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URBAN-WASTE

Urban strategies for Waste Management in Tourist Cities

D4.2–Guidelines for local policy makers for mainstreaming of URBAN-WASTE strategies into Waste Management Plans

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Abstract

The objective of the work package 4 is the development of eco-innovative and collectively-based waste prevention and management strategies for touristic cities. The idea of this guideline for local policy makers is to provide them with some inputs related to European and national regulation so that they are aware of the legal frameworks on waste management at their local scale. In fact, even if the European regulation is a common legislative framework for all the member states to conduct their national waste management policies, every country has its own specificities that lead to specific strategies in terms of waste management.

This guideline can be used as separated forms for seven different themes: avoiding waste production; reuse and prevention; avoiding litter; sorting into different fractions and recycling; biowaste and food waste; used cooking oils and environmental certifications. Those forms aim to describe all the national regulation on those themes so that local stakeholders can get legal tools to implement and support the proposed URBAN-WASTE measures on waste management at their local scale.

Moreover, economical guidelines have also been developed through that deliverable. They aim to make local stakeholders aware of the costs and saving costs generated by the measures implementation at their local scale; and can be used as decision making tools locally. Indeed saving costs can be used as convincing arguments for local stakeholders regarding the interest of the measures implementation. Besides, for the measures proposed by the URBAN-WASTE project, a business model has been developed in order to identify the relevant information to implement such a measure at local scale: timeline to implement the measure; barriers; success factors; main stakeholders to involve; supportive policy actions; financial inputs; monitoring; impact on policies, etc. This work on business models has been completed with the proposition of a common financial balance template that can be used by local policy makers as a tool to support the implementation of the measures.

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List of abbreviations

ACR+	Association of Cities and Regions for Recycling and Sustainable Resource management
ABP	Animal By-Products
BMW	Biodegradable Municipal Waste
CE	Consulta Europa
D	Deliverable
GDP	Gross Domestic Product
GPP	Green Public Procurement
IAU	Institut de l'Aménagement et de l'Urbanisme
EMS	Environmental Management System
EU	The European Union
EC	European Commission
MBT	Mechanical-Biological Treatment
MEC	Minimum Environmental Criteria
MSW	Municipal Solid Waste
NWMP	National Waste Management Plan
PEF	Product Environmental Footprint
UCO	Used Cooking Oil
WMP	Waste Management Plan
WP	Work Package
WPP	Waste Prevention Programme

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Table of Contents

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1. Introduction

The objective of the work package 4 is the development of eco-innovative and collectively-based waste prevention and management strategies for tourist cities. Those strategies are targeted at local authorities dealing with waste and experiencing important touristic activities. Thus, the main targets of these strategies will be tourists, citizens, tourism operators and service providers (hotels, restaurants and bars) and representative of other industries. The strategies developed through this work package and the whole URBAN-WASTE project are covering various topics such as prevention, reuse, and waste collection, sorting and recycling.

In order to accompany the eleven pilot cities of the URBAN-WASTE project to develop those strategies on their own territory, it has been decided to create several tools. First of all, it was required to create a unique document that would compile all the information gathered on every pilot city during the whole project; this document has been called "Pilot form". It corresponds to the identity card of every pilot city within the URBAN-WASTE project. It first compiles all the information gatheredthrough the work package 2 on waste management within the pilot city. Then, there is a part resulting from all the work that has been conducted within work package 3 on stakeholders' involvement that provides the list of local stakeholders who should be involved in the waste management strategies implementation within every pilot city. This pilot form also gathers all the reflexions that have been conducted with the pilot city and its stakeholders when selecting the measures to be implemented through the local waste management strategy. The list of the selected measures to be implemented is then presented within every pilot form with some operational comments when required. Finally, it was also very important to develop a final part for all the monitoring process. In fact, the work package 6 does not only focus on the measures implementation but also on assessing the efficiency of those measures locally. That is why the pilot forms are also used to compile all the assessment that will be led in the next period of the URBAN-WASTE project.

To develop eco-innovative and collectively-based waste management strategies, it has been decided to work on specific measures that could be integrated directly within existing or future waste management plans at local scale. So far, 22 measures have been developed though the work package 4. They are all presented within what has been called a "measure form". This measure form is divided into different parts: the description and the scope of the measure; its possible integration in a waste management plan; economic aspects to consider (costs, cost savings, revenues) and potential solutions for the financing of the measure; the type of stakeholders to involve to implement the measure; the description of the operational steps to be followed to implement the measure; examples of good practices similar to the measure and already existing; and the a set of indicators to assess and monitor the performance of the measure and guidelines to use those indicators. All those measure forms are then compiled within what has been called "toolbox" where they are ordered by theme, but also according to four categories: regulatory, economic, technological and informational. They are also ordered regarding the type of city they can be implemented: coastal cities, very urban cities, etc.

The idea of this guideline for local policy makers is to provide them with some inputs related to European and national regulation so that they are aware of the legal frameworks on waste management at their local scale. In fact, even if the European regulation is a common legislative framework for all the member states to conduct their national waste management policies, every country has its own specificities that lead to specific strategies in terms of waste management.

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2. Methodology

The aim of this deliverable 4.2 is supporting local policy makers in the integration of the waste management strategies developed through the whole work package 4 into existing or future waste management plans. It should address synergies in terms of common objectives, impacts, shared use of infrastructure, etc. It should also provide stakeholders with a common template dealing with a financial balance template and examples of business models to help them implementing their own local strategy in terms of touristic waste management.

As it was explained in the previous introduction, the European regulation is a common framework for all the member states when developing national waste management strategies. However, we can notice that every country has developed its own national waste management policies that are not always the same. Besides, national regulation provides local authorities in charge of waste management with general objectives and guiding principles, but waste management plans are mainly conducted at local scales. They also evolve periodically and differently according to the different countries. With eleven pilot cities, it was not easy to have a unique common framework for waste management strategies as every local authority in charge of waste management had already developed its own waste management strategies. That is why it has been decided to present both the European regulation and national regulation for the eight countries that are represented through the URBAN-WASTE project. This regulation has then be related to every measure that has been developed through the work package 4 (cf. Introduction) to see in what way it represents an opportunity and/or an obstacle to implement such a measure within local waste management plans. Besides, when possible, some information has been added on the local waste management strategies of the pilot cities in order to see if these local strategies represent an opportunity or an obstacle for the implementation of the proposed measures. Providing local policy makers with European and national regulation on waste management should be a useful tool for them to convince local stakeholders to involve themselves in the implementation of eco-innovative waste management strategies. This tool could also be used by local authorities in charge of waste management to convince their own local elected representatives and councillors.

Moreover, it is important to provide local stakeholders with a common financial balance template and examples of operating business models to help them developing their own local strategies in terms of touristic waste management. The common template will be useful for them to assess all the different economic inputs related to their measure implementation: costs, revenues or saved costs. The idea of providing them with examples of business models that have been conducted for operating measures is a way to encourage them contacting other European stakeholders who have already implemented one of the proposed measures of the URBAN-WASTE project on their own territory. By contacting those people, local stakeholders will be able to gather lots of information on the experience of existing measures and might be further advised on the related barriers that could jeopardize the implementation of such a measure, but also on the things that work well while implementing it.

The main concern while leading the work package 4 was to develop operational tools that could be used easily by the pilot cities within the project but that could also be used in the future by other touristic cities that are not taking part of the URBAN-WASTE project. That is why it has been decided to create what are called "policy makers forms" within this deliverable 4.2. In fact, presenting the work that has been done on separated forms that can be used individually is an easy way then to use it and disseminate it.

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3. Policy makers forms

Those "policy makers' forms" have been designed according to seven different themes chosen by taking into account the already existing general themes of the measure forms developed through the toolbox. Those themes are:

- Prevention: avoiding waste production
- Reuse and prevention
- Avoiding litter
- Sorting into different fractions and recycling
- Biowaste and food waste
- Used cooking oils
- Environmental certification

Each policy maker's form is divided into a part on European regulation and then regulatory parts for each of the eight countries. For each of those parts, a table has been developed with the list of the concerned measures per theme to describe the opportunities and obstacles that represents the regulation for the measure implementation. Finally, for each theme there is a part that compiles a list of the type of stakeholders who should be involved in the measure implementation and how to convince them to participate.

This section will present the policy makers forms that have been developed through the work package 4 of the URBAN-WASTE project.

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3.1 Prevention: avoiding waste production

Regulatory frameworks

European regulatory framework

Article 29(5) of Directive 2008/98/EC on waste calls upon the European Commission to create a system for sharing information on best practices regarding waste prevention and to develop guidelines in order to assist the Member States in the preparation of their waste prevention programmes. In order to move up the waste hierarchy, the Waste Framework Directive requires that Member States shall establish Waste Prevention Programmes not later than 12 December 2013 (Article 29). WPP should be notified to the Commission using the reporting format adopted by Commission Decision 2013/727/EU. Furthermore, the proposed Waste Framework Directive replaces Article 9 (Prevention of waste) with more precise actions.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	It can prevent food waste generation and can be part of a Waste Prevention Programme.	
3	On-site composting in tourist establishments	It contributes to the reduction of biowaste going to landfills and answers the European Directive.	
6	Partnerships between hotels and charities for reuse initiatives	This measure can be integrated into a Waste Prevention Programme.	Issues with transport, expiry dates etc. Necessary adjustments in national laws.
7	Substitution of disposable products in hotels	This measure can be integrated into a Waste Prevention Programme.	
8	Reuse initiative in camping sites	This measure can be integrated into a Waste Prevention Programme.	
9	Communication campaign on reuse through swap markets	This measure can be integrated into a Waste Prevention Programme.	
13	Promotion of tap water	This measure can be integrated into a Waste Prevention Programme as a way to decrease plastic waste.	
22	Food donation from restaurants and hotels to charities	It can prevent food waste generation and be part of a Waste Prevention Programme.	Issues with transport. It's necessary to set up this model.

French regulatory framework

National policies on waste prevention

Prevention on waste management is a concept that has been introduced within the French legislation since 1975 with the law n° 75-633 of 15 July 1975 related to waste elimination and materials recovery. This concept has been further developed thanks to the first national plan on waste production prevention implemented in 2004 for the 2004-2012 period. Besides, the law Grenelle 1 of 23 July 2009 sets the objective to reduce daily municipal waste production (residual waste, packaging and paper waste, biowaste) by 7% between 2008 and 2013. This objective included within the national waste management plan has permitted to develop local waste prevention programs within the municipalities in charge of waste management. Those local waste prevention programs have been subsidised by the French agency for energy and environment, the ADEME till 2014. The law Grenelle 2 of 12 July 2010, through the article L. 541-15-1 of the code of environment, obliges every municipality in charge of waste management to implement a local waste prevention program on its territory by January 2012 the latest. Those local waste prevention programs have to include objectives in terms of waste production reduction and a list of specific actions to achieve those objectives.

Since the publication of the European Directive 2008/98/CE on waste management, all the member states are obliged to implement such waste prevention plans. In France, the article L. 541-11 of the code of environment integrates this obligation at the national scale. Thus, the ministry of environment and the French agency of energy and environment, in cooperation with all the concerned stakeholders, have elaborated a new national waste prevention plan that will be led on the 2014-2020 period. Besides, since the publication of the new law n° 2015-992 of 17 August 2015 on energetic transition for a green growth, waste prevention is now integrated within a larger legal framework dealing with circular economy and an efficient use of resources.

The new national prevention programme for the period 2014-2020 defines the strategy of public policies in terms of waste prevention:

- Reducing by 7% municipal waste production per inhabitant between 2010 and 2020. This objective has been changed and is now even higher with the law n° 2015-992 of 17 August 2015 that sets the objective at 10%;
- Reducing professional waste production, mainly in the construction sector, between 2010 and 2020.

To achieve those objectives, the national waste prevention plan forecasts the implementation of several measures:

- Experimenting the deposit concept in order to encourage people to return their packagings for reuse and reutilisation;
- Extending products lifespan and fighting against the foreseen obsolescence;
- Developing measures against food wasting;
- Spreading the "stop-ads" approach in order to decrease non-desired printed advertisements;
- Reducing the use of plastic bags and other plastic one-use products generating lots of waste contaminating oceans.

This national waste prevention plan has to be declined on local scales and led by the municipalities in charge of waste management. To accompany them, the French agency of energy and environment has published a specific guide on the elaboration and the management of local municipal waste prevention programmes in December 2016. This guide compiles the elaboration procedure, the implementation steps, the monitoring and assessment process of those local waste prevention programmes.

Some of the main measures that are usually developed within local waste prevention programmes are:

- Distributing individual or collective composting units;
- Distributing "stop-ads" stickers to households in order to avoid paper waste;
- Promotion of tap water to avoid plastic bottles;
- Creation of second-hand shops in order to foster reuse;

- Make people aware of food wasting by providing them with new recipes to avoid throwing edible food.

Besides, the French law on energetic transition for a green growth also recommends reducing non-recyclable manufactured products amounts to be sold by 50% before 2020. This is a way to oblige producers to work even harder on eco-design. Moreover, this law also stipulates that public purchase has to serve circular economy and the achievement of the prevention objectives. By doing so, it contributes to arise good practices, especially on reuse, reutilisation and recycling.

The same law n° 2015-992 of 17 August 2015 related to energetic transition for a green growth also stipulates that one-use plastic bags used to pack merchandise are forbidden at the checkouts since 1 July 2016. Instead of one-use plastic bags, customers are now provided with paper, cardboard or fabric bags, or even compostable plastic bags. Since January 2017, one-use plastic bags are also forbidden for direct food good packaging. All the selling points are concerned by this article of the law: pharmacy, bakery, grocery, etc. If this prohibition is not respected, the seller can be punished by a sentence of two years of prison with a fine of 100,000 €. Another decree related to the law n° 2015-992 specifies that the selling and the distribution of one-use plastic dishes (glasses and plates) will be forbidden by 1 January 2020. Only compostable disposable dishes will be able to be sold or distributed for free when buying take-away food or to consume directly on-site. The decree of 30 August 2016 stipulating this prohibition precises the minimum amount of biosourced matter that needs to be present within the compostable dishes to be authorised to be sold: 50% in 2020; 60% in 2025. The industrials are concerned by this decree as they have four years to find alternatives to plastic dishes. Besides, all the food selling points such as traditional restaurants, take-away restaurants, bakeries, groceries are concerned by this decree. Those measures show a real willingness of the French authorities to try to avoid plastic waste production by integrating it within the national waste prevention policy.

Waste prevention within EPR schemes

Moreover, the national legal specifications made by the ministry of environment on EPR schemes define adapted objectives on reuse for each of those sectors:

- Furniture:
  - Achieving the national valorisation rate (reuse, recycling and energetic valorisation) of at least 80% by 2017; with a maximum of 20% of landfilled furniture;
  - Facilitating reuse for Social Solidarity Economy structures such as charities or second-hand shops for instance by guaranteeing them quality furniture in order to increase their sold reused furniture tonnages by 50% by 2017;
  - Developing eco-design in order to decrease by at least 3% waste production by 2017.

The professional section of the EPR scheme on furniture has to achieve 75% of reuse and recycling since 2015, when the household section has to achieve 45%.

New objectives will be defined at the beginning of 2018 within the new specifications defined by the ministry of environment.

- Textiles:

By 2019, achieving 95% of valorisation rate (reuse, recycling and energetic valorisation) with a minimum of 20% of recycling. At the same time, it is asked to landfill a maximum of 2% of collected textiles.

- Waste Electrical and Electronic Equipment:

The French national legal specifications on WEEE define specific reuse & recycling rate for each of the eleven WEEE categories that go from 55% to 80% to be achieved by 2018.

Those recommendations have to be achieved by the different EPR schemes, and that incites eco-organisations in dynamising all the sector's stakeholders in contributing to achieve those objectives. This is a way to foster reuse within the professional sectors such as hotels for instance when dealing with furniture, textiles and WEEE. It is also a way to subsidise second-hand shops that will be used as collection points and as selling points at the same time.
EPR schemes can also be a way to ask producers to work on reducing the waste generated by their products. In fact, some of them have to comply with eco-design objectives that have been set within the legal specifications. It is especially the case for furniture where producers have to develop eco-design in order to reduce waste production by 3% by 2017. The new legal specifications that should be published at the beginning of 2018 might set other eco-design targets. This is also the case for the EPR scheme dealing with packaging waste for instance where producers were supposed to decrease the packaging weight that was sold by 100,000 tonnes between 2007 and 2012 thanks to eco-design.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	Food prevention at buffets and restaurants is answering the national objective of reducing professional waste production between 2010 and 2020. Restaurants could ask local authorities in charge of waste management to be provided with posters on prevention actions in order to make tourists aware of food wasting. In fact, those authorities are now obliged to implement local waste prevention programmes on their territories, and are working harder and harder on food wasting as they have been asked to.	
3	On-site composting in tourist establishments	On-site composting units distribution is one of the key measures of local waste prevention plans in France. In fact, local authorities in charge of waste management are used to distribute individual or collective composting units to households	In the majority of the cases tourist establishments are considered as private entities that are responsible for their produced waste. Thus, it is not local authorities' responsibility to deal with those generated waste. Then, it might be complicated for

		to avoid biowaste management (collection and specific treatment). As generated waste from certain private establishments are assimilated to household waste because they are collected mixed all together, local authorities might be able to distribute those composting units to these establishments or at least to provide them with those composting units with a subsidised price. If they cannot be provided with composting units, they could at least benefit from composting trainings provided by local authorities. On-site composting is answering the national objectives of reducing professional waste production between 2010 and 2020.	tourist establishments to benefit from public composting units distribution. Tourist establishments might have to provide themselves with those composting units.
6	Partnerships between hotels and charities for reuse initiatives	Through their national objectives regarding reuse and guaranteeing results to Social Solidarity Economy institutions in terms of reuse, the EPR scheme on furniture is a real opportunity to develop that kind of partnerships between hotels and charities. For instance, this EPR scheme is working on developing a national database for professionals to list all the available reusable furniture that could be recovered by charities.	Certain specific fractions can be an issue when dealing with reuse for sanitary reasons for instance. That is the case with mattresses coming from the hotels and that could be reused through charities. Besides, professional textiles are not always reusable because of the name or the specific colours of the enterprise that can be used as a specific brand detail. In that case, the only way to valorise them is to recycle them into other products such as insulating material for instance.
7	Substitution of disposable products in hotels	There is no specific law on substituting disposable products within the hotels itself but there is a national decree stipulating that restaurants and other selling points won't be authorised to sell one-use plastic dishes anymore by January 2020. Besides, one-use plastic bags are not authorised anymore either since January 2016. This shows a real willingness of the French government to try to avoid disposable plastic products selling. We could then imagine	

		that future laws on waste prevention could also deal with forbidding disposable products in the hotels. Thus, hotels would be well-advised to find alternatives to disposable plastic products. Besides, thanks to the EPR schemes, producers are asked to work more and more on eco-design in order to create products with a lower impact on the environment. Thus, we can imagine that hotels will have more and more opportunities to replace their current disposable products by reusable ones.	
8	Reuse initiative in camping sites	Camping sites could ask their municipality in charge of waste management to be provided with posters on prevention actions in order to make tourists aware of waste production and waste prevention. In fact, those municipalities are now obliged to implement a local waste prevention programme on their territory.	
9	Communication campaign on reuse through swap markets	Those campaigns can be integrated and supported within the local waste prevention programmes managed by the municipalities in charge of waste management.	
13	Promotion of tap water	The promotion of tap water is one of the key measures that are usually led within local waste prevention programmes. In fact, this is a simple action to be implemented as we can already find lots of public fountains with drinkable water in France. Thus, it is a very easy way to avoid waste generation of plastic bottles.	
22	Food donation from restaurants and hotels to charities	This action could be part of a local waste prevention programme led by the municipality in charge of waste management even if it is not directly household waste but it can be considered as assimilated waste for the municipality when	It needs to comply with the sanitary rules on food donation (temperature, edible dates, etc.)

it is collected mixed with household waste. Thus, the municipality could create focused awareness campaigns for restaurants in order to incentive them to organize that kind of donations. The municipality could also be a link between restaurants and charities in order to create those partnerships as they usually know the existing charities on their territory.

