in all its facets.	n/a

Policy	Country	Type	Benefits	Quantitative results
Implementation of municipal waste advisors	Austria	Regulatory, Voluntary Agreement	The waste advisors certainly contributed to the high waste management performance in Austria where the recycling rates increased from around zero (1980) up to over 61 % in some regions like Styria today.	n/a
Ecotax applied to all transport bags	Romania	Market based, Financial	During the implementation of this policy instrument, information and awareness campaigns for producers and consumers were organized, encouraging the use of reusable packaging and reduce consumption of single-use plastic bags. Public awareness could be raised by the fact that retailers have the responsibility to display it in visible place information about the Ecotax in order to inform the final consumers about it.	n/a
Landfill tax/contribution for the circular economy	Romania	Market based, Financial	The landfill tax/contribution for the circular economy aims to reduce the amount of (municipal) waste going to landfills, implicitly the amount of plastic waste.	n/a
Selective collection campaigns	Romania	Informative	Public awareness raising.	n/a

Policy	Country	Type	Benefits	Quantitative results
The penalty paid by packaging producers and OTRs	Romania	Regulatory, Financial	One of the benefits is that the economic operators who introduce packaged products on the national market are obliged to achieve, starting with January 1, 2020, an annual average percentage of reusable packaging from the packaging used to market their products, including packaging taken for rent of at least 5%, but not less than the average percentage achieved in the period 2018 - 2019 and to increase this percentage by 5%, annually, until 2025 inclusive, the failure to fulfil this obligation can cost them a fine between 20,000 lei to 40,000 lei.	n/a
AURADECHET	France	Financial	This policy has led to an increase of waste collection, sorting and recycling capacities.	n/a

Policy	Country	Type	Benefits	Quantitative results
ORPLAST "Objective PLASTic Recycling"	France	Market based, Financial	-Increase of plastic recycling -Acculturation to recycled feedstocks by market leaders and resin processors -Help to maintain in activity the companies that are regenerating plastics (mostly small vulnerable businesses) Based on the application form filled by the 26 companies selected during the last call for projects (in 2017), with 6M€ granted in total, this policy should provide the following benefits: -An increase by 80 000tons of recycled plastics used by 2021; -120 jobs created.	Increase of the rate of annual recycled resins uptake by companies granted: For the projects that are finished = +29% (+ 24 kt/y) For the ongoing projects = + 61% (+ 35 kt/y)
Coordinated regional policies to improve plastic wastes management	France	Regulatory, Voluntary Agreement, Financial	Coordinated regional policies: -set ambitious objectives for the next 6 to 12 years in relation with national and European legislations; -plan how to achieve these objectives according to the current situation (waste production, waste facilities) and calculated prospective; -provide an action plan to meet these targets; -all these steps being discussed with all relevant stakeholders.	n/a

Policy	Country	Type	Benefits	Quantitative results
Sindra	France	Informative	Sindra responds to the need to monitor and evaluate different regional policies, including policies related to recycling and plastic reduction. The observatory brings together all available data on waste by collaborating with many partners (local public authorities, private waste treatment companies, specialised observatories, etc.). The tool "what waste, what solutions?" may also make it possible to sensitize individuals and professionals to the sorting of waste by providing information adapted to the territory concerned.	Even though it's impossible to assess the direct impact of this policy in terms of waste reduction or recycling rate, the high rate of stakeholders answering the survey (in 2019, 99,4% of local public authorities and 92% of private providers) is proof of its success.

Policy	Country	Type	Benefits	Quantitative results
PET Baltija	Latvia	Financial	Increase of recycling capacity: The company has now reached the optimal load of its production, but at the current conditions is not able to significantly increase its capacity. The equipment financed under the project “Recycling of polymer waste using an agglomeration process” will give the opportunity to create a new processing line and to increase the total processing volume. Reducing waste to landfill: Thanks to the new equipment, the company will be able to recycle PP bags (BIG BAG), PET tape and other types of polymer material without additional waste, using 100% of all the recycled material, thus reducing landfilling. The estimated processing capacity will be 5,160 tons per year. The company plans that 80% (or 4128 t / year) of recyclable waste will come from the Republic of Latvia, and 20% (or 1032 t / year) from abroad. Increase raw materials: In addition through the 2018 project ”JSC "PET Baltija" polymer processing park” a new polymer waste recycling complex will be created in Olaine municipality in order to process polymer waste (PET, HDPE, PP) and obtain an additional 5818 t of second raw materials on average per year.	n/a

Policy	Country	Type	Benefits	Quantitative results
Nature and Technology Park "URDA"	Latvia	Informative	The policy raises public awareness and contributes to enhancing the educational and research activities within the waste management and environmental protection field.	In 2019 1361 kids and 3126 students attended educational courses and events. In the same year 4606 people took part in the excursion organized at the waste management center Daibe. In the school year 2018/2019 2,450 students from educational institutions of the Ziemeļvidzeme region and other regions attended educational programs for children and young people at the Nature and Technology Park "URDA", more than 1,830 children, young people and adults went on a research trip to the waste management center "Daibe", while the centre Skudra Urda (Ant Urda) was visited by 1,040 pre-school students.
Ziemeļvidzeme Regional Waste Management plan 2014-2020	Latvia	Regulatory, Voluntary Agreement, Financial, Market-based, Informative	Increase in the number of separate waste collection infrastructure.	During the implementation of the Ziemeļvidzeme waste management plan the amount of separately collected plastic has grown from 450 tons in 2013 until 1407 tons in 2018, thus the collection rate grew nearly 1000 tons in 5 years. The policy proved to make a difference and shows that by increasing separate collection opportunities, the yearly amount of plastic averted from the landfilling grows reducing plastic leaking into nature and into the marine environment.

Policy	Country	Type	Benefits	Quantitative results
Zaļa Josta - Producers responsibility scheme for packaging	Latvia	Market-based	The policy ensures a full execution of the packaging and disposable tableware and accessories management (collection, sorting, recycling, recovery, etc.) in accordance with the laws and regulations. Zala Josta Ltd. makes a significant contribution to the education of all segments of the society on environmental issues, starting with younger generations.	PRS system of Zala Josta for used packaging in 2018 has dealt with the following figures: -Clients (packaging companies) have produced 10, 256, 670 tons of plastic packaging -Of these 6, 022, 414 tons were collected -In Latvia 572, 094 tons were recycled and 1 500,000 tons were recovered (incinerated) -Outside Latvia 3, 950, 320 tons were recycled. -The recycling rate was 44% (the legally required minimum rate is 29%) and the recovery rate was 59% (the legally required minimum rate is 44%).
Plastica Seconda Vita	Italy	Regulatory, Market based	-Increase of recycled plastics uptake -Raised public awareness -Increase of plastic waste collection and recycling.	Increase of use of recycled plastic by converters: 3% on annual basis between 2017 and 2018. In 2018 1,125 million tons of recycled plastics transformed into new products in Italy.
Circular Economy Observatory	Italy	Voluntary agreement, Informative	-Increase of plastic recycling -Raised public awareness -Sharing best practices -Knowing the problems of the plastic production and recycling chain.	n/a

Policy	Country	Type	Benefits	Quantitative results
Reverse RPET Nudge System	Italy	Market based, Voluntary Agreement	-Increase the collection and recycling levels of PET bottles, bringing the world of production, consumption and recycling in an innovative way; -Create the Italian "bottle to bottle" chain by producing rPET suitable for direct food contact; -Provide its members with all the knowledge and tools to align properly with the recent European legislation on the use of plastics.	n/a CO.RI.PET will reach, for 2025 the new target of SUP Directive: 77% collection and 25% RPET in a new bottles for their members producers of mineral water, soft drinks, milk and vegetable oil.
ECOTASSA	Italy	Market based	Decreased of disposal of plastic waste recoverable in landfills. Incentive for the recycling plants to reach the optimal percentages that allow them to reach the benefit.	In 2018 in Lombardy no urban plastic waste and no packaging was sent directly to landfills; only 2,736.7 tons of special plastic waste were sent directly to landfills, compared to a total production of plastic waste estimated at almost one million tons.
Plastica Consapevole	Italy	Informative	The main benefits are: -adoption of Sustainable practices -resources consumption reduction -increase awareness of more responsible behaviours -money saving.	n/a Assumptions: -3000 Employers get at average 1.5 litres of water/monthly from the machine (3 bottles of 500ml) as prudential estimation. -The reduction of plastic bottles in one year is about 100.000 pieces.

Policy	Country	Type	Benefits	Quantitative results
Rivending Project	Italy	Market based, Voluntary Agreement	-Increase of plastic recycling -Raised public awareness -New materials	n/a The challenge is to collect at least 20-25% of the glasses used in vending machines nationwide, generating a saving of 4-5 thousand tons of plastic.
Increase of the price-environmental fee of the thin plastic bags	Greece	Regulatory, Market based	The main benefit of the measure is the reduction of plastic waste.	In 2017, the number of the total thin plastic bags were 1.800 million pieces which corresponds to 167 pieces per person. In 2019, these numbers decreased sharply to 24 million pieces and 2 pieces per person. This trend was followed by an increase in the number of the biodegradable bags from 10.000 to 36 million pieces from 2017 to 2019.
"In my cup" project	Greece	Market based, Financial, Voluntary agreement	Reduction of plastic waste in landfills: As the number of enterprises increase, the consumer response increases as well resulting in greater reduction of plastic waste in the landfills. Raised public awareness: This policy allows consumers to be informed about the environmental impact of the single-use plastic and be part of the solution when changing their daily habits.	n/a

Policy	Country	Type	Benefits	Quantitative results
Municipality of Lipsi	Greece	Market based, Voluntary Agreement	Increase of recycling: The distribution of waste bags by the municipality increased the amount of recycling, improved the separation and the quality of recycled materials. Reduction of plastic waste in landfills: The reduction of single-use plastics provided by the businesses, the launch of Water Kiosks and the improved recycling system have led to an extremely high reduction of landfilled plastics. Raised public awareness: Citizens and tourists are engaged to this environmental policy.	Recycling program "Sorting at Source and door-to-door collection": Awarded in 2015 for achieving the highest recycling amount per person at national level. (70kg per resident) Water Kiosks: Within the first three months of operation the machine has saved 50,000 plastic bottles of 1.5 Littre measured based on the quantity of water sold.
Say no to plastic straws	Greece	Market based, Informative	Eliminate single-use plastics in landfills, replacing all items with biodegradable alternatives and raise public awareness. By cutting out the single-use plastic, SeaChange Greek Islands and the inhabitants of Cycladic islands hope to send a message to the world that a permanent change, even on a Greek island depending on tourists, can easily be made.	n/a

Policy	Country	Type	Benefits	Quantitative results
Rewarding Recycling	Greece	Voluntary agreement, Financial	- Significant contribution to achieving national quantitative recycling goals. - Significant contribution to increasing the purchasing power of citizens through the reward incentive offered. - Significant contribution to the creation of new jobs in particular through collaborating Social Solidarity Economy sector. - An important contribution to the Environmental Education of young people and students - Significant contribution to investing in the utilization of recycled materials, as large quantities of clean, separately collected at the source.	- Significant contribution to achieving national quantitative recycling goals. By the end of 2020, REWARDING RECYCLING will have achieved a recycling rate of more than 80% of the quantities assigned to contracted managers. - Significant contribution to increasing the purchasing power of citizens through the reward incentive offered, amounting to several million euros for the next six years. - The first Recycling & Environmental Education Park was created by the National Collective System REWARDING RECYCLING in partnership with the Municipality of Agioi Anargyroi & Kamatero, and is the first in Europe.
"Münchner Einwegverbot": "Munich Prohibition on one-way"	Germany	Regulatory	The goal is to reduce the amount of waste generated during such events. This waste would end up in the incineration plant of Munich.	n/a However, for instance, the world biggest public festival, the "Oktoberfest" reduces its waste amount by 90% thanks to this policy.