Spanish regulatory framework

National policies on waste prevention

The National Waste Management Plan PEMAR (2016-2022) introduces the use of economic incentives as a very effective tool to increase waste prevention, reuse and recycling. Amongst the measures proposed there are incineration and landfill taxes, a more correct waste treatment charging scheme, the establishment of taxes per generation of waste, and the implementation of EPR systems.

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies for waste prevention and minimization, promoting reuse and composting, for instance.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023) involves the 102 municipalities in the region and it includes the strategies and objectives stated in Law 22/2011. One of the objectives in the Plan relates to waste prevention in Cantabria.

Objectives of waste production decrease

A National Waste Prevention Plan was approved in 2013 for the period 2014–2020, with the main objective of reducing the amount of waste generated in 2020 by 10% - relative to 2010 (in tons) - and contributing to reducing marine litter from terrestrial sources.

There is an EPR (producer responsibility scheme) in place in Spain for packaging waste under which the producer fees range from 21€ (per tonne of wood) to 472€ (per tonne of plastic packaging). However, the system has not worked in an optimal way and has been criticized for low transparency and low engagement with municipalities.

Measures regarding on-site composting

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies for waste prevention and minimization, promoting reuse and composting, for instance.

According to the Waste Plan for the Autonomous Community of Cantabria (2017-2023), which includes the strategies and objectives stated in Law 22/2011, an increase of on-site composting (domestic and community composting) is foreseen as a consequence of the current/future actions included in the Plan.

Development of reuse centers

The national Law 22/2011, of 28th July, on waste and contaminated soils, in its Article 15, promotes the reuse of products and the preparation for reuse of discarded products, supporting existing collection and reuse centres and authorized networks. It also promotes the creation and establishment of such centres, especially in high density populated regions or in those regions without such centres.

Moreover, the National Programme for Waste Prevention includes a number of actions aimed at preventing waste generation. One of the priority areas – related to furniture, toys, books and textiles – encourages the establishment of collection networks, repair stores and second-hand, charities stores.

Waste prevention within EPR schemes

The PEMAR (2016-2022) introduces the use of economic incentives as a very effective tool to increase waste prevention, reuse and recycling. The proposed measures include the use of incineration and landfill taxes, a more correct waste treatment charging scheme, the establishment of taxes per generation of waste and the implementation of EPR systems.

Environmental legislation for commercial establishments

In Spain, there is a specific Green Public Procurement Plan, which the main objective of implementing environmental friendly practices in public procurement. Procured products and services include construction and maintenance, transportation, energy, office supplies, paper and publications, furniture, cleaning services and event organization sectors.

The national Law 22/2011, of 28th July, on waste and contaminated soils, in its article 15 includes the establishment of agreements with the hotel and restaurant sectors, in order to encourage the introduction of reusable packaging and the integration of environmental criteria and waste prevention when procuring new materials and services. The article 16 also establishes that public administrations should promote the public procurement of reusable and easily recyclable products, as well as of recycled products complying with the required quality and technical specifications.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023) proposes the implementation of a thorough data compilation of reusable packaging used in restaurants and hotels in order to identify the current recycling rate and set specific objectives.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	There are several legal instruments promoting measures to reduce food waste at buffets and restaurants. The National Law 22/2011 promotes the development of measures to prevent generation of food waste and encourage a more responsible consumption, as well as the creation of agreements with establishments to establish certain patterns for consumers and food providers, as well as to undertake activities with canteens so as to taking advantage of leftovers of food. Moreover, the	

		National Strategy on Food Waste: "More food, less waste", includes the promotion of measures to reduce food loss and waste. The Waste Plan for the Autonomous Community of Cantabria (2017-2023) also includes the development of awareness campaigns for responsible consumption in restaurants and hotels. This could also be applied to Tenerife, where tourist establishments could benefit from advice and awareness campaigns.	
3	On-site composting in tourist establishments	Not specified for tourist establishments. However, according to the Waste Plan for the Autonomous Community of Cantabria (2017-2023), an increase of on-site composting (domestic and community composting) is foreseen as a consequence of the current and future actions included in the Plan. Moreover, the Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies for waste prevention and minimization, promoting reuse and composting, for instance.	Normally, the space available in situ is reduced and a deep change of behaviour is required.
6	Partnerships between hotels and charities for reuse initiatives	Although not specifically targeted to hotels, the Law 22/2011 (Article 15) promotes the use of voluntary agreements so as to different business and industrial sectors can establish ad-hoc waste prevention plans and strategies. At regional level, the Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to decrease waste generation, including the promotion of voluntary agreements with production and distribution sectors to adopt measures for prevention. Therefore, this measure could be implemented. In Cantabria, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) includes an objective related to the promotion of social	More Corporate Social Responsibility (CSR) strategies are needed.

		development and market activities based on reusing and recovering materials.	
7	Substitution of disposable products in hotels	There are a few instruments in Spain that support the implementation of green procurement agreements. The national Law 22/2011 includes the establishment of agreements with the hotelier and catering sectors, in order to encourage the introduction of reusable packaging and the integration of environmental criteria and waste prevention when procuring new materials and services. Although it targets public procurement, there is a Green Public Procurement Plan with the main objective of implementing environmental friendly practices. In addition, article 16 of Law 22/2011 establishes that public administrations should promote the public procurement of reusable and easily recyclable products, as well as of recycled products complying with the required quality and technical specifications. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) proposes the implementation of a thorough data compilation of reusable packaging used in restaurants and hotels in order to identify the current recycling rate and set specific objectives.	
8	Reuse initiative in camping sites	In the municipality of Santander, there would not be any problem to implement such measure.	
9	Communication campaign on reuse through swap markets	Law 22/2011 promotes the reuse of products and the preparation for reuse of discarded products, especially through the implementation of educational, economic and logistic measures. It also encourages the development of awareness raising campaigns, and the provision of economic and decision-making support, as well as other type of incentives. At regional	

		level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to raising awareness amongst the population in waste generation and its correct management. Therefore, there would not be a problem to implement such measure. The Territorial Master Plan for Waste (PTEOR) in Tenerife also establishes different strategies to maximize the selective collection of waste and recycling.	
13	Promotion of tap water	There would not be a problem to implement such measure in the municipality of Santander.	
22	Food donation from restaurants and hotels to charities	Law 22/2011 promotes the creation of channels to use surpluses of food through social initiatives (such as public canteens, food banks, etc.). The National Strategy on Food Waste: "More food, less waste" also promotes measures and incentives to encourage food donations to charitable bodies. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) promotes the creation of voluntary agreements between the Administration and social entities.	In Tenerife, there is a conflict with the sanitary regulations which do not allow donating edible leftovers.

Italian regulatory framework

Objectives of waste production decrease

With the decree of 7 October 2013, the Ministry of the Environment and the Protection of the Territory and the Sea has adopted the Waste National Prevention Programme for 2020. The decree identifies many waste prevention measures (i.e. introduction of waste fee based on real waste production of each users) related to biodegradable, paper, packaging and electric and electronical waste.

- Biodegradable waste:
  - Ensuring that food industry by-products are used for a new purpose wherever possible intended;
  - Redistribution of excess food products generated in the distribution phase of the supply chain, with social objectives, either to food banks or 'solidarity markets';
  - Promotion of short food supply chains;
  - Promotion of environmental quality certification in the food service sector (catering, hotels, bars, etc.);
  - Awareness campaign and guidelines in order to reduce household food waste.

- Paper waste
  - Reduction of junk mail;
  - Dematerialisation of utilities bills and other communications;

- Reduction of paper use in offices.

- Packaging waste
  - Promote points of sale of loose/bulk products;
  - Encourage consumption of tap water.
- Waste electrical and electronic equipment
  - Design electrical and electronic equipment that has a longer lifespan or that is easier to repair and/or reusable;
  - Encourage the creation of repair/reuse centres for EEE.

The targets set (compared to the values measured in 2010) are the following:

- Reduction of 5% of urban waste production per unit of GDP;
- Reduction of 10% of special waste production per GDP unit;
- Reduction of 5% of special non-hazardous waste production per GDP unit.

The Tuscany Waste Management Plan (D.C.R.T 18 November 2014, n. 94) highlights the strategic importance of waste reduction measures and setting the target of per capita waste production intensity (from 20 to 50 kg/inhab.). To achieve the objective, the Plan defines four priority lines of intervention in the Prevention Programme:

- Regulations, including:
  - To introduce prevention objectives for the issue of authorizations for medium and large-scale distribution;
  - To disseminate Green Public Procurement among institutions;
  - Diffusion of the use of tap water with drinking water dispensers.

- Economic, including:
  - Spread of the punctual rate;
  - To provide funding for the implementation of prevention actions, such as the diffusion of domestic composting or reduction of food waste;
  - Promotion of the construction of reuse centers.

- Training and information

- Research

In Sicily waste prevention was regulated by the Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" (later integrated by the Regional law of 9 May 2012 n. 26).

In line with the National Legislation (art. 196 of Legislative Decree 152/2006), the article n. 11 deals with the prevention of waste production, supporting the implementation of:

- Incentive or penalizing actions and instruments aimed at containing and reducing the quantity of waste produced or its dangerousness by public or private entities;
- Initiatives for the promotion of the Green Public Procurement;
- Awareness campaigns addressed to public and private entities encouraging the adoption of waste prevention and reduction behaviors.

Sicily Region furthermore has to:

- Promote agreements with public and private entities defining specific actions to reduce the quantity and waste dangerousness;
- Prepare further guidelines addressed to all stakeholders promoting the implementation of the best waste prevention and reduction practices;
- Define initiatives for the introduction of the ecological tax criteria for waste reduction, prevention and minimization to stimulate the realization of new companies in the field of new environmental technologies, waste recycling and reuse, sustainable development and to promote the complete realisation of the production chains for the recycling of waste materials.

Measures regarding on-site composting

In the municipal regulation of Florence about waste tax, there is a discount in the waste tariff for domestic users who practice home composting.

The Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" promotes the household composting by:

- The distribution of composters;
- A training campaign addressed to citizens, schools, associations;
- Tax incentives for the users.

Development of reuse centres

The Tuscany Waste Management Plan foreseens the promotion of the construction of reuse centers.

The Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" promotes the collection and the treatment of reusable waste with the aim to:

- Decrease the amount of disposed waste;
- Promote the reuse of goods;
- Create a network of artisans who deal with the reusable waste.

There is no specific policy on waste prevention within the EPR schemes in Italy.

Promotion of tap water

The Tuscany Waste Management Plan foreseens the diffusion of tap water use with drinking water dispensers.

One of the foreseen measures in the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" concerns the promotion of tap water in order to reduce the amount of waste (packaging) by:

- Implementing awareness campaigns;
- Implementing water distribution points.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	This is one of the measures foreseen in the Waste National Prevention Programme for 2020. The Tuscany Waste Management Plan foreseens the provision of funding for the implementation of actions aiming to reduce food waste production.	
3	On-site composting in tourist establishments	In the municipal regulation of Florence about waste tax there is a discount in the waste tariff for domestic users who practice home composting. The Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" promotes the household composting.	
6	Partnerships between hotels and charities for reuse initiatives	The Waste National Prevention Programme for 2020, the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" and the Tuscany Waste Management Plan foreseen general commitments on waste prevention that could represent an opportunity.	
7	Substitution of disposable products in hotels	The Waste National Prevention Programme for 2020, the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" and the Tuscany Waste Management Plan foreseen general commitments on waste prevention that could represent an opportunity.	
8	Reuse initiative in camping sites	The Waste National Prevention Programme for 2020, the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" and the Tuscany Waste Management Plan foreseen general commitments on waste prevention that could represent an opportunity.	
9	Communication campaign on reuse through swap markets	The Waste National Prevention Programme for 2020, the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted	

		sites" and the Tuscany Waste Management Plan foreseen general commitments on waste prevention that could represent an opportunity.	
13	Promotion of tap water	This is one of the measures foreseen in the Waste National Prevention Programme for 2020. The Tuscany Waste Management Plan foreseens the diffusion of the use of tap water with drinking water dispensers. One of the measures foreseen in the Sicilian Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" concerns the promotion of tap water.	
22	Food donation from restaurants and hotels to charities	This is one of the measures foreseen in the Waste National Prevention Programme for 2020. The Tuscany Waste Management Plan foreseens the provision of funding for the implementation of actions aiming to reduce food waste production.	

Danish regulatory framework

Objectives of waste production decrease

In 2015 a strategy "Denmark Without Waste" was launched by the Danish Environmental Protection Agency following the Resource Strategy from 2013. The new strategy focused on waste prevention of specific waste fractions. The topics are food waste prevention, green procurement, construction and demolition waste, textiles, WEEE, packaging, sustainable consumption in industry.

The specific focus areas are:

- Green procurement: 1) Citizens will find it easier to prevent waste, 2) Public procurement supports the green transition, 3) Waste prevention is considered in consumer products.
- Food waste prevention: The objective is to reduce the amount of food waste generated at all stages of the value chain for food. One of the initiatives towards reducing food waste is mapping of the trend in the amount of food waste from households every 6 years. Other initiatives are partnerships against food waste and analysis of waste and resource efficiency in different food industries.
- Construction and demolition waste: The goal is to help the construction and demolition sector to manage activities more resource-efficient, to ensure problematic substances is managed in a healthy and environmentally sound manner, and to ensure better knowledge sharing across the sector.
- Textiles: The goal is to make it easier for the textile companies to reduce environmental impact during the production phase and make it easier to reuse and recycle textiles, by among other things reducing the use of problematic substances in the textiles.

- Electronic waste: The goal is to make it easier to reuse and recycle electrical and electronic waste, to extend the life of the products and the products can better be included in the circular economy.
- Packaging: The goal is to reduce overall environmental impact from packaging. This should be met through partnerships on optimizing packaging as well as increased recycling and more closed loop recycling systems.

Development of reuse centres

Most civic amenity sites in Copenhagen include a small facility for swapping. Here citizens can bring stuff they do not need anymore for others to take. This supports the agenda for prevention of waste by extending the life time of products.

Waste prevention within EPR schemes

Producer responsibility is only implemented for electronic waste. Producers are thereby in charge of collecting and treating the electronic waste.

All packaging for beverages is included in the refund scheme and thereby in a closed loop recycling scheme. This kind of packaging is thereby accounted as a separate stream in the waste management system in Denmark.

Promotion of tap water

Tap water is of very high quality in Denmark and is promoted during large international events.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	This measure has already been implemented in some hotels in Copenhagen.	None
3	On-site composting in tourist establishments	This measure is not possible, and most tourist establishments would prefer anaerobic digestion to produce energy.	This measure would not be relevant for tourist establishments in Copenhagen since this would lead to odours from the process and would take up space which could be used for recreational purposes.
6	Partnerships between hotels and charities for reuse initiatives	This measure is feasible.	None
7	Substitution of disposable products in hotels	This measure has already been implemented in some hotels in Copenhagen.	None
8	Reuse initiative in camping sites	This measure is feasible.	None
9	Communication campaign on reuse through swap markets	This measure would not be relevant for tourist establishments in Copenhagen since this would lead to odours from the process and would take up space which could be used for recreational purposes.	This measure is not so relevant for short stay tourists, but more for tourists staying longer periods who would need some equipment.
13	Promotion of tap water	This measure is possible and is already being done during big events.	None
22	Food donation from restaurants and hotels to charities	This measure is possible if following the legislation on food handling, storage and safety.	It needs to comply with the sanitary rules on food donation (temperature, "best before" date, etc.). Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always too high to prioritise such initiatives.

Portuguese regulatory framework

National policies on waste prevention

The Plano Estratégico para os Resíduos Urbanos (PERSU) 2020 (2014-2020) (*Strategic Plan for Municipal Waste*), which is the legal framework governing waste management, has been consolidated over the last few years with systems for managing specific waste flows, and placing the focus on producers to follow targets for prevention, separate collection, recycling and other forms of recovery.

The landfill tax was introduced in Portugal in 2007. Later on, the legislation on waste management tax changed in 2015 (Law n.º 82-D/2014), and the tax level was increased to EUR 5.5 per tonne disposed. Further increases will take place – to EUR 7.7 in 2017, EUR 8.8 in 2018, EUR 9.9 in 2019 and EUR 11 per tonne in 2020. The current tax levels for incineration with and without energy recovery are 70% and 25% of the landfill tax (100% of the waste management tax), respectively.

In Lisbon, the Municipal Waste Management Plan includes a strategic line (2015-2020) for Prevention and waste reduction. In Lisbon, the current national policy framework of waste prevention actions in the municipality of Lisbon is mainly formed by the country's third national Waste Management Plan (PNGR 2014-2020) in connection with the Strategic Urban Waste Plan (PERSU 2020).

The Regional Law nº 20/2007/A, of 25 August 2007 in Azores establishes major principles such as in accordance with the polluter-pays principle, a requirement that the costs of disposing waste must be borne by the holder of the w aste, by previous holders or by producers of the product from which the waste came. Moreover, it establishes major principles such as the promotion of prevention and reduction of waste production. In Ponta Delgada, the "Azores Strategic Plan on Waste Prevention and Management (PEPGRA)" includes the Objective 1, which relates to waste prevention and it includes the disclosure of the new regional program on waste prevention.

Objectives of waste production decrease

The PERSU 2020 defines the specific national targets: by 31 December 2020, achieving a minimum reduction of 10% by weight of produced waste per inhabitant compared to the value recorded in 2012.

Measures regarding on-site composting

In Ponta Delgada, house composting is still not an official prevention measure. However, many of the households in the rural area of the municipality actually do it, because subsistence farming has always been present.

In Lisbon is previewed the acquisition of home composters to implement in single households.

Development of reuse centres

In Lisbon they have "Repair café" to promote waste reuse.

Waste prevention within EPR schemes

Legal instruments mentioned in the Lisbon´s Strategic Plan for Municipal Waste include EPR with regard to packaging waste, WEEE and batteries.

Environmental legislation for commercial establishments

In Ponta Delgada and Lisbon, green public procurement guidelines are an area still not very developed. However, the new public procurement code already has some guidelines about green procurement, but these guidelines have to be developed and specified, so that purchase of goods and services can be made in a simple and clear way. At the city hall, due to its environmental management system, a green procurement code is in use since

2009. This document includes some of the most important (in terms of quantity or danger) goods and services with environmental impact.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	Food waste prevention measures are encouraged by PERSU 2020.	Not specified
3	On-site composting in tourist establishments	Not specified	Not specified
6	Partnerships between hotels and charities for reuse initiatives	The Environmental Department promotes training courses and environmental education actions on waste prevention and management.	Not specified
7	Substitution of disposable products in hotels	In Portugal, the new public procurement code already has some guidelines about green procurement, but these guidelines have to be developed and specified.	Not specified
8	Reuse initiative in camping sites	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
9	Communication campaign on reuse through swap markets	Not specified	Not specified
13	Promotion of tap water	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
22	Food donation from restaurants and hotels to charities	Not specified	Not specified

Croatian regulatory framework

National policies on waste prevention

The governing legislation for the waste management in Croatia includes Act on Sustainable Waste Management (Official Gazette No 94/13) and the Waste Management Plan in the Republic of Croatia for the period 2017-2022 (Official Gazette No 03/17) are important initiatives taken in Croatia in the last years in order to improve municipal waste management.

According to the act, a waste prevention plan shall form a constituent part of the Plan and shall contain, in particular:

- Waste prevention targets ;
- Measures required to attain waste minimisation or waste prevention targets.

Appropriate specific qualitative or quantitative benchmarks shall be determined for waste prevention measures adopted in order to monitor and assess the progress of the measures, and specific qualitative or quantitative targets and indicators may be determined.

Another important initiative in Croatia was the establishment of the Environmental Protection Programmes and Energy Efficiency Fund (EPEEF) in 2004. It is a fund established by a decision of the Government of Croatia in order to ensure additional resources for financing projects, programmes and similar undertakings in the field of preservation, sustainable use, protection and improvement of the environment. Among other initiatives, it co-finances projects on waste prevention, projects for improving separate collection, re-use and recovery of certain waste types, remediation of landfills and building infrastructure (recovery and waste management centres) (ETC/SCP, 2011). The EPEEF collects different environmental fees, which includes fees for burdening the environment with hazardous and non-hazardous industrial waste (ETC/SCP, 2011). Moreover, the EPEEF collects the fees from producers/importers of products within specific waste streams collection/recovery schemes such as waste oil, WEEE, waste tyres, packaging, batteries/accumulators, and ELVs. The EPEEF also compensates municipalities and regions for expenses to collection, treatment or recovery for the mentioned waste streams (ETC/SCP, 2011; CEA, 2011a).

Development of reuse centres

The act urges to organize a network of collection points for the separate collection of waste – green islands – (about 3000) and a network of recovery/recycling yards (about 100).

A number of waste management centres are planned in counties or regions. The waste management centres are planned to be constructed before the end of 2018. They will be co-financed by EPEEF and other funds (CEA, 2011a). Here are examples of finished projects:

- Funds for construction of the Bakarac County Waste Management Centre;
- Šibensko-Kinska County were provided with EUR 6 million from the ISPA (Instrument for Structural Policies for Pre-Accession) program;
- The IPA Programme had assigned EUR 24.5 million for construction of county waste centres in the Primorsko-Goranska, Istarska and Splitsko-Dalmatinska counties for the period 2007-2009 (EEA, 2010). The construction has already started in three waste management centres and another three waste management centres are in the phase of preparing for construction. Locations are still to be identified for the other planned waste management centres (CEA, 2012a).

Environmental legislation for commercial establishments

According to the Act, a product producer shall introduce and use to the maximum extent possible reusable packaging, which reduces the environmental load from waste compared to disposable packaging.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants		
3	On-site composting in tourist establishments		

6	Partnerships between hotels and charities for reuse initiatives		
7	Substitution of disposable products in hotels		
8	Reuse initiative in camping sites		
9	Communication campaign on reuse through swap markets		
13	Promotion of tap water	To inform tourists, they will focus on drinking tap water in order to reduce plastic bottles intake. They will provide information also online, maybe in collaboration with their Tourist Board on the information that tap water is drinkable and on the locations of drinking water fountains. By promoting tap water that is drinkable in the whole pilot city, they will also promote fountains that are cultural heritage of City of Dubrovnik.	
22	Food donation from restaurants and hotels to charities		

Cypriot regulatory framework

There are no specific policies regarding the measures listed below. Obviously food hygiene legislation can provide an obstacle related to food donations and food waste prevention, but the obstacle is not enough to make this kind of activities impossible. Therefore some initiatives of food donation are already in place.

Concerning tap water, there is no specific policy promoting this, and there might be a practical boundary to reduce bottled water since people are used to consume bottled water and the use of tap water might reduce the restaurant revenues.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants		
3	On-site composting in tourist establishments		

6	Partnerships between hotels and charities for reuse initiatives	This measure has already been adopted by some hotels.	
7	Substitution of disposable products in hotels		
8	Reuse initiative in camping sites		No camping sites in Nicosia
9	Communication campaign on reuse through swap markets		
13	Promotion of tap water		
22	Food donation from restaurants and hotels to charities		That could be limited by food safety issues.

Greek regulatory framework

National policies on waste prevention

The waste prevention initiatives, which were on-going on the issue of the National Waste Management Plan (NWMP) in December 2014, range from:

- Actions financed through environmental EU programmes such as the LIFE project, aiming at supporting the local authorities in the actions to be undertaken for waste prevention;
- Actions for raising awareness at schools such as the ''Eco schools'' initiative which provides for the establishment of environmental committees and environmental action plans in schools for the enhancement of the surrounding environment;
- Public-Private Partnerships for the optimization of the reduction and recycling of waste in touristic destinations (three such programmes were developed in Chalkidiki);
- Organisation of events for the demonstration of waste reduction methods;
- Actions promoting reusable bags, the reuse of clothing, the disposal of unused drugs and the exchange of used products (such as books);
- Environmental labelling, etc.

The pay-as-you-throw (''PAYT'') scheme for the reduction of waste in landfills and the enhanced participation of the public in the separate collection of waste has only been implemented as a pilot project in the municipality of Elefsina.

The NWPSP focuses on public awareness and aims at strengthening the existing actions mentioned above especially with regard to informing the public and encouraging their participation. The new strategy is to set up more effective communication campaigns through the organisation of separate campaigns focusing on specific waste streams.

The priority areas according to the plan are the following:

- Food waste;
- Paper consumption;
- Packaging waste;
- Waste from electrical and electronic equipment.

In addition, the plan proposes actions on areas outside the aforementioned "priority areas", and in particular actions mainly for informing the public (through seminars, workshops, distribution of information leaflets, posts on websites and social media accounts) in relation to the prevention of generation of MSW, construction and demolition waste and industrial waste.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	This measure is possible to implement.	
3	On-site composting in tourist establishments	This measure is possible to implementby providing training opportunities for tourist establishment owners and tourists.	
6	Partnerships between hotels and charities for reuse initiatives	This measure is possible to implement.	Not specified
7	Substitution of disposable products in hotels	This measure is possible to implement more widely and has been implemented in some hotels already.	
8	Reuse initiative in camping sites	This measure is possible to implement.	Not specified
9	Communication campaign on reuse through swap markets	This measure has already been implemented.	Not specified
13	Promotion of tap water	This measure has already been implemented.	
22	Food donation from restaurants and hotels to charities	This measure is possible if following the legislation on food handling, storage and safety.	Not specified

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690452

Stakeholders to involve

On-site composting

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Supporting the implementation of on-site composting	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	3	• Regulative support to encourage food waste generators to implement on-site composting (for instance, by reducing waste collection service taxes). • Development and update of a map locating all the restaurants/hotels composting biowaste on-site.
Municipal Solid Waste department (if publicly managed)	Providing infrastructure for the collection of biowaste, i.e. trucks, etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.
Municipal Solid Waste company (if privately managed)	Providing infrastructure for the collection of biowaste, i.e. trucks, etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.

Management or Environment, Health and Safety department within hotels and restaurants	Implementing food waste prevention strategies	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	3	• Appointment of a responsible person for:
				  • Coordination and promotion, preparation, implementation and assessment of the measure;
				  • Maintenance of composting bins (« green team »);
				  • Keeping periodic meetings between coordinator and person in charge of composting.
				• Baseline analisis of food waste generation
				• Placement of composting bins close to where food waste is generated

				• Training on how to use the composting bins/electrical composters • Awareness raising and communicating of results among staff
Kitchen staff	Undertaking good practices at the workplace	Trainings, workshops, polls	3	• Training on how to use the composting bins/electrical composters
Suppliers	Providing the materials needed, i.e. bins, containers, composters, bags, etc.	Phone calls, meetings, online platforms, email, door-to-door communication	3	• Providing composting containers/electrical composters • Providing instructions for correct use of containers
Agricultural sector	Potential users for compost	Phone calls, meetings, online platforms, email, door-to-door communication	3	• Farmers could be interested in buying the compost generated

Development of reuse centres

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Supporting the implementation reuse initiatives and development of reuse centers	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	6	• Mapping of hotels/camping sites and charities, NGOs, second-hand shops, reuse centers, etc. within the municipal boundaries. • Organisation of informative meetings to encourage hotels and hotelier associations/camping sites to liaise with charities and reuse centers. • Facilitation and support in the subscription of voluntary agreements and collaboration partnerships between participating entities. • Realization of communication campaigns at local level to engage more participants. • Regulative support to encourage hotels/camping sites to implement reuse initiatives (e.g. free collection and transportation service of donated items to charities or reuse centers).
			8	
			9	• Facilitation of participation and coordination between the organization of swap markets and reuse centers.
Hotels/ restaurants/ camping sites managers	Supporting the implementation reuse initiatives and development of reuse centers	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	6	• Subscription of voluntary agreements and collaboration partnerships between hotels/restaurants/camping sites and reuse centers. • Identifying items and waste fractions that could be potentially reused and including staff in the decision making process. • Dissemination of the initiative among clients to involve them and make them part of it.
			8	
			9	

				• Strong communication with charities and reuse centers. • Use of a sticker to show participation in such initiative.
Business associations (trade, hotelier, reuse centers)	Supporting the implementation reuse initiatives and development of reuse centers	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	6 8 9	• Subscription of voluntary agreements and collaboration partnerships between participating entities.

- **Waste prevention within EPR schemes**

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	pporting waste reduction targets	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	2	• Regulative support to encourage establishments to implement food waste prevention measures (for instance, by reducing waste collection service taxes). • Mapping of restaurants, hotels, canteens, etc. within the municipal boundaries. • Organization of informative meetings and training sessions for identified establishments. • Subscription of voluntary agreements and collaboration partnerships with participating establishments. • Realization of communication campaigns at local level to engage participants. • Creation of a network with restaurants/buffets applying food waste prevention measures. • Identification of establishments committed on food waste prevention thanks to a sticker/label recognizing it.
			22	• Regulative support and financial

				incentives to encourage restaurants, hotels, etc. to implement this measure so that donating food is more attractive than discarding it (e.g. tax reduction for food donors. • Mapping of restaurants, hotels, canteens, etc. willing to participate as potential food donors. • Mapping of food banks, charities and non-profit organizations involved in food donation activities as potential food receivers. • Organization of informative meetings and training sessions for identified establishments and charities. • Communication campaigns to engage restaurants/hotels.
Management or Environment, Health and Safety department within hotels and restaurants	Implementing waste reduction strategies	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	2	• Subscription of voluntary agreements and collaboration partnerships with participating establishments. • Identification of establishments committed on food waste prevention thanks to a sticker/label recognizing it. • Monitoring food waste behaviour and defining an action plan to address challenges identified. Considering type of waste generated and what can be reduced. • Communication campaign to all levels of organization regarding the actions to be undertaken. • Inclusion of staff in the decision-making process, asking them what can be done differently to reduce food waste. • Awareness raising of customers on food waste prevention actions through, for example, a sticker/label that indicates the organization's initiative.

				• Monitoring the food waste prevention action after being implemented and disseminating the results. • Appointing trusted employees to identify areas where cooperation is not taking place.
			22	• Appointment of the person to be in charge of food donations. • Monitoring and identification of potential food to be donated so as to define the scope of the action plan. • Ensuring compliance with all hygene requirements. • Awareness rising within the hotel/restaurant and among other hotels/restaurants. • Being aware of where is the food destinated and how is it transported, to prevent spoilage. • Promote the action among clients with, for example, stickers identifying the business.

Environmental legislation for commercial establishments

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Supporting the substitution of disposable products in hotels and restaurants	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	7	• Providing regulative support to encourage hotels to replace disposable products (for instance, by applying reductions in the waste fee, or establishing a territorial label promoting hotels with such measures implemented). • Mapping of hotels within the municipal boundaries and identification of green businesses and companies supplying eco-friendly products.
Hotel managers	Complying with the legislation regarding waste generation	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	7	• Identification of all waste fractions generated and their origin. • Modification of purchase policy and establishing goals. • Selection of products to be substituted and suppliers.
Business associations (trade, hotelier, etc)	Informing businesses about disposable products legislation	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	7	• Providing information of current legislation and strategies to comply with it.

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3.2 Reuse and prevention

Regulatory frameworks

European regulatory framework

The European Commission adopted an ambitious Circular Economy Package, which includes revised legislative proposals on waste to stimulate Europe's transition towards a circular economy which will boost global competitiveness, foster sustainable economic growth and generate new jobs. The revised legislative proposal on waste sets clear targets for reduction of waste and establishes an ambitious and credible long-term path for waste management and recycling. To ensure effective implementation, the waste reduction targets in the new proposal are accompanied by concrete measures to address obstacles on the ground and the different situations across EU Member States. Some of them are concrete measures to promote reuse and stimulate industrial symbiosis – turning one industry's by-product into another industry's raw material. Furthermore, the proposed Waste Framework Directive replaces Article 9 (Prevention of waste) with a more precise actions ((i)encourage the setting up of systems promoting reuse activities, including in particular for electrical and electronic equipment, textiles and furniture, (ii) encourage the use of products that are resource efficient, durable, repairable and recyclable). However, despite all the improvements and new references, there is no specific reuse target and reuse is included in the recycling target, as the reuse measures are only encouraged, not obligatory.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	It can prevent food waste generation.	Issues with transport. It's necessary to set up this model.
8	Reuse initiative in camping sites	This measure is part of a waste prevention strategy.	
9	Communication campaign on reuse through swap markets	This measure is part of a waste prevention strategy.	
22	Food donation from restaurants and hotels to charities	It can prevent food waste generation.	Issues with transport, expiry dates etc. Necessary adjustments in national laws.

French regulatory framework

National policies on waste prevention and reuse

The national French law n°2015-992 of 17 August 2017 on energetic transition for a green growth modifies the article L. 541-1 of the code of environment by specifying that the national policy on waste prevention and management is an essential lever for a transition into circular economy. In order to comply with the European waste treatment hierarchy, the priority is given to prevention.

This law states that household waste amounts produced per inhabitant should decrease by 10% between 2010 and 2020. This objective could be achieved through different measures such as refundable packaging and products. There is no specific target to be achieved concerning reuse rate on professional waste.

This article also specifies that it is necessary to fight against foreseen obsolescence of manufactured products thanks to the consumers' information. This is for instance the case for computers or televisions.

It also says that it is important to develop reuse and to increase waste amounts that will be prepared for reutilisation, especially for electrical and electronic equipment, textiles and furniture.

Reuse and prevention within EPR schemes

In that sense, the national legal specifications made by the ministry of environment on EPR schemes define adapted objectives on reuse for each of those sectors:

- Furniture:
  - Achieving the national valorisation rate (reuse, recycling and energetic valorisation) of at least 80% by 2017; with a maximum of 20% of landfilled furniture.
  - Facilitating reuse for Social Solidarity Economy structures such as charities or second-hand shops for instance by guaranteeing them quality furniture in order to increase their sold reused furniture tonnages by 50% by 2017.
  - Developing eco-design in order to decrease by at least 3% waste production by 2017.
  - The professional section of the EPR scheme on furniture has to achieve 75% of reuse and recycling since 2015.

  New objectives will be defined at the beginning of 2018 within the new specifications defined by the ministry of environment.