Policy	Country	Type	Benefits	Quantitative results
Stop of financial support on artificial turf pitches containing microplastic by the ministry of Baden-Wurttemberg	Germany	Financial	The main benefits will be the reduced amount of microplastics in water bodies.	n/a
Municipal packaging tax in the city of Tübingen	Germany	Financial	The main benefits will be the reduced amount of single-use packaging and the establishment of multiple-use packaging systems e.g. deposit schemes and take-back schemes. The reduced amount on packaging waste has a positive impact on different levels.	n/a
Introduction of the Recycling Bin in Augsburg	Germany	Regulatory, Voluntary Agreement	The goal is to increase the overall recycling rate of waste made out of plastics, composites and metal.	n/a

Policy	Country	Type	Benefits	Quantitative results
Waste classification, sampling, and analysis	Bulgaria	Regulatory, Informative	The project and its beneficial outcomes can be implemented in any of the partnering countries to assist and increase the public administration capacity on waste management, waste classification, and circular economy. The potential for transfer is very high, moreover, the beneficiary organizations from Bulgaria side is the National and local public authorities.	n/a
Perpetuum Mobile Albena Co-digestion of kitchen and agricultural waste	Bulgaria	Market-based	It directly affects the energy independence of the region, reduces the quantities of waste for landfilling and saves greenhouse emissions to the atmosphere. What is more, the generated electricity and heat is sold to the public grid and allows continuous flow of finances into the resort, resulting in improvement of resort's features.	The utility co-generates of electricity and heat from biomass and it has capacity of 1 MW heat for district heating. The produced fertilizer is around 25 tons per year. It is estimated that 1/3 from the yearly energy consumption is self-produced – 8 to 9 million KWh are being returned to the network from a total 24 million KWh required satisfying the needs of the resort. The project is financially stable with a IRR of 9% and pay back of 8%. The reduction of the CO2 emissions is 310 tons per year.

Policy	Country	Type	Benefits	Quantitative results
Plovdiv declared war, “Paper war”!	Bulgaria	Market based, Informative	It promotes sustainable waste prevention activities in Bulgarian schools to raise awareness of the strategies and policies for waste prevention and reduction in the EU and its Member States, aimed at transforming the concept of waste reduction into reality.	The initiative engages more than 30 schools yearly. Nearly 6.5 tons of paper were collected just by Plovdiv students in the "Paper War" campaign in 2017 and this number is gradually increasing every next event.
Municipal Enterprise "Sofia Waste Treatment Plant"	Bulgaria	Market based, Financial	The installation guarantees 87.5% less landfilled wastes. Sofia Municipality went further by creating a special guide for separate waste collection, where anyone can get information about how to collect and sort his/her waste.	The disposal of municipal waste in Sofia Municipality has decreased from 100% to 16% in just 10 years (since 2007). The data for 2019 shows that the plant treated 561 tons of collected waste. The generated energy is 2 534 483KWh which is 2 109 765 BGN (1 078 705 EUR) total revenue for the waste plant. It also produced 9 259 tons of compost.

Out of the 35 policies collected, only less than half (14) presented quantitative results, mainly due to (i) difficulties in data collection and evaluation, (ii) very recent application of the policy. This, however, confirms the analysis in the previous section, where the lack of data and monitoring mechanisms was the most common challenge that emerged from the coding of the cases. As in the analysis of the previous section, the same considerations apply here regarding their value for regional/country extrapolation.

Data analysis shows that regulatory policies are more successful and can provide measurable results when coupled with market-based and/or financial instruments. For example, the "Plastica Seconda Vita" policy in Italy aims to create and promote a market for recycled plastics alongside regulatory changes, and monitor how, when, where, and how much secondary plastics is used through a strong, transparent, and reliable certification, acknowledged by relevant accreditation bodies. This has resulted in an increase in the use of recycled plastic by plastic converters by 3% on an annual basis between 2017 and 2018. The exception is regulatory policies that prohibit or ban certain plastics, as is the case with "Münchner Einwegverbot" policy in Germany, which achieves very high recycling rates (over 90%) in festivals and events by banning certain plastic items.

When any type of policy (e.g. market-based) is coupled with a voluntary agreement character, it is easier to provide quantitative results. For example, the Municipality of Lipsi voluntary-based and market-driven policy on separate collection and recycling increased the amount of recycling, improved the separation and the quality of recycled materials, and reduced the plastic waste in local landfills. Within the first three months of operation, the policy managed to collect over 50,000 PET bottles and received a national award (in 2015) for achieving the highest recycling amount per person at the national level (70kg per resident). This could not have been effective without the participation of local businesses and the provision of incentives for the local population.

Although informative policies have been implemented widely in PLASTECO territories, they struggle to provide measurable data for their impact on the general public or the target groups each one addresses. There are exceptions, however, as the "Sindra" and "Plastica Consapevole" policies in France and Italy correspondingly, which have a high response rate from follow-up actions. Nevertheless, most policies collected for this study with a primarily informative character lack the structure or the follow-up mechanisms to account for their impact.

5.3.3 TRANSFERABILITY POTENTIAL

As mentioned already in section 5.3, the comparison of the 35 policies reveals that the differences among them are substantial. Thus, the transferability potential assessed in this section is based primarily on the national framework and the major challenges that each PLASTECO country currently faces in plastic waste management. This analysis also uses information on achieved quantitative results provided by 14 out of the 35 case studies. This strategy permits a context-specific analysis and promotes transferability efforts on the grounds of interregional learning.

France and Greece face a similar outlook in national policies and challenges in plastic waste management, with both being quite below the EU average in recycling targets (albeit Greece being lower). The implementation of more market-based and voluntary agreement policies could assist in addressing low recycling targets and in the development of a market for recycled materials. Policies such as “Plastica Seconda” and “Reverse RPET Nudge System”, which have proven to increase the recycling levels of plastic waste streams and assist in the uptake of secondary plastics, could be beneficial to draw policy lessons from.

Romania and Bulgaria have similar challenges in plastic waste management, namely a lack of effective regulations that prohibit landfilling and lack of adequate infrastructure for collection and recycling. Stronger policies in regulating landfilling, as is the case of “Münchner Einwegverbot” in Germany, may prove beneficial to draw lessons from. Also, the case of “Ziemeļvidzeme Regional Waste Management plan 2014-2020” could provide valuable lessons, as it increased the capacity of separate waste collection infrastructure, and the collection grew significantly over the first years of its implementation.

Even though Latvia does not face regulatory challenges as Romania and Bulgaria face in plastic waste management, it could benefit from policies that involve local and regional actors in voluntary schemes, to further their already developing collection and recycling infrastructure. Valuable lessons could be drawn from the implementation of the “Municipality of Lipsi” policy from Greece and the “Innovative Separate Waste Collection System for Public Space” from Austria, as both could assist in achieving higher amounts of correctly separated waste.

Germany and Austria are quite similar in their waste management framework and generally in a more advanced place regarding plastic waste management compared to other PLASTECO countries. Nevertheless, valuable lessons learned could be drawn from successful policies from other countries,

especially market-based and voluntary policies. For example, ORPLAST “Objective PLASTic Recycling” policy has increased the rate of the annual plastic resin uptake by plastic companies over 29%, with its more recent results being even more promising (over 60%).

The same applies to Italy; even though some of its regions are more advanced than other EU and Mediterranean counterparts, it could still benefit from policies that further develop its collection and recycling framework, especially supporting local communities and municipalities to eliminate uncollected waste and mismanagement. “Municipality of Lipsi” policy from Greece and the “Innovative Separate Waste Collection System for Public Space” from Austria could provide beneficial lessons to that end.

Policy	Country	Type	Transferability
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Austria	Voluntary agreement	▪ Highly transferable nationwide ▪ Transferability to other EU-countries might be limited, because collection systems (local ASZ) are needed as a prerequisite
Innovative Separate Waste Collection System for Public Space	Austria	Regulatory, Voluntary agreement	Highly transferable. Public awareness is raised. The implementation risks for infrastructure are low, as old containers on public places can just be exchanged by the waste separation stations. The demonstrated achieved benefits outweigh associated infrastructure costs by far, especially if higher quantities of the systems are produced, smaller costs per unit can be achieved.
Lesson Plan on Plastics	Austria	Informative	High potential for transfer in other regions, as awareness-raising is done for the omnipresent topic of plastics and its impacts in waste management with educational strategies. Moreover, the implementation risks can be considered low.
Implementation of municipal waste advisors	Austria	Regulatory, Voluntary Agreement	Medium potential. The implementation of municipal waste advisors requires an initial commitment of at least one region (province, big city) of more than 1 million inhabitants, to ensure economic feasibility of the development and implementation of a qualification and training programme as well as continuity of step by step implementation of waste advisors in all regions and municipalities.
Ecotax applied to all transport bags	Romania	Market based, Financial	High potential. This policy addresses a common need/problem across different EU regions.
Landfill tax/contribution for the circular economy	Romania	Market based, Financial	High potential. Landfill tax addresses a common need across different EU regions as it concerns limiting landfilling to the necessary minimum.