- Textiles:
  - By 2019, achieving 95% of valorisation rate (reuse, recycling and energetic valorisation) with a minimum of 20% of recycling. At the same time, it is asked to landfill a maximum of 2% of collected textiles.

- Waste Electrical and Electronic Equipment:
  - The French national legal specifications on WEEE define specific reuse & recycling rate for each of the eleven WEEE categories that go from 55% to 80% to be achieved by 2018.

Those recommendations have to be achieved by the different EPR schemes, and that incites eco-organisations in dynamising all the sector's stakeholders in contributing to achieve those objectives. This is a way to foster reuse within the professional sectors such as hotels for instance when dealing with furniture, textiles and WEEE.

Besides, the French law on energetic transition for a green growth also recommends reducing non-recyclable manufactured products amounts to be sold by 50% before 2020. Thus, this is a way to oblige the producers to work even harder on eco-design. Moreover, this law also stipulates that public purchase has to serve circular economy and the achievement of the prevention objectives. By doing so, it contributes to arise good practices, especially on reuse, reutilisation and recycling.

National waste prevention plan and local waste prevention programmes

In order to develop prevention strategies on household waste, in 2004 France has implemented a national action plan on waste prevention for the whole period of 2004-2012. This action plan was focusing on three aspects: mobilizing stakeholders, acting on a long-term period and implementing actions. In 2006, this national plan has been completed by another national plan focusing on domestic composting in order to spread this practice among local territories. In July 2010, the national law Grenelle 2 was approved and predicted the definition of

local prevention programmes on household waste for each municipality in charge of household waste management. A decree resulting from that law has been approved to oblige those municipalities to implement such local prevention programmes by June 2014 the latest. This shows a real willingness from the French authorities to work on household waste prevention at national and local scales. However, so far, there is no law and obligations dealing with prevention strategies on professional waste.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	Through their national objectives regarding reuse and guaranteeing results to Social Solidarity Economy institutions in terms of reuse, the EPR scheme on furniture is a real opportunity to develop that kind of partnerships between hotels and charities. For instance, this EPR scheme is working on developing a national database for professionals to list all the available reusable furniture that could be recovered by charities.	Certain specific fractions can be an issue when dealing with reuse for sanitary reasons for instance. That is the case with mattresses coming from the hotels and that could be reused through charities. Besides, professional textiles are not always reusable because of the name or the specific colours of the enterprise that can be used as a specific brand detail. In that case, the only way to valorise them is to recycle them into other products such as insulating material for instance.
8	Reuse initiative in camping sites	Camping sites could ask their municipality in charge of waste management to be provided with posters on prevention actions in order to make tourists aware of waste production and waste prevention. In fact, those municipalities are now obliged to implement a local waste prevention programme on their territory.	
9	Communication campaign on reuse through swap markets	Those campaigns can be integrated and supported within the local waste prevention programmes managed by the municipalities in charge of waste management.	
22	Food donation from restaurants and hotels to charities	This action could be part of a local waste prevention programme led by the municipality in charge of waste management even if it is not directly household waste but it can be considered as assimilated waste for the municipality when it is collected mixed with household waste. Thus, the municipality could create focused awareness campaigns for restaurants in order to incentive them to organize that kind of donations. The municipality could also be a link between	It needs to comply with the sanitary rules on food donation (temperature, edible dates, etc.)

		restaurants and charities in order to create those partnerships as they usually know the existing charities on their territory.	

Spanish regulatory framework

National policies on waste prevention and reuse

The national Law 22/2011, of 28th July, on waste and contaminated soils, in its Article 15, promotes the reuse of products and the preparation for reuse of discarded products, especially through the implementation of educational, economic and logistic measures, as well as supporting existing collection and reuse centres and authorized networks. It also promotes the creation and establishment of such centres, especially in high density populated regions or in those regions without such centres.

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies for waste prevention and minimization, promoting reuse and composting, for instance.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023), which involves the 102 municipalities in the region and includes the strategies and objectives stated in Law 22/2011, has established an objective in the Plan relating to waste prevention in Cantabria, with a focus on preparation for reuse.

Objectives of reuse rates

The national Law 22/2011 includes in its Article 22 specific objectives for reuse, recycling and valorisation:

- Before 2020, the amount of municipal waste sent for reuse and recycling of paper, metals, glass, plastics, biowaste and other recycling materials must reach, as a whole, at least 50% (weight);
- Before 2020, the amount of non-hazardous construction and demolition waste sent for preparation for reuse, recycling and valorisation of materials must reach, at least, 70% in weight of the generated waste.

National policies on waste treatment hierarchy

According to the NWMP PEMAR (2016-2022), the responsible authorities for developing policies and legislation in prevention and waste management will apply, in order to achieve the best global environmental results, a waste treatment hierarchy with the following order: prevention; preparation for reuse; recycling; valorisation (including energy recovery) and landfill.

As to waste management and landfilling costs in Spain, the average cost for landfilling is very low (30-40€/tonne) in comparison with other Member States with a more advanced waste management (90-120€/tonne). The low cost for landfilling discourages the necessary changes to make any progress in waste policies related to recycling.

Nevertheless, PEMAR (2016-2022) includes a limitation of 35% for the landfilling of the total municipal waste generated.

It is also important to mention that municipal waste taxes in Spain are not linked to the volume of waste generated nor to the type of waste (domestic or commercial). The tax is normally related to the number of square meters or the rateable value of the property, and it does not distinguish from collection and treatment taxes.

Policies on public-private partnerships to allow reuse and donations

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to decrease waste generation, including the promotion of voluntary agreements with production and distribution sectors to adopt measures for prevention. Additionally, it suggests the development of information campaigns to change citizens' consumption behaviours.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023), which involves the 102 municipalities in the region, includes an objective related to the promotion of social development and market activities based on reusing and recovering materials, using recycled materials, such as compost and organic amendments.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	Although not specifically targeted to hotels, the Law 22/2011 promotes the use of voluntary agreements with regards to different business and industrial sectors can establish ad-hoc waste prevention plans and strategies. At regional level, the Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to decrease waste generation, including the promotion of voluntary agreements with production and distribution sectors to adopt measures for prevention. Therefore, this measure could be implemented. In Cantabria, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) includes an objective related to the promotion of social development and market activities based on reusing and recovering materials.	More Corporate Social Responsibility (CSR) strategies are needed.
8	Reuse initiative in camping sites	In the municipality of Santander, there would not be any problem to implement such measure.	
9	Communication campaign on reuse through swap markets	Law 22/2011 promotes the reuse of products and the preparation for reuse of discarded products, especially through the implementation of educational, economic and logistic measures. It also encourages the development of awareness raising campaigns, and the provision of economic and decision-making support, as well as other type of incentives. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to raising awareness amongst the population in waste generation and its correct management. Therefore, there would not be a problem to implement such measure. The Territorial Master Plan for Waste (PTEOR) in Tenerife also establishes different strategies to maximize the selective collection of waste and recycling.	

22	Food donation from restaurants and hotels to charities	Law 22/2011 promotes the creation of channels to use surpluses of food through social initiatives (such as public canteens, food banks, etc.). The National Strategy on Food Waste: "More food, less waste" also promotes measures and incentives to encourage food donations to charitable bodies. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) promotes the creation of voluntary agreements between the Administration and social entities.	In Tenerife, there is a conflict with the sanitary regulations which do not allow donating edible leftovers.

Italian regulatory framework

National policies on waste prevention and reuse

With the decree of 7 October 2013, the Ministry of the Environment and the Protection of the Territory and the Sea has adopted the Waste National Prevention Program for 2020. The decree identifies many waste prevention measures, some of them enhancing the reuse too.

***Objectives for biodegradable waste*:**

- Ensuring that food industry by-products are used for a new purpose wherever possible intended;
- Redistribution of excess food products generated in the distribution phase of the supply chain, with social objectives, either to food banks or 'solidarity markets'.

***Objectives for paper waste*:**

- Reduction of paper use in offices.

***Objectives for packaging waste*:**

- Promoting points of sale of loose/bulk products.

***Objectives for waste electrical and electronic equipment*:**

- Designing electrical and electronic equipment that has a longer lifespan or that is easier to repair and/or reusable;
- Encouraging the creation of repair/reuse centres for EEE.

Objectives of reuse rates

The decree of 7 October 2013 does not set any specific target related only to reuse, but more general targets about waste prevention:

- Reduction of 5% of urban waste production per unit of GDP;
- Reduction of 10% of special waste production per GDP unit;
- Reduction of 5% of special non-hazardous waste production per GDP unit.

The Tuscany Waste Management Plan (D.C.R.T 18 November 2014, n. 94) highlights the strategic importance of waste reduction measures and sets the target of per capita waste production intensity (from 20 to 50 kg/inhab.).

To achieve the objective, one of the specific reuse measures foreseen is related to the promotion of the construction of reuse centers.

In Sicily, the Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" (later integrated by the Regional law of 9 May 2012 n. 26) promotes the collection and the treatment of reusable waste with the aim to promote the reuse of goods and to create a network of artisans who deal with the reusable waste.

National policies on waste treatment hierarchy

The article 179 of the national law TU 152/2006 sets out the criteria for waste management, namely the Waste Hierarchy, which provides the main and priority role in prevention, reuse, and after in the recycling, recovery of other types (energy) and only as a last stage final disposal (landfill).

Policies on public-private partnerships to allow reuse and donations

The Law 155/2003, so-called "Law of Good Samaritan", guarantees that charity organizations distributing free food to poor people are equated to the final consumer, within the limits of the service provided. In addition, the following law 166/2016 against food waste support and facilitate food business operators to donate food surpluses to charity organizations for human consumption (to be preferred) and animal consumption.

This legal framework can enhance the creation of public-private partnerships enhancing the collection and distribution of food for social purposes.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	The Waste National Prevention Program for 2020 does not consider this kind of specific measure, but represents, in any case, a general opportunity to promote it (e. g. it encourages the creation of repair/reuse centres for EEE). A more interesting opportunity can be represented by the Sicily Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites", promoting the collection and the treatment of reusable waste with the aim to promote the reuse of goods.	
8	Reuse initiative in camping sites	The Waste National Prevention Program for 2020 does not consider this kind of specific measure, but represents, in any case, a general opportunity to promote it. A more interesting opportunity can be represented by the Sicily Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites", promoting the collection and the treatment of reusable waste with the aim to promote the reuse of goods.	

9	Communication campaign on reuse through swap markets	The Tuscany Waste Management Plan (D.C.R.T 18 November 2014, n. 94) foreseens the promotion of reuse centers, and the Sicily Regional Law of 8 April 2010 n. 9 "Integrated waste management and remediation of polluted sites" (later integrated by the Regional law of 9 May 2012 n. 26), promotes the collection and the treatment of reusable waste with the aim to promote the reuse of goods. In particular the second one represents an opportunity to find resources in order to promote and organize swap markets.	
22	Food donation from restaurants and hotels to charities	Law 166/2016 allows food business operators to donate food surpluses to charity organizations for human consumption (to be preferred) and animal consumption. This could enhance the cooperation with charities and public local authorities enhancing collection of food from donors and its distribution to charities.	

Danish regulatory framework

Objectives of reuse rates

In 2013 the Danish Environmental Protection Agency (DEPA) launched a Resource Strategy ("Denmark Without Waste. Recycle more, Incinerate less") setting the national goal of minimum 50% recycling of selected fractions from households in 2022 (biowaste, paper, cardboard, glass, wood and metal waste). Reuse is mentioned in the strategy as preferable, but only goals on recycling are defined. This is due to the difficulty in quantifying prevention as well as reuse of resources. The main headlines of the Resource Strategy are:

- More recycling of materials from households and the service sector
- More recycling of materials from waste electronic equipment and shredder waste
- From waste incineration to biogasification and recycling
- Better exploitation of important nutrients such as phosphorus
- Improved quality in recycling construction and demolition waste
- Green conversion – new commercial opportunities.

Danish municipalities can decide to set goals of their own.

National policies on waste treatment hierarchy

The Danish national legislation for waste handling (BEK no. 1309, 18/12/2012) describes the waste hierarchy should be followed when handling waste. Only if the highest priority is not possible one should go to the next step in the waste hierarchy.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	The implementation of this measure is possible.	None
8	Reuse initiative in camping sites	The implementation of this measure is possible.	None
9	Communication campaign on reuse through swap markets	This measure has already been implemented. The measure brings environmental awareness about resources and waste prevention.	This measure is not so relevant for short stay tourists, but more for tourists staying longer periods who would need some equipment.
22	Food donation from restaurants and hotels to charities	This measure is possible if following the legislation on food handling, storage and safety.	It needs to comply with the sanitary rules on food donation (temperature, "best before" date, etc.). Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always too high to prioritise such initiatives.

Portuguese regulatory framework

National policies on waste prevention and reuse

The Lisbon's Strategic Plan for Municipal Waste has been consolidated over the last few years, with systems for managing specific waste flows, and placing the focus on producers to follow targets for prevention.

In Azores, the DLR 40/2008/A, 25th of August defines the economic, financial, enforcement and penalties regulation about waste management. As an example, it encourages the utilization of reusable packaging of alcoholic beer with a penalization tax for the non-reusable beer bottles and cans (0.10€ per individual packaging with a capacity equal or less than 0.25 liters).

Moreover, the Environmental Department promotes in all islands training courses and environmental education actions on waste prevention and management, such as:

- International workshop about waste management in islands;
- Eco-Management and Audit Scheme (EMAS) and Local Agenda 21 with the Portuguese Environmental Agency (APA);
- Divulgation of integrated waste stream management systems with the responsible entities.

Objectives of reuse rates

The PERSU 2020 includes a goal related to the preparation for reuse and recycling: by 31 December 2020 an overall increase of 50% by weight in relation to the preparation for the reuse and recycling of municipal waste, including paper, paperboard, plastic, glass, metal, wood and biodegradable municipal waste.

National policies on waste treatment hierarchy

The Portuguese Decree Law nº 73/2011 from 17 June 2011 includes in Article 7 (4) the "Waste management hierarchy Principle" which defines the priorities that should be followed in waste management, where the preparation for reuse and recycling is included. The principles that guide the application of this hierarchy, and therefore the mandatory separate collection, are precisely supported on criteria "environmental protection, precaution and sustainability, technical feasibility and economic viability, and the protection of resources and global impacts on the environment, human and social health."

The Regional law nº 20/2007/A from 25 August 2007 defines rules on waste regulation and management in Azores. This law establishes major principles such as the encouragement to apply the waste hierarchy.

In Lisbon, the Municipal Waste Management Plan includes a strategic line (2015-2020) for valorisation of waste streams.

Policies on public-private partnerships to allow reuse and donations

In Portugal there is a non-profit organization, called "Banco Alimentar" that promotes the reuse of every textiles and some furniture for charity for destitute and deprived people.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
8	Reuse initiative in camping sites	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
9	Communication campaign on reuse through swap markets	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
22	Food donation from restaurants and hotels to charities	Not specified	Not specified

Croatian regulatory framework

National policies on waste prevention and reuse

In 2010, 96% of municipal biowaste was landfilled, 1.3% composted while the rest (mainly paper and cardboard) was sent to other recovery operations.

The law defines the order of priority of waste management with the advantage primarily on the prevention of waste generation.

The Act on Sustainable Waste Management (OG No. 94/13, 73/17) defines the waste management priority order as follow:

1. Waste prevention;
2. Preparing for re-use;
3. Recycling;
4. Other recovery operations, e.g. energy recovery;
5. Disposal.

When applying the waste management priority order, the competent state authorities, the competent authorities of bodies of local and regional self-government, legal persons vested with public authority to perform environment-related activities and legal persons performing environmental protection tasks pursuant to special regulations, shall:

1. take measures to encourage the options that deliver the best environmental outcome, which may require specific waste streams departing from the waste management priority order where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste;

2. take into account the general principles of environmental protection – the principle of precaution and the principle of sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts in accordance with Article 9 of this Act;

3. make sure that increased costs that may arise by virtue of applying the waste management priority order are not disproportionate compared to other waste treatment options and that a market exists or can be formed for the materials or energy obtained.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives		
8	Reuse initiative in camping sites		
9	Communication campaign on reuse through swap markets		
22	Food donation from restaurants and hotels to charities		

Cypriot regulatory framework

The Waste Framework Directive (2008/98/EC) sets the policies regarding waste treatment hierarchy and recycling in Nicosia. Prevention and reuse should therefore be promoted, but this is considered too general to provide specific opportunities on the measures listed below.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	Some restaurants have already adopted it.	
8	Reuse initiative in camping sites		No camping sites in Nicosia.
9	Communication campaign on reuse through swap markets		
22	Food donation from restaurants and hotels to charities		Food safety issues.

Greek regulatory framework

National policies on waste prevention and reuse

The waste prevention initiatives, which were on-going on the issue of the National Waste Management Plan (NWMP) in December 2014, range from:

- Actions financed through environmental EU programmes such as the LIFE project, aiming at supporting the local authorities in the actions to be undertaken for waste prevention;
- Actions for raising awareness at schools such as the ''Eco schools'' initiative which provides for the establishment of environmental committees and environmental action plans in schools for the enhancement of the surrounding environment;
- Public-Private Partnerships for the optimization of the reduction and recycling of waste in touristic destinations (three such programmes were developed in Chalkidiki);
- Organisation of events for the demonstration of waste reduction methods;
- Actions promoting reusable bags, the reuse of clothing, the disposal of unused drugs and the exchange of used products (such as books);
- Environmental labelling, etc.

The pay-as-you-throw (''PAYT'') scheme for the reduction of waste in landfills and the enhanced participation of the public in the separate collection of waste has only been implemented as a pilot project in the municipality of Elefsina.

The NWPSP focuses on public awareness and aims at strengthening the existing actions mentioned above especially with regard to informing the public and encouraging their participation. The new strategy is to set up more effective communication campaigns through the organisation of separate campaigns focusing on specific waste streams.

The priority areas according to the plan are the following:

- Food waste;
- Paper consumption;
- Packaging waste;
- Waste from electrical and electronic equipment.