Policy	Country	Type	Transferability
Selective collection campaigns	Romania	Informative	Medium potential. ▪ Local public administration authorities are needed in order to fulfill their obligations regarding the collection and management of municipal waste. ▪ An increase of the institutional capacity of both environmental authorities and local authorities and inter-community development associations in the field of waste is needed.
The penalty paid by packaging producers and OTRs	Romania	Regulatory, Financial	This policy is EU wide transferable, designed and addressed for a worldwide common need called recyclability.
AURADECHET	France	Financial	This policy is easily transferable to any country or region willing to invest on recycled plastics.
ORPLAST "Objective PLASTic Recycling"	France	Market based, Financial	This policy is easily transferable to any country or region willing to invest on recycled plastics.
Coordinated regional policies to improve plastic wastes management	France	Regulatory, Voluntary Agreement, Financial	There is a need in all European countries to provide regional detailed plan on waste management linked to national and European targets. These regional plans can set ambitious but achievable targets according to local infrastructures and facilities. They can also complete these mid-term plans with financial, informative and voluntary agreement policies to help achieve these targets.

Policy	Country	Type	Transferability
Sindra	France	Informative	This policy is transferable and addresses the common need to monitor changes in the different types of waste produced, collected and recovered in order to assess and adapt regional and local policies related to waste management and prevention. The regional scale is interesting to provide precise data adapted to the regional waste prevention plan. It also feeds the National and EU observatories with essential data.
PET Baltija	Latvia	Financial	Medium potential. The calculated increase of second raw plastics materials is expected to outweigh the infrastructure investment costs.
Nature and Technology Park "URDA"	Latvia	Informative	The policy addresses the need to increase awareness and research activities within the field of waste management by creating a high-quality educational center in synergy with the main waste management actors within the region. The involvement of students and the creation of curricula and vocational training opportunities represents a good transferable practice to promote waste reduction and create new research fields in this area.
Ziemeļvidzeme Regional Waste Management plan 2014-2020	Latvia	Regulatory, Voluntary Agreement, Financial, Market-based, Informative	There are no common regulations of the European Commission on how to implement separate waste collection for plastic in EU. Each EU country deals with it respecting several national features: traditions, number of inhabitants, population density, geographic patterns etc. The policy is a good example of several methods to organize the separate collection of plastic and can be transferred to other EU countries with sparsely populated areas.

Policy	Country	Type	Transferability
Zaļa Josta - Producers responsibility scheme for packaging	Latvia	Market-based	High potential. The creation of an agreement with Producer Responsibility Scheme operators allows governments to prevent wastes at the source and achieve waste management plans' goals through coordinated actions and better monitoring.
Plastica Seconda Vita	Italy	Regulatory, Market based	EU-wide transferable: Increase in uptake of recycled plastics is one of the topics of Circular Economy Action Plan. Recycled content is calculated according to the provisions of the EN ISO 14021 standard, taking into account only post-consumer and post industrial waste recycling (byproducts reuse is not accounted). Some Italian standard on recycled plastics apply, but these material quality criteria can be easily transferred.
Circular Economy Observatory	Italy	Voluntary agreement, Informative	This kind of policy it's absolutely transferable in other Italian or European region. For example other region like Emilia Romagna has a similar policy.
Reverse RPET Nudge System	Italy	Market based, Voluntary Agreement	Reverse system based under caution is operating in the different EU nations. Nudge system is quite different and more difficult, but more efficient in a long term, because based on voluntary agreement and cooperation of citizens/consumers. Furthermore it addresses a common need/problem across different EU regions that is to recover and recycle the more possible volume of plastic waste and to reduce to fabric new bottles with PET instead of RPET.
ECOTASSA	Italy	Market based	It can be replicated in other Italian regions.

Policy	Country	Type	Transferability
Plastica Consapevole	Italy	Informative	High transferability with no risks. The budget line was about 20.000 euro. Lombardy Region participates also in the GPP4GROWTH Project, approved in the framework of the European INTERREG EUROPE 2014/2020 program, whose objective is to promote and increase green purchases in Lombardy through the exchange of experiences, process harmonization and analysis of technical-scientific assessment tools. The project aims to improve the capacity of Public Bodies to implement policies that promote eco-innovation and green growth through green public procurement, involving a partnership of nine European Public Bodies of Greece, Italy, Poland, Belgium, Spain, Latvia, Bulgaria, Ireland and Malta committed to sharing experience and best practices.
Rivending Project	Italy	Market based, Voluntary Agreement	Versalis has joined the Circular Plastics Alliance (CPA) to actively contribute achieving the ambitious European target of using 10 million tonnes of recycled plastic in new products by 2025. The aim of the Alliance, promoted by the European Commission, with numerous member companies and associations across the value chain, is to boost plastic recycling in Europe and at the same time develop the market for secondary raw materials.
Increase of the price-environmental fee of the thin plastic bags	Greece	Regulatory, Market based	High potential. Needs addressed are common across European regions and the environmental fee reflected on the price of the thin plastic bags is in line with the European Guidelines.

Policy	Country	Type	Transferability
"In my cup" project	Greece	Market based, Financial, Voluntary agreement	This policy can easily be transferred at national and European level due to the common problems of increased plastic waste and common solutions meeting European Union's recent directive, according to which by 2021 single-use plastics will be gradually banned in all its member-states. Public authorities can promote this policy. There are no special skill requirements for the implementation of this policy.
Municipality of Lipsi	Greece	Market based, Voluntary Agreement	This policy can easily be transferred to national and European level due to the common problems of increased plastic waste and common solutions meeting the European Union's recent directive for single-use plastics. The policy presents low skill requirements for implementation and can be easily replicated by other small Greek islands/municipalities.
Say no to plastic straws	Greece	Market based, Informative	This policy can easily be transferred at national and European level due to the common problems of increased plastic waste and common solutions meeting European Union's recent directive, according to which by 2021 single-use plastics will be gradually banned in all its member-states.
Rewarding Recycling	Greece	Voluntary agreement, Financial	This policy can be easily transferred at countrywide and EU-wide level since the problems addressed are common among different EU region and raising awareness and achieving great goals for recycling is a common goal with low implementation risk.

Policy	Country	Type	Transferability
"Münchner Einwegverbot": "Munich Prohibition on one-way"	Germany	Regulatory	The policy is transferable. Each city / region can decide to introduce such a policy. The policy addressed a common need to reduce the amount of waste generated by single-used drink and food packaging. In addition, it can be assumed that a high number of events took place on public grown. Therefore, the policy is relevant for many other regions. Last but not least, such a policy has very low implementation costs. It only needs policy bodies which are willing to initiate and implement such policy.
Stop of financial support on artificial turf pitches containing microplastic by the ministry of Baden-Wurttemberg	Germany	Financial	Medium potential. This policy is transferable, either by stopping financial support on artificial turf pitches containing microplastic or by financially support artificial turf pitches without microplastic.
Municipal packaging tax in the city of Tübingen	Germany	Financial	This policy is transferable, as the introduction of taxes on single-used packaging and tableware on local level is relatively easy to implement. No high costs occur e.g. for infrastructure.
Introduction of the Recycling Bin in Augsburg	Germany	Regulatory, Voluntary Agreement	This policy is transferable. Of course, this highly depends on the current situation of the collection systems.
Waste classification, sampling, and analysis	Bulgaria	Regulatory, Informative	Waste classification, sampling, and analysis is targeting one very important common need/problem across Europe - to increase the knowledge and the expertise of the experts in the Bulgarian national and local authorities.

Policy	Country	Type	Transferability
Perpetuum Mobile Albena Co-digestion of kitchen and agricultural waste	Bulgaria	Market-based	The practice is possible to be implemented in many agricultural farms as a single initiative or as a joint project for smaller neighbouring agricultural producers. It also enhances employment, supports environmentally friendly energy generation and way of living, use of bio fertilizers for the agriculture and clean and healthy food products.
Plovdiv declared war, "Paper war"!	Bulgaria	Market based, Informative	After the success of the campaign in Plovdiv, couple of other Bulgarian municipalities initiated the organization of similar events in their schools – Lom, Stara Zagora, Parvomai etc. This policy instrument for promotion of separate waste collection is very easily transferable not only EU-wide, but also worldwide due to its low implementation risk, not complicated procedures and practical orientation. Moreover, it addresses an overly sensitive issue of waste management that is faced by numerous EU member states' regions. Finally, while the investment nears zero, the benefits from the initiative are visible and easily measurable.
Municipal Enterprise "Sofia Waste Treatment Plant"	Bulgaria	Market based, Financial	Although many of Europe's major cities have long state-of-the-art waste treatment plants and are quite advanced with their waste management systems, the construction of "Sofia Waste Treatment Plant" is a significant and strategic development of Sofia aiming for healthier environment, more efficient economy and more sustainable living. Waste management is in high priority in Sofia Municipality and similar treatment plants will be easily transferred in the whole nation.

5.4 Ten effective policies to promote the separation, sorting and recycling of plastics wastes in PLASTECO REGIONS

The 10 selected policies received the scores above 16. They are presented in annex A, and the scores are presented in Annex C. It should be mentioned that all collected cases are classified as good or promising, and no poor policies (with Total score < 9) were identified.

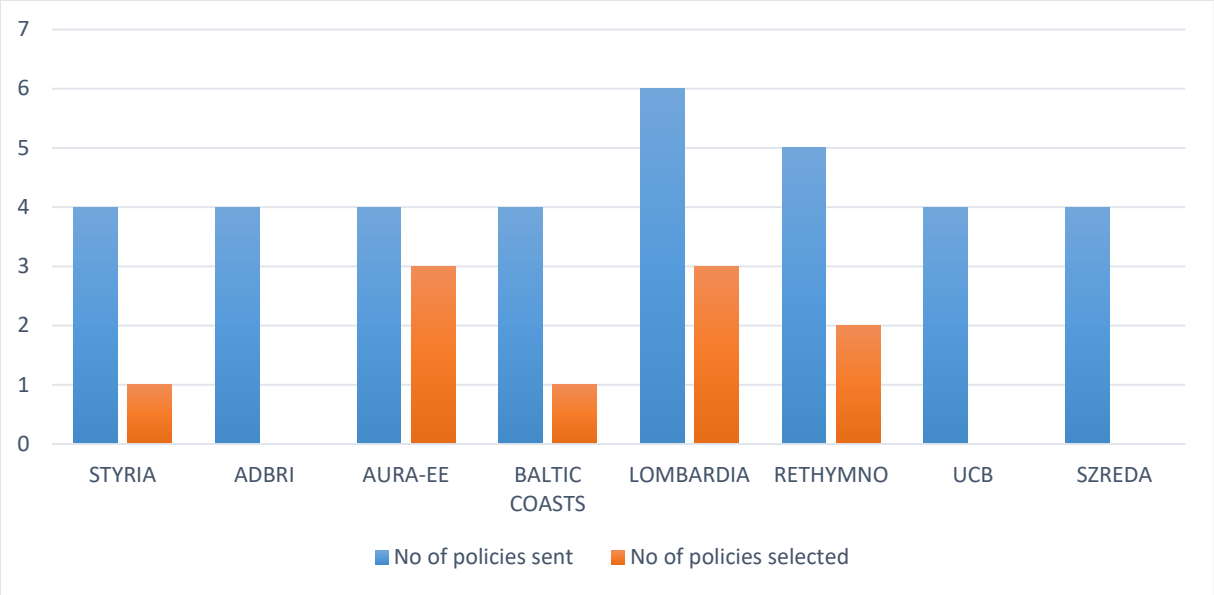


Fig. 13. Cases collected and analysed by partner.

Overview of the 10 selected policies

Table 10. Overview of 10 effective policies.

#	Policy	Type	Process	Target	Country/ region	Geographical scale
1	Plastica Consapevole	Informative	Separation (prevention: definitively cut of bottle plastic waste)	Municipal wastes	Italy/Palazzo Lombardia, Milan	Regional, Local
2	Municipality of Lipsi	Market based, Voluntary Agreement	Separation, Recycling, Uptake of recycled plastics	Municipal wastes, Commercial and Industrial wastes, Microplastics in waters	Greece/Lipsi	Local
3	Extended Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Voluntary agreement	Separation, Sorting	Municipal wastes	Austria/ Province of Styria	Regional
4	AURADECHET	Financial	Separation, Sorting, Recycling	Commercial and Industrial wastes	Auvergne Rhône-Alpes Region in France	Regional
5	ORPLAST	Market based, Financial	Uptake of recycled plastics	Commercial and Industrial wastes	FRANCE & Auvergne Rhône-Alpes Region	National, Regional
6	RIVENDING Project	Market based, Voluntary Agreement	Separation, Recycling, Uptake of recycled plastics	Municipal wastes	Pilot test in Lombardy Region	National, Regional

#	Policy	Type	Process	Target	Country/ region	Geographical scale
7	Increase of the price-environmental fee of the thin plastic bags	Regulatory, Market based	Uptake of recycled plastics	Municipal wastes, Commercial and Industrial wastes, Microplastics in waters	Greece	National
8	Sindra – The waste observatory of Auvergne-Rhône-Alpes Region	Informative	Separation, Sorting, Recycling	Municipal wastes, Commercial and Industrial wastes	Auvergne Rhône-Alpes Region	Regional
9	Ziemeļvidzeme Regional Waste Management plan 2014-2020	Market based, Voluntary Agreement, Regulatory, Informative, Financial	Separation, Sorting, Recycling	Municipal wastes, Commercial and Industrial wastes	Ziemeļvidzeme waste management region, Latvia	Regional, Local
10	ECOTASSA	Market-based	Sorting, Recycling	Municipal wastes	Regione Lombardia	Regional

6 KEY CONCLUSIONS

The key conclusions that can be drawn from the analysis and comparison of the 35 policies collected from all PLASTECO territories are the following:

- The complete absence or faulty implementation of data collection and monitoring mechanisms is an overarching challenge that almost all 35 policies faced. This challenge emerges as the most significant one since the lack of data on behalf of respondents on the quantitative or measurable impact of the policies highlights the far-reaching implications of this challenge. A key lesson of this report, therefore, is that project partners should boost their efforts to ensure that proper mechanisms are in place for measuring the results of existing or upcoming policies. It is strongly recommended that these mechanisms are a core function of each policy design and not an afterthought or an ancillary aspect of the policy implementation process.

  Especially in the field of the quality of plastics and its relation to monitoring, establishing the traceability of recycled plastics is crucial, as it further secures the quality of the products in the market for secondary plastics. To this end, the further uptake of EU-approved certification and integration into policies, such as the EuCertPlast, can promote the more efficient recycling of plastic waste.
- Lack and/or failure to engage the public in most policies examined is another important finding of this study. This challenge is critical, since a lot of policies, from regulatory to financial to market-based in nature, have invested their success on increased public engagement. A key takeaway for PLASTECO partners, therefore, is that they need to increase capacity-building efforts and targeted, as well as stakeholder-heavy, outreach initiatives, and awareness-raising campaigns to ensure the proper implementation of the national, regional, and local policies presented so far in this document.
- Mixed-type policies, i.e. policies that combine a regulatory with a market-based and/or voluntary character, are more successful in their implementation and are in a position to address better, according to the data, the challenge of providing measurable results to the public. This could be explained by the broader coalitions that such policies require and consequently the less top-down approach used in its implementation (e.g. involvement of businesses and the public rather than just relevant authorities). Also, another factor could be that the combination of any type of policy with a market-based one, especially when it

includes financial incentives, makes it easier for the markets to pick up and support the policy. As a result, PLASTECO partners may benefit by introducing market-friendly aspects in plastic waste management policies and by building broader coalitions to design and implement them.

- The effectiveness of a policy depends on the characteristics of each regions' outlook (e.g. regulatory conditions, political orientation, cultural issues and consumer behavior, geomorphological conditions), thus a successful policy in a certain place may not prove successful in another without the necessary modifications. In the context of policy transferability, due to the context-specific nature of the majority of the policies analysed, interregional learning is a better term to capture the potential of a policy to impact positively the policy development and implementation in another PLASTECO region. With this report, project partners have in their disposal an array of many different policies from which they may draw lessons and ideas, depending on their particular needs.

7 REFERENCES

[1] Plastics Europe. https://www.plasticseurope.org/en/about-plastics/what-are-plastics

[2] European Commission (2018). A European Strategy for Plastics in a Circular Economy. Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions. Brussels, COM (2018) 28 final.

[3] Hopewell, J., Dvorak, R., Kosior, E. (2009). Plastics recycling: challenges and opportunities. Philosophical transactions of the Royal Society of London. Series B, Biological sciences, 364(1526), 2115–2126.

[4] Velzen, U., Bos-Brouwers, H., Jim Groot, J., Bing, X., Jansen, M., Luijsterburg, B. (2013). Scenarios study on post-consumer plastic packaging waste recycling. Wageningen UR Food & Biobased Research.

[5] Messal, R. (2018). Oceans de plastique. https://www.futura-sciences.com/planete/dossiers/pollution-dechets-plastique-mer-septieme-continent-1898/page/5/

https://www.advancedsciencenews.com/global-alliance-to-end-plastic-waste/

[6] Saveyn, H., Eder, P., Ramsay, M., Thonier, G., Warren, K., Hestin, M. (2016). Towards a better exploitation of the technical potential of waste-to-energy. EUR 28230 EN.

[7] Rousta, K. (2018). Household waste sorting at the source. A procedure for improvement. PhD Dissertation. University of Boras.

[8] Rousta, K., Bolton, K., Dahlén, L. (2016). A Procedure to Transform Recycling Behavior for Source Separation of Household Waste. Recycling.

[9]ASTM International. ASTM D7611 / D7611M13e1, Standard Practice for Coding Plastic Manufactu red Articles for Resin Identification.

[10] Biswajit, R., Vivek, P., Priyajit, J., Srivastava, V. (2015). Sorting of plastic waste for effective recycling. Int. J. Appl. Sci. Eng. Res.

[11] International Organization for Standardization. Plastics - Guidelines for the recovery and recycling of plastics waste (ISO 15270:2008). In Switzerland, 2008.

[12] Hopewell, J., Dvorak, R., Kosior, E. (2009). Plastics recycling: challenges and opportunities. Plastics recycling: challenges and opportunities 2009, 364 (1526), 2115-2126.

[13] Locock, KES (2017). The Recycled Plastics Market: Global Analysis and Trends. CSIRO, Australia.

[14] Song, J., Murphy, R., Narayan, R., Davies, G. (2009). Biodegradable and compostable alternatives to conventional plastics. Biodegradable and compostable alternatives to conventional plastics 2009, 364 (1526), 2127-2139.

[15] Ryberg, M., Laurent, A., Hauschild, M. (2018). Mapping of global plastics value chain and plastics losses to the environment (with a particular focus on marine environment). United Nations Environment Programme. Nairobi, Kenya.

[16] World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company. (2016). The New Plastics Economy — Rethinking the future of plastics

http://www.ellenmacarthurfoundation.org/publications.

[17] Plastics Europe Deutschland e.V, Germany trade and invest (2017).

https://www.gtai.de/GTAI/Navigation/EN/Invest/Industries/Materials-processing/plastics,t=the-plastics-industry-value-chain,did=1165016.html

[18] Hennlock, M., Castell-Rüdenhausen, M., Wahlström, M., Kjær, B., Milios, L., Vea, E., Watson, D., Hanssen, O., Fråne, A., Stenmarck, A., Tekie, H. (2014). Economic Policy Instruments for Plastic Waste– A review with Nordic perspectives. TemaNord.

[19] Office, Publications. "What is policy". Retrieved by sydney.edu.au.

[20] EEA (2019). Preventing plastic waste in Europe. European Environment Agency report, 2019.

[21] Types of EU law. European Commission. https://ec.europa.eu/info/law/law-making-process/types-eu-law_en

[22] European Commission DG ENV. (2001). Plastic waste in the environment. Revised final report.

[23] Legislation Update Service (2018). Directive (EU) 2018/851 Amending Directive 2008/98/EC on Waste. https://legislationupdateservice.co.uk/directive-eu-2018-851-amending-directive-2008-98-ec-on-waste/

[24] European Commission (2019). Single-Use Plastics Directive, 2019/904. https://eur-lex.europa.eu/eli/dir/2019/904/oj

[25] European Commission (2015). First Circular Economy Action Plan. https://ec.europa.eu/environment/circular-economy/first_circular_economy_action_plan.html

[26] European Commission (2019). Circular Plastics Alliance. https://ec.europa.eu/growth/industry/policy/circular-plastics-alliance_en

[27] OECD (2018). Improving Plastics Management: Trends, policy responses, and the role of International co-operation and trade. Background Report. Prepared by the OECD for the G7 Environment, Energy and Oceans Ministers.

[28] European Commission (2018). A European Strategy For Plastics In A Circular Economy. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN

[29] The 2020 EU Circular Economy Action Plan: https://ec.europa.eu/environment/circular-economy/index_en.htm

[30] European Commission. EU plastics strategy. https://ec.europa.eu/info/research-and-innovation/research-area/environment/plastics-circular-economy_en

ANNEX A: TEN EFFECTIVE POLICIES TO PROMOTE THE SEPARATION, SORTING AND RECYCLING OF PLASTICS WASTES IN PLASTECO REGIONS

POLICY 1: "PLASTICA CONSAPEVOLE" (AWARE OF PLASTIC) - REGIONAL ACTION PLAN FOR GREEN PURCHASING

Location: Italy

Summary

European Union has approved a program to reduce plastic in circulation, firstly by prohibiting disposable ones by 2021, and bringing the recycling rate of plastic bottles to 90% by 2025. Starting from this point, Lombardy Region in 2019 started a very ambitious project, a best practice in order to cut the plastic consumption in Lombardy Region building in Milan. The entire project of PLASTICA CONSAPEVOLE has been approved by the Regional Council to be part of the GPP (Green Procurement Policy) named "Appalti verdi".