In addition, the plan proposes actions on areas outside the aforementioned "priority areas", and in particular actions mainly for informing the public (through seminars, workshops, distribution of information leaflets, posts on websites and social media accounts) in relation to the prevention of generation of MSW, construction and demolition waste and industrial waste.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
6	Partnerships between hotels and charities for reuse initiatives	This measure is possible to implement.	Not specified
8	Reuse initiative in camping sites	This measure is possible to implement.	Not specified
9	Communication campaign on reuse through swap markets	This measure has already been implemented.	Not specified
22	Food donation from restaurants and hotels to charities	This measure is possible if following the legislation on food handling, storage and safety.	Not specified

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Stakeholders to involve

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Identification and engagement of relevant stakeholders and creation of networks within the municipal boundaries	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	6	• Organization of informative meetings to encourage hotels and hotelier associations to undertake these initiatives and liaise with charities and similar organisations.
			8	• Facilitation and support in the subscription of voluntary agreements and collaboration partnerships between participating entities (i.e. camping sites, charities, etc.).
			9	• Preparation for reuse: checking, cleaning or repairing recovery operations by which products or components are prepared and so that they can be reused without any other pre-processing. • In the market area, as an option, promotion of recycling providing opportunity to selective waste collection.
			22	• Regulative support and financial incentives to encourage restaurants, hotels, etc. to implement this measure so that donating food is more attractive than discarding it (e.g. tax reduction for food donors – they may be able to deduct a certain percentage of the value of donated food from their income corporate tax).
Regional agencies (Environmental and Sanitary agencies)	Advising regarding regulations and improvement opportunities	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	6	• Regulative support to encourage hotels to implement reuse initiatives (e.g. free collection and transportation service of donated items to charities).
			8	• Regulative support to encourage camping sites to implement reuse measures (e.g. about permitting procedures and compliance with waste management legislation).
			9	• Measure participation and monitor the quantity of products reused.

			22	• Support and incentives to encourage restaurants, hotels, etc. to implement this measure so that donating food is more attractive than discarding it (e.g. tax reduction for food donors – they may be able to deduct a certain percentage of the value of donated food from their income corporate tax)
NGO's, charities	Mobilizing public participation. Creating partnerships between hotels/restaurants and charities, organisations.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	6	• Facilitation and support in the subscription of voluntary agreements and collaboration partnerships between participating entities.
			8	• Realization of communication campaigns at local level to engage more participants and raise awareness (e.g. provision of a "give box" in a public area).
			9	• Communication campaign with public media, press release and journalists invited to the event, display posters to inform the public and advertise via social networks and partners' channels
			22	• Organization of informative meetings and training sessions
Business associations (Camp sites, hotels, restaurants, tourism, trade associations)	These types of associations could inform members on the reuse and recycle opportunities and achievements.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	6	• Facilitation and support in the subscription of voluntary agreements and collaboration partnerships between participating entities.
			8	• Organization of informative meetings to encourage camping sites to undertake these initiatives and liaise with charities and similar organisations for a potential collaboration.
			9	• Defining the concept and the rules: swap party, exchange market, school event, etc.
			22	• Facilitation and support in the subscription of voluntary agreements and collaboration partnerships with participating establishments and charities.
Management or Environment, Health and Safety department	Implementing the reuse and recycling strategies	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls,	6	• The first step before launching any reuse initiative should be the monitoring and assessment of the type of waste generated in the hotel, including the identification of items and waste fractions which could be potentially reused.

within hotels and restaurants		door-to-door communication	8	• Installing the box at the chosen location with instructions or a small poster explaining its purpose and functioning.
			9	• Measure participation and monitor the quantity of products reused.
			22	• Appointment of the owner/manager or specific employee to be in charge of food donations (this will avoid mismanagement of food surplus, pick-ups and schedule for collection, etc. and therefore prevent avoidable losses).
Staff	Having the knowledge/skills to make an efficient use of their resources.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	6	• Asking hotel staff for their input and assistance on what things can be reused to minimize waste and reward them for good ideas. Including them in the decision-making process can pay dividends in higher productivity, better morale and most importantly, less waste.
			8	• Providing training to camping site staff.
			9	• Evaluation and provision of feedbacks.
			22	• A presentation and introduction of the measure should be provided to hotels and restaurant personnel, at all levels. Including them in the decision-making process can translate into a higher commitment and better morale of involved staff.
Suppliers	In order to implement some of the measures, certain materials should be purchased. The choice of the right partners is determinative.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	6	• Suppliers must be also informed and updated on disposal policies and initiatives taken in the hotel, as this will reinforce collaboration with them and facilitate cooperation with other hotels interested in implementing similar measures.
			8	• Dissemination of the information gathered with pictures and other relevant feedback to the organisers and stakeholders involved.
			9	• Measure participation and monitor the quantity of products reused.

			22	• Communication campaign materials and continuous support/training should be distributed to all involved stakeholders to ensure participation and a proper understanding and uptake of the measure.

3.3 Avoiding litter

Regulatory frameworks

European regulatory framework

Litter is defined by the Waste Framework Directive in Article 3 and is further referenced in Articles 8, 28 and 36 in forms of various appearances and responsibilities.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places		If this waste is not recycled adequately but landfilled it would be against the WFD, as there will be a ban on landfilling of separately collected waste.
15	Waste sorting in marinas	This could increase the separate collection rate from a target group which was not covered before.	If this waste is not recycled adequately but landfilled it would be against the WFD, as there will be a ban on landfilling of separately collected waste
16	Information on waste sorting for cruise ships		It depends on the available capacity on the ships. At the same time, those ships are registered in Caribbean countries sometimes or countries outside the EU and they do not necessarily need to comply with the EU directives.
17	Pocket boxes and ashtrays against litter		It could become waste itself if someone uses it only once.
18	Eco-event guidelines	This measure could increase awareness.	
19	Awareness campaign on marine litter	This measure could increase awareness.	

French regulatory framework

Regulation on preventing waste production to avoid litter

The national French law n°2015-992 of 17 August 2017 on energetic transition for a green growth modifies the article L. 541-1 of the Code of environment by specifying that the national policy on waste prevention and management is an essential lever for a transition into circular economy. This law states that household waste amounts produced per inhabitant should decrease by 10% between 2010 and 2020. This objective could be

achieved through different measures such as refundable packaging and products. Besides, the French law on energetic transition for a green growth also recommends reducing non-recyclable manufactured products amounts to be sold by 50% before 2020. The same law n° 2015-992 of 17 August 2015 also stipulates that one-use plastic bags used to pack merchandise are forbidden at the checkouts since the 1 July 2016. Instead of one-use plastic bags, customers are now provided with paper, cardboard or fabric bags, or even compostable plastic bags. Since January 2017, one-use plastic bags are also forbidden for direct food good packaging. All the selling points are concerned by this article of the law: pharmacy, bakery, grocery, etc. If this prohibition is not respected, the seller can be punished by a sentence of two years of prison with a fine of 100,000 €. Another decree related to the law n° 2015-992 specifies that selling and distribution of one-use plastic dishes (glasses and plates) will be forbidden by 1 January 2020. Only compostable disposable dishes will be able to be sold or distributed for free when buying take-away food or to consume directly on site. The decree of 30 August 2016 stipulating this prohibition precises the minimum amount of biosourced matter that needs to be present within the compostable dishes to be authorised to be sold: 50% in 2020; 60% in 2025. The industrials are concerned by this decree as they have four years to find alternatives to plastic dishes. Besides, all the food selling points such as traditional restaurants, take-away restaurants, bakeries, groceries are concerned by this decree. Those measures show a real willingness of the French government to try to avoid plastic waste production knowing that plastic waste is a big source of pollution for oceans.

Penalties against littering

The article R.632-1 of the penal Code stipulates that dropping off waste, materials or any other object so that they would be collected by the local authority in charge of this without respecting the rules that have been set by the collecting service itself is punished by a fine. Additionally, according to the article L. 541-3 of the French Code of environment, when waste are abandoned or managed in a way that differs from the legal prescriptions, the local authority in charge of police power has to act. Fines are applied to people who do not respect these legal prescriptions. The police power is mayor's responsibility according to the articles L. 2212-1 and 2 of the French local authorities general Code. However, the mayor can decide to delegate this power to a municipal police that will be in charge of controlling the respect of the municipal rules. To fight against street or beach littering, some cities have decided to fix high fines for people throwing waste without respecting the legal prescriptions to do so.

In Nice, they decided to forbid cigarettes on the beaches through the label "Plage sans tabac" ("Beach without tobacco"), and some neighboring cities have developed the pocket ashtrays distribution on the beaches in order to make tourists aware of beach litter but also in order to prevent it. In Nice, they have implemented more than 930 street ashtrays in order to avoid cigarette buts littering; and the penalty for throwing a cigarette but directly into the street is 35€. Some penalties have also been developed to avoid dogs' dejections; in Nice the penalty costs from 45€ to 450€ in case of recidivism.

Besides, the regional authorities around Nice have implemented specific penalties for people who throw cigarette buts directly into the environment. In fact, those buts are very dangerous at summer time within this particular region of the south of France where they can cause big wildfires because of the heat. In that case, the police will ask people throwing cigarette buts into the environment to pay a penalty of 135€.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places	This measure is a way for municipalities to avoid street littering by providing people means to sort their waste on public areas. Besides, it is a way for the municipalities to comply with their legal obligation on street cleaning.	
15	Waste sorting in marinas	This measure would be a way for local authorities to prevent litter on marinas and directly within the sea; which is a big issue in terms of marine preservation in general and within the marine natural parks and protected marine areas in particular. Besides, that would be a way for local authorities in charge of waste management to contribute to achieve the national objectives on selective collection and recycling rates.	
16	Information on waste sorting for cruise ships	This measure would be a way for local authorities to prevent litter on marinas and directly within the sea; which is a big issue in terms of marine preservation in general and within the marine natural parks and protected marine areas in particular. Besides, that would be a way for local authorities in charge of waste management to contribute to achieve the national objectives on selective collection and recycling rates.	
17	Pocket boxes and ashtrays against litter	Lots of beaches around Nice have already used the distribution of pocket ashtrays to make tourists aware of cigarette buts littering and providing them with a solution to prevent littering.	In Nice, smoking is prohibited on the beaches and more than 930 street ashtrays have already been implemented within the whole city. Thus, the distribution of such individual boxes might not be necessary and very useful in this context.
18	Eco-event guidelines	Through eco-events, local authorities can prevent littering by making awareness campaigns on the subject to make participating people aware of littering. Besides, the eco-events can use reusable dishes that are not disposable. The law n° 2015-992 specifying that selling and distribution of one-use plastic dishes (glasses and plates) will be forbidden by 1 January 2020 is an opportunity for the eco-events to avoid using disposable dishes.	

19	Awareness campaign on marine litter	Nice is already working a lot on awareness campaign on marine litter as they are increasing each year the number of beaches where it is prohibited to smoke through the label "Plage sans tabac". Then, this measure could be supported even more widely.	

Spanish regulatory framework

Regulations concerning littering

The National Waste Prevention Plan, approved in 2013 for the period 2014–2020, has the main objective of reducing the amount of waste generated by 10% in 2020 - relative to 2010 (in tonnes) - and contributing to reducing marine litter from terrestrial sources.

The national Law 41/2010, of 29th September, for Marine Environment Protection, includes specific Marine Strategies per region, including Canary Islands and north Atlantic areas (incl. Cantabria). Amongst the strategies the assessment of marine litter generated from beaches and coastal areas is considered.

The Law 1/1999, of 29th January, of Waste in the Canary Islands, in its Article 38, establishes a range of infringements and penalties with regards to waste disposal and littering.

In Santander, the Municipal Ordinance on "Municipal Waste Management and Street Cleaning" establishes the range of infringements and penalties with regards to waste disposal and littering on the streets (including cigarette butts, wrapping paper, plastics, etc.). This Ordinance also regulates littering and cleaning obligations on beach.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places	Municipalities are responsible for municipal waste management and must comply with recycling targets. Therefore, the implementation of sorting bins in public and touristic places is encouraged and included in their municipal ordinances with regards to waste. The establishment of sorting bins in public and touristic places is already in place in the municipality of Santander. In Tenerife, it is also possible to be implemented although it is essential to count on the support from local and regional government and collection/recycling schemes.	In Tenerife, aesthetics, accessibility, etc. aspects must be also considered to homogenize infrastructure, maintenance, etc. and also provide information signs (in several languages for instance).
15	Waste sorting in marinas	Municipalities are responsible for municipal waste management and must comply with recycling targets. Therefore, the implementation of sorting bins in public and touristic places is encouraged and included in their municipal ordinances with regards to waste.	

16	Information on waste sorting for cruise ships	Not specified.	
17	Pocket boxes and ashtrays against litter	As waste disposal and littering on the streets is regulated under municipal ordinances (e.g. Municipal Ordinance in Santander on Municipal Waste Management and Street Cleaning), the distribution of pocket boxes and ashtrays to citizens and tourists would be beneficial and encouraged by municipalities.	
18	Eco-event guidelines	Law 22/2011 establishes that waste prevention plans must include the development of awareness rising and information campaigns addressed to the general public, therefore the development of eco-event guidelines would be encouraged. In the municipality of Santander, there would not be any problem to implement such measure.	
19	Awareness campaign on marine litter	Law 22/2011 establishes that waste prevention plans must include the development of awareness rising and information campaigns addressed to the general public, therefore the development these measures focusing on marine litter would be encouraged. The establishment of awareness campaigns on marine litter is already in place in the municipality of Santander. In Tenerife, it is also possible to implement this measure with the support of regional/local governments.	

Italian regulatory framework

Regulations concerning littering

The Article 192 of the national law d.lgs. 152 del 2006 stipulates that waste abandonment is prohibited and includes administrative and penal sanctions.This has been also confirmed in Law 221/2015 which introduces specific administrative sanctions for the abandonment of small waste in urban areas (e.g. chewing gums, kleenex, butts), ranging from EUR 30 to EUR 300. There is no specific penalty against marine litter on the beaches or in marinas.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places		
15	Waste sorting in marinas		
16	Information on waste sorting for cruise ships		
17	Pocket boxes and ashtrays	The highest sanctions foreseen by the	

	against litter	law 221/2015 are related to cigarette butts (could be double than the other ones).	
18	Eco-event guidelines		
19	Awareness campaign on marine litter		

Danish regulatory framework

Regulations concerning littering

The Danish Environmental Protection Agency (DEPA) sets monetary penalties for littering. All penalties can be found on the homepage of the DEPA: http://mst.dk/affald-jord/affald/affaldsfraktioner/henkastet-affald/oversigt-over-boeder-for-henkastet-affald/. They range from EUR 40 to EUR 1000.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places	This measure has already been implemented as tests.	None
15	Waste sorting in marinas	This measure has already been implemented.	None
16	Information on waste sorting for cruise ships	This measure has already been implemented.	None
17	Pocket boxes and ashtrays against litter	This measure has already been implemented.	None
18	Eco-event guidelines	This measure is possible to implement.	Funding is needed to check if events live up to guidelines/Eco demands if the municipality implements such a measure.
19	Awareness campaign on marine litter	This measure is possible to implement.	None

Portuguese regulatory framework

Regulations concerning littering

The Lisbon Urban Solid Waste Regulation (Deliberation n. º 523/CM/2004) previewed penalties for litter in the streets.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles

12	Sorting bins in public and touristic places	There are already available sorting bins for tourists.	In Lisbon, the management of the public space is shared between several Municipal Departments and External Entities, which implies coordination between them.
15	Waste sorting in marinas	In the Lisbon marinas specific bins for sorting waste already exist.	Not specified
16	Information on waste sorting for cruise ships	The Environmental Departments promote in all islands of Azores training courses and environmental education actions on waste prevention and management.	Not specified
17	Pocket boxes and ashtrays against litter	Not specified	Not specified
18	Eco-event guidelines	The Environmental Departments promote training courses and environmental education actions on waste prevention and management. Lisbon Waste Management Department in collaboration with companies that organize the events started to implement sorting bins for each event. Lisbon City Council is also developing guidelines and necessary requirements to organize internal and external Eco Events.	There is a need of available people to monitor the procedures and the quality of the sorted waste.
19	Awareness campaign on marine litter	The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified

Croatian regulatory framework

No specific regulation on littering has been found for the Croatian regulatory part.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places		
15	Waste sorting in marinas		
16	Information on waste sorting for cruise ships		
17	Pocket boxes and ashtrays against litter		
18	Eco-event guidelines		
19	Awareness campaign on marine litter		

Cypriot regulatory framework

Since Nicosia is an inland city there are no opportunities to reduce waste generated in marinas or by cruise ships. However, there are penalties and other measures against litter in the streets according to the prevention of pollution in public streets and places (Law N. 19(I)/1992) and sorting bins in public places are already in place. Additionally, there is no policy providing either opportunities or obstacles to introduce pocket boxes and ashtrays against litter or to develop eco-event guidelines.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places	Those bins already exist in central areas.	
15	Waste sorting in marinas		No marina
16	Information on waste sorting for cruise ships		No cruise ship
17	Pocket boxes and ashtrays against litter		
18	Eco-event guidelines		
19	Awareness campaign on marine litter		No marina

Greek regulatory framework

No specific legislation has been found on littering in the Greek context.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
12	Sorting bins in public and touristic places	Those bins already exist in central areas.	
15	Waste sorting in marinas	This measure has already been implemented.	
16	Information on waste sorting for cruise ships	This is seperately managed by private companies.	
17	Pocket boxes and ashtrays against litter	This measure has already been implemented.	
18	Eco-event guidelines	This measure could be implemented.	
19	Awareness campaign on marine litter	They are already taking place occassionaly.	

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Stakeholders to involve

- **Penalties against litter in the streets (cigarette buts, etc.) and marine litter on the beaches (plastic, etc.)**

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal government	Providing regulative framework regarding street/beach littering	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	12	• Putting in place ordinances against littering in streets and beach. • Defining the design of the bins based on the objectives previously identified. • Defining the signaletic accompanying the sorting bins. • Implementing a pilot test in relevant areas. • Launching communication campaigns to raise awareness on waste sorting and to inform on the new system being implemented. • Mapping of all the sorting bins located on a touristic area and providing the tourist offices/touristic establishments with it.
			17	• Identification of the areas the most impacted by littering. • Quantification of the number of boxes to distribute. • Establishment of partnerships for financing and distributing the boxes and raising awareness on litter. • Organization of the distribution and awareness campaign: where and when.