The project foresees, starting from January 2020, in 30 break areas, the installation of dispenser of purified, natural and sparkling drinking water, in addition to the 3 already existing, in order to reduce the use of bottled water and consequently, the consumption of plastic. In addition, in order to reinforce the adoption of sustainable behaviors, Lombardy Region accompanied this installation with a communication campaign - called #plasticaconsapevole - aimed at promoting a more conscious forms of behavior both for internal staff and the whole citizenship. Furthermore, an immersive exhibition has been installed in the various common

areas of Palazzo Lombardia, with images of Mandy Barker, a British artist who received international recognition for her photographic work on plastic waste, aimed at stimulating people to reflect on the dimension of use aware of the plastic and to realize concrete actions in first person.

Objectives

Palazzo Lombardia hosts about 3000 people, and receives hundreds of guests daily so the main objectives are to:

- Increase people's awareness of a conscious and reduced use of disposable plastic
- Reduce the production of plastic waste
- Increase the use of tap water instead of buying mineral water in bottles from vending machines

Results

The main benefits are:

- Adoption of Sustainable practices
- Resources consumption reduction
- Increase awareness of more responsible behaviours
- Money saving.

Employees and Guests are taking full advantage of the presence of drinking water dispenser; employees also received a personalized glass bottle. Assuming that 3000 Employers get on average 1.5 liters of water/monthly from the machine (3 bottles of 500ml), then the reduction of plastic bottles in one year is estimated to be about 100.000.

Transferability Potential

The transferability potential is high with no important risks identified. It should be noted that the related costs were notably low. Specifically, the budget line was about 20.000 euro.

Further Information

https://www.openinnovation.regione.lombardia.it/it/b/635/ilpianodazionepergliappaltiverdidiregionelombardia

https://www.regione.lombardia.it/wps/portal/istituzionale/HP/DettaglioRedazionale/istituzione/attivita-istituzionali/red-contaminazioni-plastica-consapevole

https://www.openinnovation.regione.lombardia.it/it/b/633/finoaltrentaaprilecontaminazionimostraperunusoconsapevoledellaplastica

https://www.lombardianotizie.online/plastica/

POLICY 2: AN ENVIRONMENTAL POLICY FOR RECYCLING AND REDUCING OF PLASTIC IN MUNICIPALITY OF LIPSI

Location: Greece

Summary

The island Municipality of Lipsi implements an environmental policy for recycling and reducing of plastic use in three levels:

1. The Municipality implements a recycling program "Sorting at Source and door-to-door collection". The system is not based on the traditional bins as temporary storage of waste. The Municipality distributes waste bags (for temporary storage) to the residents and local businesses in their space. The waste separation takes place at the Source for the following materials: paper, plastic, nylon, metal/aluminum, glass. There are three recycling locations with separate collection points– including biowaste – on the main beaches of the island, in order to enhance the system.
2. The Municipality of Lipsi and the local businesses jointly decided to stop using plastic recognizing the significant environmental problem and demonstrating that public and private collaboration can maximize the benefit.
3. The water of the water supply network is not drinkable in Lipsi island, causing a large consumption of plastic water bottles. The Municipality overcame this problem by installing Water Kiosks with drinkable water. These water kiosks had a significant financial and environmental impact as the water provided by the water kiosks is cheaper than the mineral water in the plastic bottles eliminating the need for the thousands of plastic bottles.

Objectives

The basis behind this integrated policy is to reduce waste, to encourage recycling, to raise environmental awareness for citizens and to promote the island as an environmental friendly touristic destination.

Results

- **Increase of recycling:** The distribution of waste bags by the municipality increased the amount of recycling, as well as improved the separation and the quality of recycled materials.
- **Reduction of plastic waste in landfills:** The reduction of single-use plastics provided by the businesses, the launch of Water Kiosks and the improved recycling system have led to an extremely high reduction of landfilled plastics.
- **Raised public awareness:** Citizens and tourists are engaged to this environmental policy.
- **Recycling program "Sorting at Source and door-to-door collection":** Awarded in 2015 for achieving the highest recycling amount per person at national level. (**70kg per resident)**
- **Water Kiosks:** Within the first three months of operation the machine has saved **50,000 plastic bottles of 1.5 Littre** measured based on the quantity of water sold**.**

Transferability Potential

This policy can easily be transferred to national and European level, due to the common problems of increased plastic waste and common solutions meeting the European Union's recent directive for single-use plastics. The policy also presents low skill requirements for implementation, and can be easily replicated by other small Greek islands/municipalities.

Further Information

http://www.lipsi.gov.gr/en/node/2137

https://greenagenda.gr/%CE%BF%CE%B9-%CE%BB%CE%B5%CE%B9%CF%88%CE%BF%CE%AF-%CE%B1%CF%86%CE%B1%CE%BD%CE%AF%CE%B6%CE%BF%CF%85%CE%BD-%CF%84%CE%B1-%CF%80%CE%BB%CE%B1%CF%83%CF%84%CE%B9%CE%BA%CE%AC-%CE%BC%CF%80%CE%BF%CF%85%CE%BA/

https://www.iefimerida.gr/ellada/leipsoi-proto-elliniko-nisi-horis-plastika

https://www.sofokleousin.gr/oi-leipsoi-protagonistoun-stin-anakyklosi

https://iskra.gr/%CE%BB%CE%B5%CE%B9%CF%88%CE%BF%CE%AF-%CF%84%CE%BF-%CF%80%CF%81%CF%8E%CF%84%CE%BF-%CE%B5%CE%BB%CE%BB%CE%B7%CE%BD%CE%B9%CE%BA%CF%8C-%CE%BD%CE%B7%CF%83%CE%AF-%CF%87%CF%89%CF%81%CE%AF%CF%82-%CF%80%CE%BB/

https://www.newgreektv.com/news-in-english-for-greeks/greece/item/25961-lipsi-is-the-first-city-in-greece-to-remove-plastic-bottles

https://www.gwp.org/en/NCWR/ncwr-programme/NCWR-Programme-Mediterranean/Programme-in-Greece/

POLICY 3: EXTENDED SEPARATE COLLECTION OF PLASTIC FRACTIONS IN STYRIAN WASTE COLLECTION CENTRES

Location: Austria

Summary

Lightweight packaging is the collective term for packaging made of plastics, composites, textiles, wood, ceramics, expanded polystyrene, and biogenic packaging materials. In Austria, these are collected in different models of separate collection.

The process of this separate collection is organized by producer responsibility organizations (PRO). PRO must be approved based on the AWG 2002 and the Packaging Ordinance by the responsible Federal Ministry. There are six different enterprises (status 2020) approved to act as PRO in Austria. Another important system player, the Packaging Coordination Office, in German Verpackungskoordinierungsstelle (VKS), was founded as non-profit organization in 2014. It became necessary to establish a neutral service provider and coordination body for all PRO due to the market opening defined at EU level in the area of separate collection of household packaging and the associated amendment of the Packaging Ordinance. Pursuant to § 30a AWG, the tasks of the VKS include the information and coordination of consumer information, the auditing of obligated companies (if their payments to PRO for packaging put on the market is correct), the organisation of sorting analysis of collected packaging waste, the determination of arbitration modalities and the operation of a register for companies to provide data on their industrial packaging waste.

In the case of Styria, recyclable material (i.e. lightweight packaging) can be disposed of in a door-to-door system in the yellow bags, “gelber Sack” in German, or in a bring system in the yellow bins (containers at collection points close to households). Furthermore, problematic materials, WEEE, batteries and recyclable materials, hence lightweight packaging, can be disposed of at local waste collection centres (ASZ) and resource parks. In general, up to 90 different waste fractions are collected separately in the Styrian ASZ. However, not all types of waste are collected in all ASZ, more than 80 fractions are collected in the "resource parks".

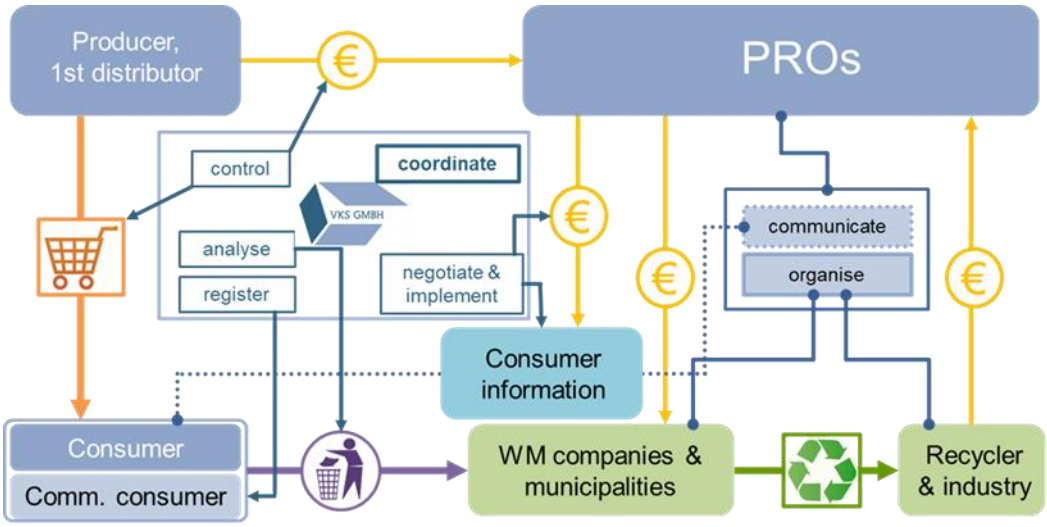


Fig.14. System landscape of the Austrian lightweight packaging management.

The collection of lightweight packaging material from households and household-like sources at municipal waste collection centres is called “Module 5”. The scheme of “Module 5” is within the framework of extended producer responsibility (EPR).

In addition, Styria operates a so-called Module 5+ system, which corresponds to the voluntary commitment beyond EPR. Module 5+ means an agreement between the local authority (ASZ operator) and the responsible PRO, where a further sorting depth is agreed upon beyond the fractions according to the standard Module 5 (PET, EPS, hollow bodies, LDPE films). The responsible PRO defines the necessary fractions and quality with the plastics recycler and then contracts with the ASZ operator the according implementation of additional fractions with a defined level of purity. In ASZ Ratschendorf and Leibnitz for example in addition PET blue, PET green, PET clear, PE closures, coloured films, clear films, etc. are collected separately. This further separation is remunerated with higher prices compared to the normal Module 5 material. With this form of further separation high-quality input materials can be obtained for further recycling.

Objectives

In general, the aim of separate lightweight packaging collection is to collect as much material as possible with as little impurities as possible for high-quality recycling. With this initiative, very higher purities can be achieved.

Results

Through further separation, an increased sorting depth of recyclable material, i.e. lightweight packaging (plastics), and therefore higher quality recycling can be enabled. Moreover, the system of Module 5+ collection can be tailored to specific needs in certain regions as the responsible PRO defines the necessary fractions and quality with the plastics recycler and then contracts with the ASZ operator the implementation of the collection of those additional fractions with a defined level of purity.

The higher the sorting depth, the more homogeneous the packaging material is, the more suitable it is for material recycling, the lower the re-sorting effort and the more likely it is that packaging will be sent for high-quality rather than low-quality recycling. Presently mixed lightweight packaging from the yellow bin/yellow bag systems is only 25 - 26% recycled, while the recycling rate of single-sorted plastic packaging is 80% and higher. The success and benefits of an extended separate collection of plastic packaging are currently being evaluated in a master thesis.

Transferability Potential

The initiative is highly transferable nationwide, as the needed infrastructure can be found in most areas in Austria. Furthermore, implementation risks for infrastructure can be considered low. When it comes to the transfer to other EU-countries, transferability might be limited because comparable bring collection systems (local ASZ) are needed as a prerequisite.

Further Information

Website of the VKS GmbH: http://www.vks-gmbh.at/

Example of an innovative Styrian resource park (Leibnitz):
https://www.awv.steiermark.at/cms/beitrag/11966820/43837/

Concept of “resource parks”:
https://www.abfallwirtschaft.steiermark.at/cms/beitrag/12411881/134969000/

POLICY 4: AURADECHET

Location: France

Summary

AURADECHET is a subsidy scheme which main objective is to develop new sorting and recycling capacities in the Auvergne Rhône-Alpes Region.

Eligible projects are those focusing on:

- Investments in exemplary equipment and solutions for sorting and/or recovery of waste,
- The development of innovative solutions.

This policy is based on calls for proposals. Companies must fill an application form and a jury selects the most promising and efficient projects. Calls for projects are opened twice each year (January and June).

Considering the success of this policy, calls for projects are repeated each year. The 2020 call for projects is already launched.

This policy is not restricted but includes projects focusing on plastic waste management. Several selected projects were dealing with the improvement of the plastic wastes management value chain:

- Sorting and recycling of plastic cables;
- Improvement of plastic waste recycling (qualities and quantities);
- Creation and improvement of commercial and industrial wastes collection facilities.

The total funding for this policy is 2M€ per year. About 6 to 7 projects benefit for this subsidy scheme each year.

Objectives

The aim of this policy is to:

- Help companies to invest in new exemplary equipment and solutions for sorting and / or recycling waste;
- Grid the territory with waste disposal/collection facilities dedicated to professionals. Every waste is concerned as long as it's not part of an Extended Producer Responsibility scheme.

Results

This policy has led to an increase of waste collection, sorting and recycling capacities.

Transferability Potential

This policy is easily transferable to any country or region willing to invest on recycled plastics, due to the common problems of increased plastic waste at EU level and the low skill requirements for implementation.

POLICY 5: ORPLAST "OBJECTIVE PLASTIC RECYCLING"

Location: France

Summary

ORPLAST intends to promote the uptake of recycled plastics by plastic manufacturers.

This policy is based on 3 financial tools:

Tool 1: grants for diagnostics and feasibility studies;

Tool 2: investment grants;

Tool 3: financial support scheme to the purchasing of regenerated resins above a price maintaining the viability of the regeneration process compared to virgin resins in a period (from 2015) where these resins where more competitive because of the crude oil price.

Tools 1 and 2 focus on process modifications to make it compatible with regenerated resins, or to increase the share of recycled plastics in final products.

This policy is based on calls for proposals. Companies must fill an application form and a jury selects the most promising and efficient projects.

Considering the success of this policy, the first call for proposals launched in 2016, was followed by another in 2017, and a new one has been announced by the end of 2020. Depending on the calls for proposals, the selection of projects was either on a national or at a regional scale.

Objectives

The aim of this policy is:

- To stimulate the demand for recycled plastics by encouraging plastic manufacturers to develop their supply chains, and to make their clients aware of the existence of such feedstocks

- In some cases, to maintain a decent price for the regenerated resins versus virgin resins in participating to the extra costs of these resins.

The primary target is plastic manufacturers. The indirect target are the plastic recycling companies who are facing difficulties to:

- Develop their markets because of the lack of demand
- Sell their products at a price that covers the production costs.

The policy addresses the periodical market issues faced by plastic recyclers when virgin resins are cheaper than recycled ones. This is once again the case since the end of 2019.

This is also a temporary solution in the absence of a regulation on binding minimum recycled feedstock incorporation rates in plastic products.

Results

Policy's benefits:

- increase of plastic recycling
- acculturation to recycled feedstocks by market leaders and resin processors
- help to maintain in activity the companies that are regenerating plastics (mostly small vulnerable businesses)

Based on the application form filled by the 26 companies selected during the last call for projects (in 2017), with 6M€ granted in total, this policy should provide the following benefits:

- An increase by 80 000tons of recycled plastics used by 2021;
- 120 jobs created.

Achieved results:

Increase of the rate of annual recycled resins uptake by companies granted:

For the projects that are finished = +29% (+ 24 kt/y)

For the ongoing projects = + 61% (+ 35 kt/y)

Transferability Potential

This policy is easily transferable to any country or region willing to invest on recycled plastics, due to the common problems of increased plastic waste at EU level and the low skill requirements for implementation.

Further Information

https://appelsaprojets.ademe.fr/aap/ORPLAST2017-68

http://www.plastiques-caoutchoucs.com/Le-retour-d-Orplast.html

http://www.plastiques-caoutchoucs.com/L-Ademe-presente-les-laureats-d.html

POLICY 6: RIVENDING PROJECT

Location: Italy

Summary

RiVending project, a dedicated collection of polystyrene coffee cups and stirrers, has been launched in refreshment areas supplied with vending machines. The project involves all employees as users of vending machines that, after enjoying their coffee, are asked to place their used cups and stirrers, made in polystyrene, in a special container that makes it possible to collect separately the material thus simplify the process of selection and recover of this single type of plastic, allowing the production of a selected secondary raw material. Versalis feed this secondary raw material in its plant in Mantua to produce expandable polystyrene (EPS), suitable to be transformed into expanded polystyrene panels for thermal insulation of buildings and protective packaging for appliances and furniture.

This policy, sponsored by the municipality of Parma and developed with the patronage of the Lombardy Region, it's a clear example of how the big private companies' buildings could collect their simple wastes and recycled them in a specific way. The regions could enhance this practice in all their territory in order to have a simple and uniform steam of material instead of heterogeneous collected wastes.

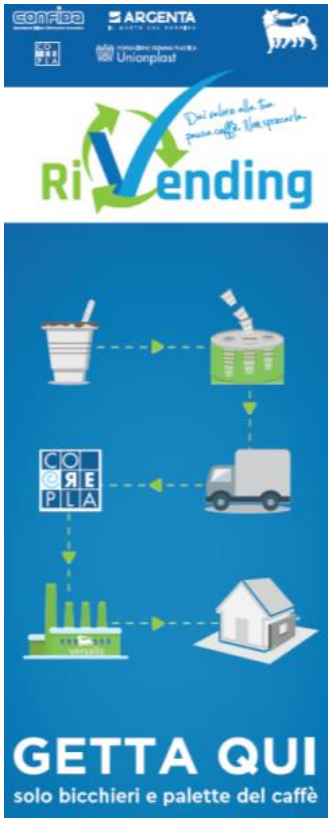
Objectives

The RiVending project is an example of a virtuous value chain of mechanical recycling and is also potentially scalable and exportable for many types of plastic products for short term applications, thus becoming a model that is bound to provide interesting volumes of selected secondary raw materials in the future.

Results

Project's benefits:

- Increase of plastic recycling
- Raised public awareness
- New materials



It is estimated that almost 5 billion disposable plastic cups in the automatic distribution sector used every year in Italy by students and workers. The production of glasses with an average weight of 4-5 grams each, including a scoop for sugar, involves an annual consumption of 20 thousand tons of virgin polystyrene, of which only a small part is actually recycled today. The challenge is to collect at least 20-25% of the glasses used in vending machines nationwide, generating a saving of 4-5 thousand tons of plastic.

The expected quantities related to S. Donato Milanese offices amounted to approximately 3.5 million pieces, divided into approximately 8.5 tons of glasses and 1.5 tons of pallets.

The first transfer to Amsa (Municipalized Company for waste management), carried out on 30 October 2019, about 20 days from the start of the pilot, accounted for a quantity equal to 490 kg, largely on the average indicated in the budget. The quality of the collected material was excellent, equal to 99.25% purity and therefore with almost no contamination, representing a key success factor for the project.

However, there was an incidence of the material coming from the bags (polyethylene), about 10% of the total weight of the transfer, a problem that had been underestimated since, at the start of the project, there was no knowledge of it. Tests are being carried out to identify the most optimal separation methods.

The second transfer testified an increase in volumes, for a total of 670 kg, and an almost stable maintenance of quality (97.85%), with a not negligible incidence of material other than the Polystyrene (about 16 kg).

Another result it's the creation of a new material called REVIVE:

Versalis Revive® EPS is an expandable polystyrene made of recycled raw materials from separated domestic waste collected in Italy (including polystyrene cups, trays and yogurt pots), suitable to be transformed into expanded polystyrene panels for thermal insulation of buildings and protective packaging for appliances and furniture. This innovative product is obtained using Versalis' proprietary technology at an existing plant, making it possible to include currently up to 20% of recycled content. The characteristics of the resulting product are comparable to those of 100% virgin polystyrene.

This project increases the circularity of the products and makes it possible to dramatically improve the recycling potential of styrenic polymer-based products. In addition, it gives new life to products that are important for our daily lives by converting them, after use, into durable goods.

Versalis created a link between the RiVending Project and the production of the Versalis Revive® EPS, as both regard the recovery of the same material (post-consumer polystyrene) represented into the following scheme.

Fig. 15. Versalis along with the RiVending Project.

Transferability Potential

This policy is easily transferable to any country or region willing to invest on recycled plastics, due to the common problems of increased plastic waste at EU level and the low skill requirements for implementation.