				• Creation of a map of all the distributing points of boxes/ashtrays to provide to the tourist establishments.
Municipal Solid Waste department (if publicly managed)	Providing input on the collection of sorted waste	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	12	• Assessing the possible waste fractions to collect separately based on the current local waste collection scheme and the existing waste infrastructures for treatment and recycling. • Identifying the most relevant areas for the implementation of the sorting bins, and the most relevant waste fractions to collect. • Identifying the logical constraints for the implementation of the sorting bins. • Defining the design of the bins based on the objectives previously identified. • Defining the signaletic accompanying the sorting bins.
			17	• *Same actions than the municipal government if the campaign is launched by the municipal solid waste department.*
Municipal Solid Waste company (if privately managed)	Providing input to the collection of sorted waste	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	12	• Assessing the possible waste fractions to collect separately based on the current local waste collection scheme and the existing waste infrastructures for treatment and recycling.
			17	• *Same actions than the municipal government if the campaign is launched by the municipal solid waste company.*
Managers of touristic places (beaches, parks,	Supporting the implementation of separate collection system	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door	12	• Implementing a pilot test in relevant areas. • Launching communication campaigns to raise awareness on waste sorting and to

museums, etc.)		communication		inform on the new system being implemented. • Mapping of all the sorting bins located on a touristic area and providing the tourist offices/touristic establishments with it.
Suppliers	Resources provider	Phone calls, email, polls, door-to-door communication	12	• Providing different types of bins for all the waste fractions.
			17	• Providing ashtrays for the municipalities or solid waste department or company.

- **Penalties against marine litter on marinas**

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal government and Port authority	Providing regulative framework regarding litter on cruise ships and marinas	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	15	• Diagnostic of the current situation (type of waste bins in the marinas, surveys among the recreational sailors regarding their behaviour and their willingness to sort waste, etc.). • Elaboration of the communication material and purchase of the material. • Launch of a communication campaign and distribution of the bags and waste instructions leaflets during the touristic season in the marina.
			16	• Adjusting the initiative to the waste management plan of the port. • Providing the area for storing of waste. • Contact and contract with waste collection companies.
Municipal Solid Waste department (if publicly managed)	Providing input on the collection of sorted waste	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	15	• Purchasing and installing in the marina the facilities to throw the sorted waste in adequate bins.
			16	• Providing information to managers of marinas and cruise ship companies about waste sorting. • Contact and contract with municipality and

				port authorities.
Municipal Solid Waste company (if privately managed)	Providing input to the collection of sorted waste	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	15	• Purchasing and installing in the marina the facilities to throw the sorted waste in adequate bins.
			16	• Providing information to managers of marinas and cruise ship companies about waste sorting. • Contact and contract with municipality and port authorities.
Managers of marinas and cruise ship companies	Supporting the implementation of a waste sorting system	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	15	• Purchasing and installing in the marina the facilities to throw the sorted waste in adequate bins. • Elaboration of the communication material and purchase of the material.
			16	• Providing input on relevant waste fractions. • Focusing on communication for good collaboration.
Sailor associations	Supporting the implementation of a waste sorting system	Phone calls, email, polls, door-to-door communication	15	• Creating a map of all the marinas participating in such initiative and providing recreational sailors with it.
			16	

• Promoting awareness campaign on littering

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal government	Supporting the implementation of awareness campaigns	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	18	• Identification of the available existing material and the potential material to purchase (reusable dishes, ecocups, mobile dishwasher, signaletic signs, reusable furniture, etc.). • Identification of the local events to target through the guidelines.

				• Contact of the stakeholders to involve for the creation of the guidelines. • Organisation of workshops and working groups to identify waste prevention actions as well as the content of the guidelines and their legal status. • Validation of guidelines and testing in a pilot area before implementing in larger events. • Appointing responsible personnel to update the guidelines with obtained results and received feedbacks.
			19	• Analysis of the composition of marine litter in the concerned area through surveys and monitoring activities (which can be part of clean-up events). • Identification of the existing measures regarding marine litter. • Creating partnerships with stakeholders from the local community. • Defining the precise scope of the communication campaign. • Defining the budget and the possible sources of funding.
Municipal Solid Waste department (if publicly managed)	Supporting the implementation of awareness campaigns	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	18	• *Same actions than the municipal government if the guidelines are developed by the municipal solid waste department.*
			19	• Collaborating with the municipality in the implementation of the campaigns.
Municipal Solid Waste company (if privately managed)	Supporting the implementation of awareness campaigns	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	18	• *Same actions than the municipal government if the guidelines are developed by the municipal solid waste company.*
			19	• Collaborating with the municipality in the implementation of the campaigns.
Event organizers	Supporting the implementation	Interviews, meetings, workshops,	18	• *Same actions than the municipal government if the guidelines are*

	of awareness campaigns	webinars, online platforms, phone calls, email, polls, door-to-door communication		*developed by the event organizers directly.*
Environmental associations and NGO's	Supporting the implementation of awareness campaigns	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	18	• *Same actions than the municipal government if the guidelines are developed by environmental associations or NGO's.*
			19	• Analysis of the composition of marine litter in the concerned area through surveys and monitoring activities (which can be part of clean-up events). • Identification of the existing measures regarding marine litter. • Creating partnerships with stakeholders from the local community. • Defining the precise scope of the communication campaign. • Defining the budget and the possible sources of funding.
Private service providers	Providing consultancy services	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	18	• *Same actions than the municipal government if the guidelines are developed by consulting companies.*

3.4 Sorting into different fractions and recycling

Regulatory frameworks

European regulatory framework

The key legislative background for separate collection and recycling is the Waste Framework Directive (2008/98/EC). Previous WFD only laid down targets for MSW recycling. The Circular Economy Package has brought in amendments to the WFD. The following targets: (i) a common EU target for recycling 65% of municipal waste by 2030; (ii) a common EU target for recycling 75% of packaging waste by 2030 and (iii) a binding landfill target to reduce landfill to maximum of 10% of municipal waste by 2030 are the ones which should drive separate collection. Furthermore, the new amendments see a ban on landfilling of separately collected waste, too.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	If this waste is considered as MSW in a particular country, given the quantity of waste these establishment produce, separate collection of this fraction could indeed increase the selectively collected amount sent to AD/compost (and increase recycling rates).	
10	Waste sorting in hotel rooms	This measure would permit to increase separate collection rates.	If this waste is not recycled adequately but landfilled it would be against the WFD, as there will be a ban on landfilling of separately collected waste.
11	Recycling advisors for tourist establishments	This could increase the separate collection rate from a target group which was not covered before.	Low interest of tourists.
12	Sorting bins in public and touristic places	This could increase the separate collection rate from a target group which was not covered before.	If this waste is not recycled adequately but landfilled it would be against the WFD, as there will be a ban on landfilling of separately collected waste.
14	Waste sorting instructions in foreign languages	This could increase the separate collection rate from a target group which was not covered before.	

15	Waste sorting in marinas	This could increase the separate collection rate from a target group which was not covered before.	If this waste is not recycled adequately but landfilled it would be against the WFD, as there will be a ban on landfilling of separately collected waste.
16	Information on waste sorting for cruise ships		It depends on the available capacity on the ships. At the same time, those ships are registered in Caribbean countries sometimes or countries outside the EU and they don't necessarily need to comply with the EU directives.
21	WasteApp	This measure is a way to increase selective collection through fun and awards.	Low interest of tourists.

French regulatory framework

National policies on sorting into different fractions and recycling

The law n° 92-646 of 13 July 1992 related to waste treatment modifies the law n° 75-633 of 15 July 1975 related to waste treatment by adding new recommendations to prevent and reduce hazardous waste production; to organize waste transportation; to valorise waste thanks to reuse, recycling or energetic valorisation. It also stipulates that since July 2002 landfilling units are only authorised to receive ultimate waste that cannot be valorised in any other process. This law has been one of the first steps to implement selective collections at source in order to valorise higher amounts of waste.

Sorting and recycling through the EPR schemes

The same year of 1992, the EPR scheme on packaging waste has been created in France. This scheme has been a real incentive for local authorities in charge of municipal waste management to implement a selective collection for packaging waste as they received fiscal subsidies when contracting with the eco-organisation. This scheme has received new specifications from the ministry of environment for the period 2018-2022. Several objectives have been set within those specifications for the period 2018-2022:

- Objectives on prevention and eco-design for household packaging: the accredited eco-organisation has to contribute to achieve the national objectives on waste prevention; especially the one focusing on reducing by 10% municipal waste production per inhabitant between 2010 and 2020, but also the one that aims to reduce by 50% non-recyclable manufactured products to be sold before 2020. To do so, the accredited eco-organisation has to provide the packaging producers with recommendations to help them reducing packaging and designing packaging that could be reused or recycled into their next packaging design.
- Objectives on recycling for household packaging: the accredited eco-organisation has to contribute actively to achieve the national objective of recycling at least 75% of household packaging that are sold in France every year by 2022. To do so, this eco-organisation has to increase the mobilisation of all the concerned stakeholders in order to improve collection and sorting rate; support the extension of packaging waste sorting instructions to any kind of packaging waste (especially on plastics, and not only

bottles and flasks) by 2022; support the standardization of collecting schemes at national scale (colors of the collection bins, collection system: door-to-door, voluntary approach, number and nature of separated fractions, etc.).

In 2006, an EPR scheme has been implemented on paper waste in France; it was a French initiative. This EPR scheme has been created in order to develop paper waste selective collection and recycling. The accredited eco-organisation in charge of that EPR scheme has received new specifications from the national ministry of environment in 2017 for the period 2017-2022. Several objectives have been set within the national specifications for the period 2017-2022:

- Objectives on prevention for paper: the accredited eco-organisation has to contribute to achieve the national objectives on waste prevention; especially the one focusing on reducing by 10% municipal waste production per inhabitant between 2010 and 2020. To do so, the accredited eco-organisation has to provide the paper producers with recommendations to help them reducing the impacts on environment of their production and designing paper that can be recycled.
- Objectives on recycling for paper: the accredited eco-organisation has to contribute actively to achieve the national objective of recycling at least 65% of papers that are sold in France every year by 2022. To do so, this eco-organisation has to increase the mobilisation of all the concerned stakeholders in order to improve collection and sorting rate; support local authorities in charge of municipal waste management in updating waste sorting instructions; support the standardization of collecting schemes at national scale (colors of the collection bins, collection system: door-to-door, voluntary approach, number and nature of separated fractions, etc.).

In France, lots of different EPR schemes have been implemented those last years, even if there was no European obligation on certain sectors. They represent a way to improve selective collection rates on different products, and thus to improve recycling rates at national scale by defining specific objectives on collection and recycling to be achieved. In France, there are 18 different EPR schemes in 2017. Besides the EPR schemes on packaging and paper, the main ones that could be useful for the URBAN WASTE project are dealing with textiles, furniture such as beds for instance, and waste electrical and electronic equipment.

Regulation on biowaste selective collection

Moreover, the article 70 of the French national law n°2015-992 of 17 August 2015 on energetic transition for a green growth expects the generalisation of biowaste selective collection at source for any kind of producers to be implemented by 2025. The local authorities in charge of waste collection have then to define technical solutions and specific schedules for implementing appropriate local composting units or biowaste selective collections on their own territory. The generalisation of biowaste selective collection at source by orienting that waste into quality organic recycling facilities makes irrelevant the construction of new mechanical biological waste treatment plants for residual waste. Thus, those installations should not be subsidised by the state anymore. Biowaste selective collection at source can be operated on-site by using individual or collective composting units or can be managed collectively after being collected through door-to-door or voluntary systems. Biowaste represent 30% of household residual waste; which amounts to almost 8 million tonnes every year in France, mainly composed of kitchen biowaste.

The French law n° 2010-788 of 22 July 2010 called law Grenelle II and codified with the article L. 541-21-1 of the code of environment plans that all the entities producing or possessing big amounts of waste with at least 50% of their weight composed of biowaste (excluding packaging weight) will have to guarantee its selective collection

at source in order to valorize the organic matters. That law has to contribute to national objectives defined through that same law Grenelle II, which are:

- Achieving a recycling rate of 75% for the non-hazardous waste produced by economic activities (except for the construction, the agricultural and the food and beverage industry sectors);
- Decreasing by 15% the waste amounts sent to landfill and incineration; to achieve the national objective of doubling the capacity of the biowaste recycling facilities between 2009 and 2015.

The main objective of that article is to favor the soil return of the organic matter. Households are not concerned by this article, neither are the waste treatment facilities operators. Packaged biowaste can be collected directly into their packaging. Those biowaste will have to be unpacked in an adapted facility before being valorised. For sanitary and environmental reasons some biowaste are excluded from this obligatory framework: animal by-products from categories 1 and 2, biowaste including raw pieces of meat or fish, liquid biowaste except used cooking oils, wooden waste that will be energetically valorised. The main impacted sectors are the collective catering and commercial catering (restaurants, supermarkets, etc.). An entity is considered as a big producer when it exceeds the defined threshold. This threshold is decreasing gradually till 2016. At the beginning, only the big supermarkets were concerned by such law as the thresholds were defined as follows: 120 tonnes per year in 2012 and 80 tonnes per year in 2013. Since 2016, the threshold is 10 tonnes/year and 60 liters/year for used cooking oils. We estimate that the restaurants serving more than 70,000 meals a year are concerned by this threshold. Those waste big producers have two solutions: on-site recovery (composting or anaerobic digestion) or appointing external contractors in charge of collecting and recovering waste by sending them to compost or anaerobic digestion. In case of non-compliance, there is a penalty of 75,000 € and a term of imprisonment of two years (source: Préfecture de la Meuse, 2016).

Deadline	Biowaste threshold	Used cooking oil threshold
01/01/2012	> 120 t/yr	> 1,500 l/yr
01/01/2013	> 80 t/yr	> 600 l/yr
01/01/2014	> 40 t/yr	> 300 l/yr
01/01/2015	> 20 t/yr	> 150 l/yr
01/01/2016	> 10 t/yr	> 60 l/yr

Implementing all those different selective collections at source and improving collection and recycling rates on those separated waste through national specifications represent a great opportunity to achieve the objectives set by the French law n°2015-992 of 17 April 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%. This is also a way to respond the EU Directive 1999/31/EC regarding the diversion of biodegradable municipal waste from landfills and banning the landfilling of certain waste fractions.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	The article L. 541-21-1 of the code of environment plans that all the entities producing or possessing big amounts of waste with at least 50% of their weight composed of biowaste (excluding packaging weight) will have to guarantee its selective collection at source in order to valorize the organic matters. Since 2016, biowaste producers considered as big producers who have to comply with this law are the ones who produce at least 10 tonnes/year. We estimate that the restaurants serving more than 70,000 meals a year are concerned by this threshold. Those waste big producers have two solutions: on-site recovery (composting or anaerobic digestion) or appointing external contractors in charge of collecting and recovering waste by sending them to compost or anaerobic digestion. In case of non-compliance, there is a penalty of 75,000 € and a term of imprisonment of two years. This regulation will legally incentive restaurants to implement such a selective collection.	So far in France, we cannot observe concrete control policies on that obligation. That is why we can notice that few restaurants have implemented such selective collection for the moment. In fact, that represents high additional costs for the restaurants to implement a biowaste selective collection. Besides, the sanitary regulation that order a strict traceability of collected and treated biowaste sometimes makes this selective collection harder for restaurants.
10	Waste sorting in hotel rooms	Implementing waste sorting in the hotel rooms contributes to the national EPR schemes on packaging waste and papers by increasing separately collected and recycled waste amounts. The hotels can benefit from all the awareness campaign documents that are developed by the eco-organisations in order to make people aware of waste sorting and to convince them to sort better their waste.	
11	Recycling advisors for tourist establishments	Through the EPR scheme on packaging waste, some local authorities in charge of waste management can benefit from recycling advisors whose salaries are 100% paid by the eco-organisation. Besides, lots of local authorities in charge of waste management have decided to contract on their own recycling advisors even without financial support from the eco-organisation in order to improve their collecting and	The recycling advisors who are contracted by the local authorities are working on public contracts for a public institution. Then, it might be complicated to allow them working for private companies as they are mainly supposed to make households aware of waste sorting.

		recycling performances on packaging waste and papers. Thus, hotels could try to sign public-private partnerships with their local authority in order to benefit from the recycling advisors. In fact, if tourists are well-informed on the sorting instructions of the city where they are staying, then they might also sort better their waste within the streets. Besides, a public authority in charge of waste management is also in charge of making local stakeholders aware of waste management and waste recycling.	
12	Sorting bins in public and touristic places	Increasing the number of sorting bins in public and touristic areas is a way for local authorities to increase their separate collection and recycling rates to contribute to the EPR schemes on packaging waste and papers. It is also a way to contribute to achieve the objectives set by the French law n°2015-992 of 17 August 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%.	
14	Waste sorting instructions in foreign languages	By providing tourists with waste sorting instructions in foreign languages, stakeholders such as hotels and tourist offices contribute to achieve the objectives of the EPR schemes on packaging waste and papers. They also contribute to the objectives set by the French law n°2015-992 of 17 August 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%. Hotels and tourist offices could use all the awareness campaign materials developed by the waste management department of the cities in their waste recycling strategy. They also can benefit from the awareness campaign material that has been developed by the eco-organisations at national scale.	
15	Waste sorting in marinas	Developing waste sorting in marinas is a way for local authorities to increase their separate collection and recycling rates to contribute to the EPR schemes on packaging waste and papers. It is also a way to contribute to achieve the objectives set by the French law n°2015-992 of 17 August 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%.	