Further Information

Website:

https://rivending.eu/

News:

http://www.flo.eu/en/communication/news/rivending-ecomondo.aspx

https://www.zerosprechi.eu/index.php/la-plastica-del-caffe-diventa-circolare

POLICY 7: INCREASE OF THE PRICE-ENVIRONMENTAL FEE OF THE THIN PLASTIC BAGS

Location: Greece

Summary

The implementation of the environmental fee for pricing the use of thin plastic bags started in January 2018. In 1 January 2019 the Greek law for the pricing of the thin plastic bags sold in the supermarkets and stores changed and the price per piece increased from 0.04€ to 0.09€ (VAT included).

The Institute of Retail Consumer Goods conducted a survey which shows that this law reform achieved an extreme reduction of 98.6% in plastic bags used in super markets (from 2017 to 2019).

Objectives

The immediate goal of the increase in plastic bag price was the reduction of plastic waste (by discouraging consumers to use plastic bags and use reusable bags instead). The indirect goal is the raise of awareness of the general public for the detrimental effect of plastics waste on the environment.

Up to 2017, the plastic bags in supermarkets were free of charge and as a result the total thin plastic bags used have reached the number of 1.800 million pieces/year.

Results

The main benefit of the measure is the reduction of plastic waste. In 2017, the number of the total thin plastic bags were 1.800 million pieces which corresponds to 167 pieces per person. In 2019, these numbers decreased sharply to 24 million pieces and 2 pieces per person. This trend was

followed by an increase in the number of the biodegradable bags from 10.000 to 36 million pieces from 2017 to 2019.

Transferability Potential

Needs addressed are common across European regions, and the environmental fee reflected on the price of the thin plastic bags is in line with the European Guidelines.

Further Information

http://www.ielka.gr/?p=2632

https://www.huffingtonpost.gr/entry/to-2019-meiosame-ten-chrese-leptes-plastikes-sakoelas-sta-soeper-market-kata-99_gr_5e43d45dc5b6d0ea3810ea43?utm_hp_ref=gr-homepage&fbclid=IwAR2WrQNIMZwbQ22AWL0ml3TsrXuG2dwwW5tkYIZC4b_n1oJ9V9_etOBMisI

POLICY 8: SINDRA – THE WASTE OBSERVATORY OF AUVERGNE-RHÔNE-ALPES REGION

Location: France

Summary

Sindra is the waste observatory of the Auvergne Rhône-Alpes region. It was created by the Regional Council and the Environment and Energy Management Agency (ADEME) in 2000. It is the main tool for monitoring indicators of the regional waste prevention and management plan. It includes:

- A continuously updated database on domestic waste and waste generated by economic activities.
- Indicators calculated at different scales (municipalities, local public authorities, departments and region) each year.
- A general public section presenting a directory of regional actors (what wastes, what solutions?) and departmental and regional reviews and summaries.
- An extranet part to share data for local public authorities and private companies.

It is a single optimized tool to limit the solicitations of data providers and meet the different expectations of the territories:

- At the local level: summary sheet for local public authorities (monitoring, comparison, annual report, key figures),
- At regional level: monitoring of the regional waste prevention and management plan, evaluation of public policies, support of territorial animation, annual edition of regional results,

- At national level: supply of the ADEME national database, input to the European statistical system.

Each local public authority, company collecting waste or company managing a direct processing facility, provides the information that concerns it by entering directly into the database on the Internet, or by filling in a survey file. Approximately 170 local public authorities and 200 waste treatment companies annually update their data. This involvement of local public authorities and companies in the collection of their information guarantees Sindra up-to-date and reliable data. Sindra produces summary information that is accessible as a reference point for assessing actions taken or to come for the improvement of waste management and prevention in Auvergne-Rhône-Alpes region.

Sindra links partners around the same subject: waste management and prevention. Based on the principle of exchange of information, the system creates a collaborative space, extended to different levels of the regional territory where certain territorial solidarities can be expressed. Each local authority can compare itself to the others, take into account nearby equipment, highlight possible complementarities and synergies, pool resources, and generate economies of scale.

Objectives

The main objectives of Sindra are the following:

- Provide local public authorities with a tool to help them in waste management and prevention.
- Enable each local authority to be in line with the others, to create complementarities and synergies to achieve economies of scale.
- Enable waste management professionals to make themselves known, to participate in a better knowledge of waste management in the territories and to develop partnerships with the various stakeholders.

Results

Sindra responds to the need to monitor and evaluate different regional policies, including policies related to recycling and plastic reduction. The observatory brings together all available data on waste by collaborating with many partners (local public authorities, private waste treatment companies, specialised observatories, etc.).

The tool "what waste, what solutions?" may also make it possible to sensitize individuals and professionals to the sorting of waste by providing information adapted to the territory concerned.

Even though it's impossible to assess the direct impact of this policy in terms of waste reduction or recycling rate, the very high rate of stakeholders answering the survey (in 2019, 99,4% of local public authorities and 92% of private providers) is proof of its success.

Indeed, this policy is well accepted because it answers to the need to get more precise and harmonized data on waste production and management practices at local, regional, and national scale.

Data collected from 370 various regional stakeholders:

- 170 local public authorities
- 200 private companies

Representing > 1000 facilities:

- 670 public and private waste collection centres
- 440 public or private waste transfer and recycling facilities

Transferability Potential

This policy is transferable and addresses the common need to monitor changes in the different types of waste produced, collected and recovered in order to assess and adapt regional and local policies related to waste management and prevention. It also feeds the National and EU observatories with essential data.

Further Information

www.sindra.org

POLICY 9: ZIEMEĻVIDZEME REGIONAL WASTE MANAGEMENT PLAN 2014-2020

Location: Latvia

Summary

The Ziemeļvidzeme Regional Waste Management Plan (Ziemeļvidzeme RWMP) is a policy and strategical planning mid-term document which gives provisions for a 6-year period (2014-2020) in the municipal waste management field for one of the Latvian waste management regions (Ziemeļvidzeme). It has been elaborated in accordance with the Cabinet of Ministers Regulation No 564 Provisions on National and Regional Waste Management Plans and the National Waste Prevention Program, adopted by the Cabinet of Ministers of the Republic of Latvia on July 12, 2011. During the planning phase a strategical environmental impact assessment of the policy documents was elaborated following the Law "On Environmental impact assessment", including a public hearing procedure. The plan is elaborated in close cooperation with all 22 municipalities of the Ziemeļvidzeme region and the document has been adopted by all of them. The elaboration of the plan was not compulsory for the municipalities, it has been adopted by common agreement.

The Plan includes: information on the Ziemeļvidzeme waste management region, characteristics of the existing regional waste management system, waste production analyses, evaluation of the realization of the previous regional waste management plan (2006-2013), main directions to improve the waste treatment prior to re-use, recycling, recovery and disposal without endangering the environment, main measures for the development of the regional waste management system, estimated capacity for separate collection and recovery facilities and their location criteria, available and necessary funding for the implementation of the measures set in the regional waste management plan, compliance of the regional waste management plan with regulatory enactments in the field of waste management and annexes.

Objectives

The main objectives of the region's waste management are related to:

- Stimulating the public opinion in order to minimize the generation of waste;
- Strengthening the operation of the regional waste management center;
- Returning as much and as high-quality as possible secondary raw materials to the economy, ensuring a more consumer-friendly range of collection infrastructure networks and services;
- Improving the quality of recyclable resources by treating them for recovery;
- Increasing public awareness on the concept of "there is no waste, there are only resources";
- Minimize the amount of waste to be disposed of by eliminating biodegradable substances from the landfilling;
- Minimize the impact of waste disposal on human health and all environmental factors (air, surface water and groundwater, soil, flora and fauna, etc.);
- Ensure efficient use of landfill gas.

Regarding separate collection and sorting of recyclables, including plastic waste, from the point of view of municipalities (based on municipal enquiry) the main attention has to be paid to:

- Establishment of separate collection in all municipalities of the region and further development of separate collection infrastructures to prepare waste for recovery to the largest possible extend;
- Necessity to inform inhabitants and businesses about the need for and benefits of separate waste collection, as well as about plans to develop a separate collection system in the region;
- Fractioning of waste for recovery (recycling, re-use) basing on the proximity principle which calls to the need to treat and/or dispose of waste in reasonable proximity to their point of generation so to minimize its environmental impact.

Results

At the end of 2018 the last evaluation of the plan fulfilment was completed. Regarding separate waste collection, including plastic, the following conclusions were made: the number of separate waste collection infrastructure has rapidly grown and it corresponds to and even transcends the requirements of the Regulation of the Cabinet of Ministers No. of 328 Criteria and Order for Assessing the Availability of the Separate Collection Service to the Public, except for one separate waste collection place (ECO place) in Priekuļi where the population exceeds 8000 inhabitants. Regarding ECO points (container points) the planned number for 2020 was 430 but at the end of 2018 it reached already 486. Thus, the situation on the availability of services of separate collection infrastructure is far better than envisaged and ZAAO, Ltd. has succeeded in the implementation of the tasks and the population has been provided with all needed equipment in order to separate plastic from arising waste and to submit used plastic to the waste operator using infrastructure especially build for them.

The total amount of collected municipal waste in the region in 2018 makes 36300, 3 tons of which separately collected is used packaging: glass – 2184,4 tons, paper, and cardboard – 2080,1 tons, metal 175,7 tones and plastic – 1407,5 tons. The total amount of separately collected used packaging is 5847,7 t. During the implementation of the Ziemeļvidzeme waste management plan the amount of separately collected plastic has grown from 450 tons in 2013 until 1407,5 tons in 2018, thus the collection rate grew nearly 1000 tons in 5 years. The policy proved to make a difference and shows that by increasing separate collection opportunities, the yearly amount of plastic averted from the landfilling grows reducing plastic leaking into nature and into the marine environment.

Transferability Potential

The policy is a good example of several methods to organize the separate collection of plastic and can be transferred to other EU countries with sparsely populated areas.

There are no common regulations of the European Commission on how to implement separate waste collection for plastic in EU. Each EU country deals with it respecting several national features: traditions, number of inhabitants, population density, geographic patterns etc. Latvia is among those EU countries without a plastic deposit refund system therefore actions have to be taken to let

people separate waste at source – at home - and make the separation process comfortable. There have to be enough places where to separate plastic and places have to be located at convenient areas suitable for the daily routine of inhabitants and also for waste collectors (at shops, gasoline stations, municipal buildings etc., preferably on municipal land plots to avoid problems with impacting private ownership rights).