		Besides, it is also a real opportunity to avoid ocean pollution which is a big issue nowadays.	
16	Information on waste sorting for cruise ships	Training cruise ships on waste sorting and making them aware of the need to provide tourists with waste sorting solutions is a way to contribute to the objectives set by the EPR schemes on packaging waste and papers, but also the ones set by the French law n°2015-992 of 17 August 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%. The recycling advisors working within the waste department of local authorities could organise trainings for the crews to teach them how to sort. The crew will then be able to accompany tourists in their sorting gesture. Besides, local authorities in charge of waste management can also provide cruise ships with waste sorting leaflets they have created to make local people aware of local waste sorting instructions.	
21	WasteApp	The WasteApp aims to help tourists finding the appropriate sorting bins in the pilot city. Thus, it contributes to improve waste sorting within the city and is a way to achieve the objectives set by the EPR schemes on packaging waste and papers, but also the ones set by the French law n°2015-992 of 17 August 2017 to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%. It is also a way to make tourists aware of waste production, prevention and recycling which are important points of this law.	

Spanish regulatory framework

Policies on sorting into different fractions and recycling

According to the Law 22/2011, of 28th July, on waste and contaminated soils, municipal authorities are responsible for the management of municipal waste from households, businesses, offices and services, including separate collection and transport of MSW.

In most Spanish regions the streams considered for sorting and collection include mixed residual waste, glass, paper and packaging other than glass (plastics, metals, etc.). In some regions the system is complemented by separate collection of bio–waste, while in a few municipalities in other regions bio–waste is collected instead of packaging waste. The number of households served by door-to-door collection is limited, mostly in small and medium-sized municipalities in the regions of Catalonia, Basque Country and Navarra.

The national Law 22/2011 states that environmental authorities must promote measures for i) domestic and community composting, ii) the separate collection of biowaste to undertake composting and anaerobic digestion treatment, especially green waste, biowaste from large generators and households.

One of the objectives included in the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to raising awareness amongst the population in waste generation and its correct management.

Fractions that have to be sorted

Glass and paper waste separated at source are sent to sorting plants and organic waste (mainly in the region of Catalonia) to composting with pre-sorting. Civic amenity sites are used for collecting recyclables including plastics, metals, garden and wood waste, construction and demolition waste; waste for reuse or preparation for reuse, such as clothes, furniture, lumber, and waste electrical and electronic equipment (WEEE); and hazardous waste. In some regions, the system is complemented by separate collection of bio–waste, while in a few municipalities in other regions bio–waste is collected instead of packaging waste.

At regional level, the Law 1/1999 of 29th January, of Waste in the Canary Islands, specified that the Autonomous Community of the Canary Islands shall include the selective collection of the following waste fractions (amongst others): plastic, paper and cardboard, glass, used cooking oil, clothes and textiles, etc. It also states that municipalities and local authorities are obliged to provide the separate collection and treatment for such fractions.

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to maximize the selective collection of waste and recycling, differentiating between paper and cardboard, packaging and glass.

Moreover, one of the objectives in the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to increasing separation at source and waste collection. The current separate waste collection system includes packaging, paper/cardboard, glass and mixed/residual waste (including biowaste).

Homogenizing colours of the sorting bins per fraction

In Tenerife, brown containers should include biowaste, green containers for glass, blue containers for paper and cardboard and yellow containers for packaging (metal, plastic and tetra pack), and orange for UCO.

In Santander, green containers should include residual/mixed waste, green containers (igloo type) should include glass, blue containers for paper and cardboard and yellow containers for packaging (metal, plastic and tetra pack).

Objectives to achieve in terms of recycling rates

In recent years, recycling rates have remained steady at around 30% in Spain. Therefore, further measures are needed to enhance recycling, and the recently approved NWMP PEMAR (2016-2022) includes measures to improve recycling levels.

In order to meet the recycling target of the Waste Framework Directive, Spain has to increase its recycling rate with 17 percentage points by 2020, corresponding to 2.9 percentage points per year. This means that Spain needs to speed up its efforts to increase recycling.

The national Law 22/2011, of 28th July, on waste and contaminated soils, defines the objective of – by 2020 – recycling at least 50% (in weight) of domestic and commercial waste including paper, glass, plastic, biowaste and other recyclables. Regarding packaging materials, the targets for recycling rates to reach in 2020 are the following: total (70%), paper (85%), glass (75%), metals (70:70%) (Aluminium: steel), plastic (40%), and wood (60%).

For instance, the municipality of Puerto de la Cruz (Tenerife) has started a new initiative to increase the recycling rate of the city, which currently represents 14%. The "Plan 70/20: el Puerto Recicla" aims at increasing the selective collection of the different waste fractions so that the municipality could reach a recycling rate of up to 70% by 2020.

According to the Waste Plan for the Autonomous Community of Cantabria (2017-2023) the recycling rate in the region is 40.6% (considering only curbside collection). The objective is to increase this figure up to 50% by 2020.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	The NWMP (PEMAR 2016–2022) includes targets on the separate collection of certain waste materials in order to reach the objectives for recycling (including biowaste). Moreover, the Ministry of Agriculture has established subsidies to enhance separate collection of biowaste. At regional level, the PTEOR encourages the separation at source and it considers the implementation of specific containers for biowaste. In Tenerife, this measure could be gradually implemented if specific staff training is provided and a bring bank system is established.	In many regions and municipalities, biowaste must be disposed together with the mixed/residual fraction and so it is difficult to separately manage it. The municipal waste collection system might need to be adapted to biowaste collection.
10	Waste sorting in hotel rooms	According to Law 22/2011, municipal authorities are responsible for the management of municipal waste from	

		businesses, offices and services; including separate collection and transport of MSW. Therefore, hotels should also comply with municipal ordinances on waste sorting and disposal.	
11	Recycling advisors for tourist establishments		Due to financial reasons, it might be difficult to implement such measure.
12	Sorting bins in public and touristic places	Municipal authorities are responsible for the management of municipal waste, considering businesses, offices and services; including separate collection and transport of MSW. The establishment of sorting bins in public and touristic places is already in place in the municipality of Santander. In Tenerife, it is also possible to be implemented although it is essential to count on the support from local and regional governments and collection/recycling schemes.	In Tenerife, aesthetics, accessibility, etc. aspects must be also considered to homogenize infrastructure, maintenance, etc. and also provide information signs (in several languages for instance).
14	Waste sorting instructions in foreign languages	At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to raising awareness amongst the population in waste generation and its correct management. Therefore, there would not be a problem to implement such measure in the municipality of Santander. The Territorial Master Plan for Waste (PTEOR) in Tenerife also establishes different strategies to maximize the selective collection of waste and recycling.	
15	Waste sorting in marinas	Although not targeting specifically marinas, Law 22/2011 includes the development of awareness raising campaigns, and the provision of economic and decision-making support, as well as other type of incentives.	
16	Information on waste sorting for cruise ships	Although not targeting specifically cruise ships, Law 22/2011 includes the development of awareness raising campaigns, and the provision of economic and decision-making support, as well as other type of incentives.	
21	WasteApp	Not specified.	

Italian regulatory framework

National policies on sorting into different fractions and recycling

The first Italian law introducing the concept of integrated waste management is the Ronchi Decree (Legislative Decree 22/97). This law has been further improved in the TU (Testo Unico) 152/2006 Part Four and subsequent amendments and Legislative Decree 205/2010.

Article 179 TU sets out the criteria for waste management, namely the Waste Hierarchy, which provides the main and priority role in prevention, reuse, and after in the recycling, recovery of other types (energy) and only as a last stage final disposal (landfill).

Article 181 defines that the municipalities must collect separated waste and from 2015 must collect at least paper, metal, plastic and glass, and where possible wood. The municipal waste regulation describes fractions to be sorted in households and businesses and the waste collection system used.

The municipal waste tax regulation of the municipality of Florence provides:

- a discount for non-domestic users certified by EMAS and/or ISO 14001, if they implement waste prevention actions;
- a discount for non-domestic users that ensure, in agreement with the public waste manager, own spaces dedicated to separate collection.

Sorting and recycling through the EPR schemes

For packaging waste, Italy applies Extended Producer Responsibility (EPR) by means of the national organisation CONAI. Different consortia have been established for paper, glass, plastic, etc. The system covers a large part of the recycling in Italy, achieving increased volumes of recycled packaging every year.

Objectives to achieve in terms of recycling rates

Municipal waste generation has been decreasing in the last years in Italy, reaching 487 kg/y/inhab. In 2015, a value which is slightly above the EU average (476 kg/y/inhab.). In 2015 separated collection of municipal waste, including composting and material recycling, accounted for 47.2%, although there are large differences between regions: e.g. 46.1% in Tuscany and 12.8% in Sicily.

InItaly the TU (TestoUnico) 152/2006 Part Four sets the target of 65% of municipal waste collected in a separated way to be reached by 2012.
The Tuscany waste management plan (D.C.R.T 18 November 2014, n. 94) forecasts to achieve 70% of waste collected in a separated way and 60% of effective recycling rate by 2020.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	The ambitious target set at national level (65% of separated collection by 2012) has not been reached by the majority of municipalities. So it would be a priority for cities to concentrate resources and efforts in	

		the selective collection of the most important fractions of waste, such asbiowaste from restaurants and hotels.	
10	Waste sorting in hotel rooms	The municipal waste tax regulation of the municipality of Florence provides a discount for non-domestic users that ensure, in agreement with the public waste manager, own spaces dedicated to separate collection.	
11	Recycling advisors for tourist establishments		
12	Sorting bins in public and touristic places		The placement of bins in the historical center needs to be approved by the cultural heritage's authority.
14	Waste sorting instructions in foreign languages	The ambitious target set at national level (65% of separated collection by 2012) has not been reached by the majority of municipalities. So it would be a priority for cities to concentrate resources and efforts in the selective collection of the most important fractions of waste, such as waste produced by tourists in their accommodation.	
15	Waste sorting in marinas		
16	Information on waste sorting for cruise ships		
21	WasteApp		

Danish regulatory framework

National policies on sorting into different fractions and recycling

The national legislation for waste handling (BEK no. 1309, 18/12/2012) describes that municipalities shall develop municipal waste regulation. Along the regulation a 12 year plan for handling of waste shall be made. This can be revised every six years. The municipal waste management plan shall contain:

1) A mapping part describing the status of the waste management in the municipality;

2) A target part, outlining the municipality's overall objectives for the waste management;

3) A planning part with special focus on planning the first 6 years of the planning period.

Two different regulations describe how the waste in Copenhagen shall be handled. This is due to different schemes for household and business waste. The waste management system is different from each municipality in Denmark, unless the municipalities have tendered the waste management, this could lead to equal management systems in municipalities serviced by the same waste management company.

Waste fractions collected from households:

- Residual waste
- Paper
- Cardboard
- Glass packaging
- Metal packaging
- Plastic packaging
- Waste electrical and electronic equipment (WEEE)
- Portable batteries and accumulators
- Hazardous waste.

On demand or frequently collected:

- Bulky waste
- Garden waste.

Waste fractions to be handled by private collectors from businesses:

- Residual waste
- Paper
- Cardboard
- Hard plastic
- Plastic films
- Glass
- Garden waste
- Used cooking oil
- Organic waste/food waste
- Hazardous waste
- Metals
- Waste electrical and electronic equipment (WEEE).

Households should go to the recycling centers with other waste fractions.

Some types of waste fractions should in some cases be sorted further depending on the requirements of the plant receiving and processing the waste.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690452

Objectives to achieve in terms of recycling rates

The recycling target for household waste in The City of Copenhagen is 45% by 2018.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	This measure has alredy been implemented.	Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always to high to prioritise such initiatives.
10	Waste sorting in hotel rooms	This measure has alredy been implemented in some hotels.	None
11	Recycling advisors for tourist establishments	This measure has alredy been implemented.	None
12	Sorting bins in public and touristic places	This measure has alredy been implemented as tests.	None
14	Waste sorting instructions in foreign languages	This measure has alredy been implemented but needs further spreading and distribution.	None
15	Waste sorting in marinas	This measure has alredy been implemented.	None
16	Information on waste sorting for cruise ships	This measure has alredy been implemented.	None
21	WasteApp	This measure is possible to implement.	None

Portuguese regulatory framework

National policies on sorting into different fractions and recycling

Those Portuguese national laws are the ones stipulating to implement separate collection:

- Decree Law nº 178/2006 of 5 September 2006 (Decreto-Lei n.º 178/2006, de 5 de Setembro) of waste prevention, generation and management);
- Decree Law nº 73/2011 of 17 June 2011 (Decreto-Lei n.º 73/2011, de 17 de Junho) transposition of the WFD and amendment to Law Decree nº 178/2006.

The strategy for the implementation of separate collection systems is established in the National Waste Management Plan (2014-2020) (PNGR) and in the Strategic Plan for Municipal Waste (2014-2020) (PERSU), which sets out specific guidelines and objectives for the management of municipal solid waste. Generally, these plans are consistent with the guidelines of the EU Waste Framework Directive.

In Portugal, around 95% of the households are covered by bring point systems. Approximately, 67% of all bring points are for mixed waste only, while 28% have three additional separate collection bins for recyclables (paper, glass and plastic & metal packaging) in addition to the mixed waste bin. Door-to-door collection is not common in Portugal, and in this case mainly residual waste is collected.

The collection system in Portugal is applied throughout the country for all rural and urban areas. However, the specific type of collection system may vary even within a given municipality and depends on the technical solutions implemented in each municipality. According to PERSU, municipalities are responsible for collection of the urban waste.

Stakeholders (whether municipalities or Urban Waste Management Systems or the green dot company), had already defined their powers and duties, in specific legislation, supported by the DL 73/2011 (in the case of the packaging DL 366-A/97, republished by DL 48/2015, transposing the 94/62/CE Directive). Also, the existing planning instruments reinforce and detail the legal provisions.

Some of the larger cities in Portugal have increased door-to-door collection but the national authorities currently impose no obligations on municipalities to introduce door-to-door separate collection schemes. Door-to-door collection could be one tool for aiming at higher recycling rates. For household waste, waste collection is legally assigned to municipalities. However, contracts can be made individually.

The Strategic Plan for Municipal Waste (2014-2020) (PERSU) (legal framework governing waste management) has been consolidated over the last few years, with systems for managing specific waste flows, and placing the focus on producers to follow targets for prevention, separate collection, recycling and other forms of recovery. Moreover, the plan puts forward the possibility of increasing the landfill tax as well as establishing pilot projects for pay-as-you-throw systems. It also defines four national targets, two corresponding directly to the EU Directive targets of 50 % recycling, and landfilling of biodegradable municipal waste (BMW), one relating to waste prevention and another one for packaging recycling

In Lisbon, the Municipal Waste Management Plan includes a strategic line (2015-2020) for waste recycling and quality improvement. The municipality of Lisbon is responsible for waste collection and it includes waste produced by households and by so-called similar establishments like schools, offices, public institutions, tourist establishments like hotels, and businesses more in general with a maximum production of 1,100 litres a day. Door-to-door collection of both glass and food waste is only available for businesses. For glass, households use the bring-to collection points, civic amenity sites and underground containers. Schemes for door-to-door

collection are applied in large urban centers of Lisbon based on scale economies and routes management options.

Fractions that have to be sorted

In Portugal, since 1997, there is a green dot company that cautions the extended producer responsibility for packaging and packaging waste. At the time of the implementation of the Waste Framework Directive, Portugal had already implemented (all over the country) a selective collection network, for packaging and non- packaging waste, which includes paper, plastic and metal, and glass.

Homogenizing colours of the sorting bins per fraction

In Portugal, the bins are yellow for metal and packages; blue for paper and cardboard; green for glass; brown for biowaste; and grey for residual waste. It should be noted that the colours, rules and signs of selective waste disposal were determined by the "*Sociedade Ponto Verde"*, which is the Regulator of packaging flow in Portugal.

Sorting and recycling through the EPR schemes

Legal instruments mentioned in the Plano Estratégico para os Resíduos Urbanos (PERSU) 2020 (2014-2020) (*Strategic Plan for Municipal Waste*) include EPR with regard to packaging waste, WEEE and batteries.

Objectives to achieve in terms of recycling rates

The 2012 municipal solid waste annual production in Portugal was approximately 454 kg per inhabitant and therefore below the EU average. The MSW separate collection rate improved by 280% from 2002 to 2012; reaching in 2012 the value of 26% in separate collection *(PERSU 2020)*.

The main target of the PERSU 2020 is to achieve a general municipal solid waste (MSW) reduction of 10% per inhabitant by 2020 compared to 1995 and to adopt measures to attain the targets for recycling and preparing for re-use: to achieve a recycling rate of 50% of MSW from separate collection of glass, metal, plastics, paper, wood and biowaste, and to reduce biodegradable waste in landfills by 35%.

Regarding packaging waste, the PERSU 2020 establishes the following target: the recycling of at least 70% by weight of packaging waste shall be guaranteed at national level by 31 December 2020.

Furthermore, an annual separate collection rate of 47 kg per inhabitant is the target for 2020 *(PERSU 2020).*

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	In Lisbon, door-to-door collection of biowaste is already available for big producers (restaurants, canteens, markets and hotels). The plan (PERSU 2020) puts forward the possibility of increasing the landfill tax as well as establishing pilot projects for pay-as-you-throw systems. The plan (PERSU 2020) defines four national targets, two corresponding directly to the EU Directive targets of 50% recycling, and landfilling of municipal biowaste, one relating to waste	PERSU 2020 identifies separate collection as a weak area in municipal waste management. In Portugal, the specific type of collection system may vary even within a given municipality and depends on the technical solutions implemented in each municipality.

		prevention and another one for packaging recycling. Within the plan the construction of four or five more organic recycling units is expected. This could have a strong effect on recycling figures once the new plants become fully operational. The MBT plants also play a key role for the country to meet its municipal biowaste landfill diversion targets.	In Ponta Delgada there is no legal framework for the collection of biowaste.
10	Waste sorting in hotel rooms	PERSU enhanced sanctions for lack of compliance on waste management. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive targets of 50% recycling. Neya hotel in Lisbon is already doing it.	PERSU 2020 identifies separate collection as a weak area in municipal waste management.
11	Recycling advisors for tourist establishments	PERSU enhanced sanctions for lack of compliance on waste management. PERSU 2020: The plan puts forward the possibility of increasing the landfill tax as well as establishing pilot projects for pay-as-you-throw systems. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive targets of 50% recycling, and landfilling of municipal biowaste, one relating to waste prevention and another one for packaging recycling. The communication materials are bilingual whenever directed to entities that serve foreign population.	Not specified
12	Sorting bins in public and touristic places	PERSU: enhanced sanctions for lack of compliance on waste management. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive targets of 50% recycling, and landfilling of municipal biowaste, one relating to waste prevention and another one for packaging recycling.	PERSU 2020 identifies separate collection as a weak area in municipal waste management.