Further Information

ZAAO, Ltd. www.zaao.lv

Ziemeļvidzeme regional waste management plan 2014-2020 (2013)
http://www.zaao.lv/sites/default/files/zvraap_21_03_2014_178lpp2.pdf

Evaluation of Ziemeļvidzeme regional waste management plan (2018)
http://www.zaao.lv/sites/default/files/zv_raap_izvertejums_29112018_final.pdf

Announcement for public hearing by State Environmental Impact Assessment Bureau
http://www.vpvb.gov.lv/lv/strategiskais-ivn/pazinojumi/?id=577

Announcement for public hearing by municipalities: Valmiera - https://www.valmiera.lv/lv/jaunumi/zala_valmiera/9724_iespeja_izteikt_viedokli_par_ziemelvidzemes_regionalo_atkritumu_apsaimniekosanas_planu_20142020gadam/; Līgatne http://www.ligatne.lv/jaunumi/notikusi-zraap-2014-2020gadam-apspriesanas-sanaksme/print//print/; Cēsis https://www.cesis.lv/lv/novads/aktualitates/zinas/pasvaldiba/-iespeja-izteikt-viedokli-par-ziemelvidzemes-regionalo-atkritumu-apsaimniekosanas-planu-2014--2020-gadam/.

Announcement of adoption of Ziemeļvidzeme Regional Waste Management Plan 2014-2020
http://www.zaao.lv/lv/zinas/ziemelvidzemes-regionalais-atkritumu-apsaimniekosanas-plans-2014-2020gadam-nodots

National Waste Management Plan 2013-2020 http://polsis.mk.gov.lv/documents/4276

Figures of infrastructure and tools for separate waste collection and sorting used by ZAAO, Ltd. on daily base

Fig. 16. Special PET collection container.

Fig. 17. ECO bag for collection of used packaging, including PET and other plastic.

Fig.18. ECO points (container places) in different municipalities.

Fig.19. ECO place in Limbaži municipality.

Fig.20. Sorting line of separately collected used packaging.

POLICY 10: ECOTASSA - TAXATION ON LANDFILL WASTE DISPOSAL AND ECONOMIC CONCESSIONS FOR VIRTUOUS RECYCLING PLANTS THAT ACHIEVE OPTIMAL WASTE RECOVERY PERFORMANCE

Location: Italy

Summary

In 1996 the landfill tax was introduced in Italy with the 1996 financial law (law No. 549 of 28 December 1995); the detailed discipline was delegated to the regions as well as the collection and management of the revenue deriving from the tax. In the Lombardy Region the ecotax is regulated by the law 10/2003 which governs the determination of the tax, by defining some tax rates that aimed to promoting the recovery of waste as material or energy and by discouraging the transfer of waste to landfill.

In order for the ecotax tool to be effective, the rates must be constantly updated and their increase must not result in an increase in revenues but in a decrease in the quantities of waste sent to landfills.

Lombardy Region, with d.g.r. n. 4274 of 25 October 2012, defined the criteria to facilitate some types of plants that achieve optimal waste recovery performance, allowing these plants to apply the reduced tax for the landfilling of waste.

Among these plants are also included the sorting and plastic recovery plants which reach a minimum recovery percentage of 50% according to the following formula:

% recovery = (total B + C / total A + Mp) x 100

in which:

A = Quantities of waste entering treatment;

Mp = Total quantities of any raw materials used by the plant;

B = Quantities of materials obtained from waste recovery activities leaving the plant;

C = Quantities of waste, decaying from the recovery operations carried out at the plant, which are sent to other plants that conclude their recovery.

In Lombardy, the revenue from this tax remains for the 90% with the Region and is intended for the following purposes:

- Favor the lower production of waste, the recovery of raw materials and energy;
- Carry out the remediation of polluted soils, including abandoned industrial areas, the recovery of degraded areas;
- Maintain protected natural areas.

Starting from the 2018, 10% of the eco-tax is assigned to the municipalities where the landfills and incineration plants without energy recovery are located and to the neighbouring municipalities, actually affected by the inconvenience caused by the presence of the landfill or the incinerator plants. Municipalities must use this introit for the implementation of interventions aimed at improving the environment of the territory concerned, protecting residents' hygiene and health, developing environmental control and monitoring systems and integrated management of urban waste.

The eco-tax constitutes the DG Environment budget and with it are funded actions including the construction of second-hand centres, the Savager project for Earth observation in order to highlight illegal situations of abandonment of waste, calls to combat food waste , remediation and environmental remediation projects.

Objectives

- Reduction of the quantities of waste sent to landfills
- Achievement of optimal waste recovery performance by plants that want to obtain the “ecotax”
- Use of the tax for environmental purposes and in particular for projects to reduce waste, combat illegality and environmental remediation.

Results

Benefits: Decreased of disposal of plastic waste recoverable in landfills. Incentive for the recycling plants to reach the optimal percentages that allow them to reach the benefit.

In 2018 (last data available) in Lombardy no urban plastic waste and no packaging was sent directly to landfills only 2,736.7 tons of special plastic waste were sent directly to landfills, compared to a total production of plastic waste estimated at almost one million tons.

An example of a recycling plant that receive the tax benefit

The Montello S.p.A. recycles 700,000 tons / year of organic waste from separate collection (FORSU), transformed into biomethane with CO_2 recovery and into organic fertilizer, and deals in the integrated activity of Selection, recovery and recycling of raw materials in the second form of flakes and granules of 300,000 tons / year of post-consumer plastic packaging waste from urban recycling. Almost 60% of plastic packaging is processed into flakes and granules. The high quality of the secondary raw materials produced allows their use in many sectors and applications such as the packaging itself, but also the automotive, textile, construction and urban furniture sectors. The process waste resulting from the selection and recycling plants that are not recoverable are treated to eliminate the chlorinated plastic and, subsequently, ground to a suitable size for the production of Secondary Solid Fuel (CSS), intended for cement factories and / or dedicated systems for their energy recovery. The waste that is sent to landfill accounts for less than 20% of the total incoming packaging.

Transferability Potential

Needs addressed are common across European regions. Eco-tax can be easily transferred across Europe.

Further Information

https://www.regione.lombardia.it/wps/portal/istituzionale/HP/DettaglioProcedimento/servizi-e-informazioni/imprese/Sicurezza-ambientale-e-alimentare/gestione-dei-rifiuti/Pagamento-tributo-in-misura-ridotta-deposito-discarica/pagamento-tributo-in-misura-ridotta-deposito-in-discarica

ANNEX B: QUESTIONNAIRE

Title of the policy	
Policy Identification	
Category of policy	☐ Regulatory* (* Do not document in this Table EU Directives and EU regulations) ☐ Market-based ☐ Voluntary agreement ☐ Financial ☐ Informative
Geographical scale	☐ National ☐ Regional ☐ Local
Location	
Starting year of policy	
Policy Description	
Policy promotes	☐ Separation ☐ Sorting ☐ Recycling ☐Uptake of recycled plastics
Policy targets	☐ Municipal wastes ☐ Commercial and Industrial wastes

	☐ Microplastics in waters
Summary of policy	
What are the main objectives, targets and needs addressed by this policy?	
Who initiated and implemented the policy?	
Policy Implementation	
Is this policy linked to a National/EU legislation or initiative? Please specify. *(Please see Chapter 2)*	
What was the kind of support for this policy (For instance: Political support and/ Public)?	

Who are the key stakeholders of the plastics value chain that are/were involved and affected by the implementation of this policy? In what way?
What were the main problems encountered during implementation? (For instance: conflicting regulation, reactions of plastics value chain stakeholders, lack of interest/uptake).
Results and Transferability Potential
What are the main benefits this policy delivered? (For instance: raised public awareness, reduction of plastic waste in landfills, increase of plastic recycling).
Please provide quantitative results such as reduction of plastics in the landfills (% or absolute numbers), increase of plastic recycling.

Is this policy countrywide and/or EU-wide transferable? What are the main features that make this policy transferable? (For instance: it addresses a common need/problem across different EU regions, low implementation risks for infrastructure, demonstrated achieved benefits outweigh infrastructure investment costs by far).
Policy Self-Assessment
How would you classify the aforementioned policy and why?
☐ Poor ☐ Promising ☐ Good *(Please provide here further details about your choice)*
Does it require further development? In which aspects?
Further information (links, sources of information)

ANNEX C: EVALUATION OF COLLECTED POLICIES.

Policy	Relevance	Impact	Problems encountered*	Transferability	Total score
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	5	5	4	3	17
Innovative Separate Waste Collection System for Public Space	3	4	3	4	14
Lesson Plan on Plastics	5	3	3	4	15
Implementation of municipal waste advisors	3	4	3	4	14
Ecotax applied to all transport bags	4	3	3	4	14
Landfill tax/contribution for the circular economy	3	3	3	3	12
Selective collection campaigns	4	3	3	3	13
The penalty paid by packaging producers and OTRs	4	4	3	4	15
AURADECHET	5	4	3	5	17
ORPLAST “Objective PLASTic Recycling”	5	4	4	4	17

Policy	Relevance	Impact	Problems encountered*	Transferability	Total score
Coordinated regional policies to improve plastic wastes management	3	4	3	4	14
Sindra	4	4	4	4	16
PET Baltija	4	3	3	3	13
Nature and Technology Park "URDA"	3	3	3	4	13
Ziemeļvidzeme Regional Waste Management plan 2014-2020	4	4	4	4	16
Zaļa Josta - Producers responsibility scheme for packaging	3	3	3	3	12
Plastica Seconda Vita	4	4	4	3	15
Circular Economy Observatory	3	3	3	3	12
Reverse RPET Nudge System	4	3	3	3	13
ECOTASSA	4	4	4	4	16
Plastica Consapevole	5	5	4	5	19
Rivending Project	5	4	4	4	17
Increase of the price-environmental fee of the thin plastic bags	5	4	4	4	17

Policy	Relevance	Impact	Problems encountered*	Transferability	Total score
"In my cup" project	4	3	3	3	13
Municipality of Lipsi	5	5	4	4	18
Say no to plastic straws	5	3	3	3	14
Rewarding Recycling	4	3	3	3	13
"Münchner Einwegverbot": "Munich Prohibition on one-way"	3	3	3	3	12
Stop of financial support on artificial turf pitches containing microplastic by the ministry of Baden-Wurttemberg	3	3	3	3	12
Municipal packaging tax in the city of Tübingen	5	3	3	3	14
Introduction of the Recycling Bin ("Wertstofftonne") in Augsburg	4	3	3	3	13
Waste classification, sampling, and analysis	3	3	3	3	12
Perpetuum Mobile Albena	3	3	3	3	12

Policy	Relevance	Impact	Problems encountered*	Transferability	Total score
Co-digestion of kitchen and agricultural waste					
Plovdiv declared war, “Paper war”!	1	3	3	3	10
Municipal Enterprise "Sofia Waste Treatment Plant"	2	4	3	3	12

*no problems= scores 5.