14	Waste sorting instructions in foreign languages	PERSU: enhanced sanctions for lack of compliance on waste management. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling. The communication materials on waste separation in Lisbon are bilingual, when the presence of a foreign population in the target population to be reached by communication actions is identified. The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
15	Waste sorting in marinas	PERSU: enhanced sanctions for lack of compliance on waste management. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling.	Not specified
16	Information on waste sorting for cruise ships	PERSU: enhanced sanctions for lack of compliance on waste management. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling. The Environmental Departments promote training courses and environmental education actions on waste prevention and management.	Not specified
21	WasteApp	PERSU 2020 defines four national targets, two corresponding directly to the EU Directive target of 50% recycling, and landfilling of municipal biowaste, one relating to waste prevention and another one for packaging recycling. In Ponta Delgada, there is an interest to connect an existing App "Eco-Island" to the WasteApp.	PERSU 2020 identifies separate collection as a weak area in municipal waste management.

Croatian regulatory framework

National policies on sorting into different fractions and recycling

The governing legislation for the waste management in Croatia is the following:

- Act on Sustainable Waste Management (Official Gazette No 94/13)
- Waste Management Plan in the Republic of Croatia for the period 2017-2022 (Official Gazette No 03/17)

According to the Act on Sustainable Waste Management (OG No. 94/13, 73/17), the waste management plan of a local self-government unit shall include general measures for the management of waste, hazardous waste and special categories of waste.

The law also encourages separate collection of biowaste in order to be used in composting, anaerobic digestion and incineration with energy recovery.

The Republic of Croatia has transposed the EU acquis in waste management sector, where Act on Sustainable Waste Management is completely in alignment with the Framework Directive on Waste 2008/98/EC. In this Act, separate collection is defined as a collection of waste in a way that a waste fraction is kept separate by type and nature to facilitate treatment and preserve the valuable properties of waste.

In addition, Republic of Croatia must take measures via its competent authorities to ensure separate collection of the following types of waste: paper; plastics; metals; glass; electric and electronic waste; waste batteries and accumulators; end-of-life vehicles; end-of-life tyres; waste oils; textile and footwear waste and medical waste. Obligation for separate collection of biowaste (food waste) is not part of the Act. The local self-government unit is obliged to fulfil separate collection of difficult waste by ensuring:

- the operation of at least one recycling yard or a mobile unit in its area;
- the installation of an adequate number and type of containers on public surfaces for the separate collection of difficult waste, paper waste, metal, glass, plastic and textile, which are not covered by the special waste management system;
- that households are notified of the location and changes of the location of recycling yards, mobile units or containers for separate collection of difficult waste, paper waste, metal, glass, plastic and textile;
- the transportation of bulky municipal waste on user's request.

Objectives to achieve in terms of recycling rates

Several categories of waste are collected separately, albeit in relatively small quantities, in the scope of treatment - recovery of waste. This waste is recycled or treated in a number of ways. Separate collection of waste was initiated in the second half of 1980s and is today operated through a dozen of recycling yards and some 10,000 street containers for paper waste, cardboard, glass, PET, tin cans, etc. About 4.5% of municipal waste from households was collected separately and recycled in 2004. The separate collection of other categories of waste is operated by various establishments and industrial operators. Significant capacities are currently in place for the recycling of separately collected waste, but are unfortunately not sufficiently used:

- Glass: Although total capacities available in the manufacture and treatment of glass amount to 140,000 t/year, only about 30,000 t/year (about 21%) are used for separately collected glass;
- Paper and cardboard: Although total capacities available in the manufacture and treatment of paper and cardboard amount to 320,000 t./year, only about 110,000 t./year (about 33%) are used for separately collected paper and cardboard.

The separately collected municipal waste consisted mainly of bulky waste (38%), organic waste (20%), and paper (8%) in 2010 (CEA, 2012a). The amount of separately collected fractions of municipal waste is continually growing; in 2010 it accounted for 14% (227,651 tonnes). However only part of this quantity ends up being recovered while the rest is landfilled.

According to Eurostat data, the level of organic recycling is very low, only 1% or 13,000 tonnes in 2010 and 12,487 tonnes in 2009. The material recycling (packaging, paper, cardboard, etc.) is also low and was only 3% or 53,000 tonnes in 2010.

Croatia has introduced a producer responsibility scheme on packaging waste. The importers and producers of packed goods have to pay a fee to the Environmental Protection Programmes and Energy Efficiency Fund (EPEEF). The EPEEF compensates municipalities and regions for expenses to collection, treatment or recovery for packaging waste (ETC/SCP, 2011; CEA, 2011a). In 2010, the collection of packaging waste added up to 187,631 tonnes. The main part was paper and cardboard (124,476 tonnes) followed by glass (37,148 tonnes) and plastic (24,127 tonnes) (CEA, 2012a). A part of the collected packaging is collected in the business and service sector.

The national waste management strategy in 2007 sets a target of 18% for separate collected and recycled municipal waste in 2020 and 25% in 2025. Total recycling significantly increased between 2007 and 2014, from 3.1% in 2007 to 16.5% in 2014, but is still very far from the EU average (EU-28: 43.4% in 2014). The best recycling rate is on material recycling (14.4% in 2014) while composting and digestion are negligible: 2% in 2014 compared to 15.8% in EU-28. However, Croatia needs to follow the EU Waste Framework Directive which forecasts a 50% recycling target for household waste to be fulfilled by 2020. The fulfilment of the 50% recycling target by 2020 would require extraordinary efforts in Croatia. It would require an increase of the MSW recycling rate of at least 4.6 percentage points per year from 2010 to 2020.

By 1 January 2020 the Republic of Croatia shall take measures via its competent authorities to ensure the preparation for reuse and recycling of the following waste materials: paper, metal, plastic and glass from households and other sources, if possible, when such waste fractions are similar to household waste, which shall account for a minimum of 50% of the waste mass. By 1 January 2020 the Republic of Croatia shall take measures via its competent authorities to ensure the preparation for reuse, recycling and other material recovery of non-hazardous construction waste, including the backfilling and spreading of waste, when such waste is used in place.

Recycling of municipal waste is a new activity in Croatia and it takes time to get the infrastructure ready. The bottom line is that there is room for improvement of both material and organic recycling.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels		
10	Waste sorting in hotel rooms		
11	Recycling advisors for tourist establishments		
12	Sorting bins in public and touristic places		
14	Waste sorting instructions in foreign languages		
15	Waste sorting in marinas		
16	Information on waste sorting for cruise ships		
21	WasteApp	This measure is possible to implement.	

Cypriot regulatory framework

No policy has been identified in relation to this area. However the practice is described in the previous report D2.7 – Compendium of waste management practices in pilot cities and best practices in touristic cities. There are no policies providing either an opportunity or an obstacle in relation to the measures listed below.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels		
10	Waste sorting in hotel rooms		
11	Recycling advisors for tourist establishments	Some big hotels already have.	
12	Sorting bins in public and touristic places	Those bins already exist in the central areas.	
14	Waste sorting instructions in foreign languages		
15	Waste sorting in marinas		No marina in Nicosia.
16	Information on waste sorting for cruise ships		No cruise ship in Nicosia.
21	WasteApp		Restaurants and hotels are needed to be licensed from the municipality and specifically from the technical services and to comply with the Municipal Law in order to participate.

Greek regulatory framework

National policies on sorting into different fractions and recycling

The key priority targets of the New National Waste Management Plan centre around the re-allocation of waste management to a municipal level, placing the responsibility for separation at source and recycling on the municipalities through:

- small-scale units;
- the encouragement of community participation;
- the targeting of advanced waste management techniques;

- and as an overarching principle, maintaining the public nature of waste management.

The consequences are, according to the plan, reduced costs, local communities reaping the profits from waste management through appropriate financial incentives and up to 16,000 new jobs, presumably most of those in the public sector. Alternative waste management, currently almost entirely privately-run, will also be brought under public control.

Objectives to achieve in terms of recycling rates

The New NWMP replaces the previous one for non-hazardous waste which came into force in 2004 and – among others – adopted the provisions of EU Directive 91/156/EEC5. According to the New NWMP which is supplementary to the National Waste Prevention Strategic Plan, the national policy on waste management is oriented to the following targets for 2020:

- the generation of waste per capita to be reduced drastically;
- 50% of the aggregate Municipal Solid Waste to be prepared for reuse and to be recycled through separate collection of recyclables and biowaste;
- the recovery of energy to act as a complementary treatment option when all other recovery options will have been exhausted;
- landfill to constitute only the final treatment option and to be limited to less than 30% of aggregate MSW quantities.

The New NWMP contains the following statistical data with respect to the waste management situation in 2011 (reference year) in Greece and regarding waste production:

- MSW: 5,575,000 tonnes of which:
    - 6,500 tonnes were hazardous waste;
    - 2,470,000 tonnes were biowaste;
    - 866,000 tonnes were packaging waste;
    - 1,860,000 tonnes were other recyclable materials.
- Sludge from municipal waste: 174,000 tonnes;
- Industrial waste and waste from other activities: 17,459,000 tonnes;
- Construction and demolition waste (CDW): 1,307,000 tonnes;
- Agricultural/livestock waste: 10,781,000 tonnes.

The New NWMP promotes drastically the implementation of waste separation at source, as the most appropriate means of collection. The aim for implementing separation at source was to achieve high quality recycling through the establishment of separate collection points of waste materials i.e. paper, metal, plastic and glass throughout the whole country. The above measures were taken aiming to achieve the2020 targets for:

- recycling i.e. at least 60% by weight;
- establishment of separate collection of biowaste i.e 40% by weight;
- biowaste treatment in order to produce compost which meets quality criteria so as to be able to be used further in accordance with international and/or national standards.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
5	Selective collection of biowaste from restaurants and hotels	This measure can be proposed as a new applicable measure - there are currently no specific measures applicable to restaurants and hotels.	
10	Waste sorting in hotel rooms	This measure can be proposed as a new applicable measure - there are currently no specific measures applicable to hotels.	
11	Recycling advisors for tourist establishments	This measure can be proposed as a new applicable measure - there are currently no specific measures applicable for advising tourists regarding waste management. Besides, the NWPSP proposes actions for informing the public (through seminars, workshops, distribution of information leaflets, posts on websites and social media accounts) in relation to the prevention of generation of MSW.	
12	Sorting bins in public and touristic places	This measure could be applicable.	
14	Waste sorting instructions in foreign languages	This measure could be proposed as a new applicable measure - there are currently no specific measures applicable to translating sorting instruction in foreign languages.	
15	Waste sorting in marinas	This measure has already been implemented.	
16	Information on waste sorting for cruise ships	This measure could be proposed as a new applicable measure - there are currently no specific measures applicable to waste sorting for cruise ships other than private initiatives.	They remain private initiatives.
21	WasteApp	This measure could be proposed as a new applicable measure - there are currently no similar waste management measures.	

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Stakeholders to involve

- **Sorting into different fractions and recycling**

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Identification and engagement of relevant stakeholders and creation of networks within the municipal boundaries	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	5	• A selective collection service should be in place with the support of the local government. This service could be provided either by the municipality or by private authorized waste collectors.
			10	• Mapping of hotels within the municipal boundaries, identifying the ones that are already involved in such a policy.
			11	• Creation of a recycling advisor's team/unit.
			12	• Planning of local waste collection scheme and maintenance of existing waste infrastructures.
			14	• Identifying the main nationalities of the tourists in the concerned area to define the languages in which the instructions will be translated.
			15	• Contacting the responsible of the marina and the entity in charge of the waste collection in the marina.
			16	• Organization of awareness campaign about waste sorting on cruise ships.
			21	• Marketing of the WasteApp.

Waste management /Urban planning department of local authorities	Implementing the reuse and recycling strategies	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	5	• Regulative support to promote and encourage biowaste generators to separate organic waste and comply with the requirements of the collection service (e.g. schedule for collection, correct separation of waste at source, etc.) should be established (for instance, by reducing waste collection fees).
			10	• Organization of informative meetings with hotels and hotelier's associations to promote the implementation of waste sorting in hotel rooms. Hotels that have already implemented such a system could be invited to explain their policy and share their experience.
			11	• Monitoring of the actions implemented and results obtained.
			12	• Monitoring of waste fractions and collection.
			14	• Disseminating the instructions in multiple languages through the contacts identified.
			15	• Diagnostic of the current situation (type of waste bins in the marinas, surveys among the recreational sailors regarding their behaviour and their willingness to sort waste, etc.).
			16	• Monitoring of the collected waste fractions on cruise ships.
			21	• Monitoring of the WasteApp.
Waste management company/local authority in charge of municipal waste collection	Advising regarding regulations and improvement opportunities	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	5	• Provide the restaurants/hotels with a map that registers all the areas served by a door-to-door selective biowaste collection service (with specific schedules) and the biowaste bring banks in order to help them accessing the

				system.
			10	• Realisation of communication campaigns to engage more participants.
			11	• Identification and mapping of businesses.
			12	• Identifying the most relevant areas for the implementation of the sorting bins, and the most relevant waste fractions to collect.
			14	• Creating a multi-languages communication campaign on sorting waste within the touristic areas, the airports, the train stations, etc.
			15	• Launch of a communication campaign and distribution of the bags and waste instructions leaflets during the touristic season in the marina.
			16	• Analysis of the collected data about waste collection on cruise ships.
			21	• Analysis of the collected data by the usage of the application.
Hotel and restaurant/ marina managers and staff	Implemetation of activities and measures	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	5	• Staff should be asked and interviewed for their input and assistance on what and how things can be done in the selective biowaste collection practices of the hotel.
			10	• Distribution of individual small-sized bins adapted to separate different fractions in every room.
			11	• Appointing of responsible person within the establishment as coordinator of actions to be implemented and main point of contact with the recycling

				advisor.
			12	• Implementing a pilot test in relevant areas.
			14	• Identifying the main nationalities of the tourists in the concerned area to define the languages in which the instructions will be translated.
			15	• Conducting surveys among the recreational sailors regarding their behaviour and their willingness to sort waste, etc.
			16	• Engage cruise ships in awareness campaigns and waste collection processes.
			21	• Implementation of the WasteApp functions and providing information.
Suppliers	In order to implement some of the measures, certain partners are needed.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	5	• Careful design of the required tools (i.e. containers).
			10	• Providing quality products.
			11	• Measure participation and monitor the quantity of products reused.
Assossiations (tourism, hotels, marinas, etc.)	Informing members on the sorting and recycling opportunities and achievements.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	5	• Awareness activities and training of new biowaste collection and treatment processes among members.
			10	• Organization of informative meetings with hotels to promote the implementation of waste sorting in hotel rooms. Hotels that have already implemented such a system could be invited to explain their policy and share their experience.
			11	• Engaging recycling advisors. Providing information and organizing commnication and networking opportunities.

			12	• Providing information about the location of the waste sorting bins. Organizing awareness campaigns.
			14	• Disseminating the instructions in multiple languages through the members.
			15	• Creating a map with all the marinas participating in such initiative and provide it to the recreational sailors.
			16	• Promoting waste sorting on cruise ships.
			21	• Promoting the use of the WasteApp among the members.

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3.5 Biowaste and food waste

Regulatory frameworks

European regulatory framework

The key EU regulations on biowaste are the Landfill Directive (1999/31/EC) and the Waste Framework Directive (2008/98/EC). The Landfill Directive Article 5(2) sets down three targets for the diversion of biodegradable municipal waste from landfills and bans the landfilling of certain waste streams. The last target for the diversion of biodegradable municipal waste from landfills has to be met by the Member States by 16 July 2016. Pursuant to Article 5(2), it shall be reexamined by 16 July 2014 with a view to confirming or amending it in order to ensure a high level of environmental protection and in light of the practical experience gained by Member States in the pursuance of the two previous targets. The amendments brought into the Waste Framework Directive further put pressure on Member States: "Member States shall ensure the separate collection of biowaste where technically, environmentally and economically practicable and appropriate to ensure the relevant quality standards for compost and to attain the targets set out in Article 11(2)(a), (c) and (d) and 11(3)". The same amendment lays down a set of envisaged and desirable treatment options. The Landfill Directive (1999/31/EC) obliges Member States to reduce the amount of biodegradable municipal waste that they landfill to 35% of 1995 levels by 2016 (for some countries by 2020) which will significantly reduce this problem. Animal by-products (ABPs) are materials of animal origin that people do not consume. The ABP regulation is another legislative document (EC 1069/2009) which regulates waste of organic origin. This Regulation concerns kitchen waste, regarded as ABP3 which entails specific requirements for collection (cleaning of container and trucks) and treatment (unit with a sanitary agreement in terms of food waste). It's the Article 10 which describes what fall under the Category 3 while Article 14 describes the treatment options for this type of waste. In terms of food waste, Member States should take measures to promote prevention of food waste in line with the 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly on 25 September 2015, and in particular its target of halving food waste by 2030. These measures should aim to prevent food waste in primary production, in processing and manufacturing, in retail and other distribution of food, in restaurants and food services as well as in households. Having regard to the environmental and economic benefits of preventing food waste, Member States should establish specific food waste prevention measures and should measure progress in food waste reduction. The Sustainable Development Goals (SDG), adopted in September 2015, including a target to halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	This measure can prevent food waste generation.	It would work in case of visitors who are staying for more days, rather than city breakers and short-term tourists.

2	Food prevention at buffets and restaurants	This measure can prevent food waste generation.	The collection frequency has to be on a daily basis due to large quantities which cannot be stored or the establishment does not have storage capacities.
3	On-site composting in tourist establishments	This measure contributes to the reduction of biowaste going to landfills.	Capacity issues and odour.
5	Selective collection of biowaste from restaurants and hotels	This measure contributes to the reduction of biowaste going to landfills.	WFD foresees a ban on landfilling selectively collected waste.
20	Food tracking device	This measure can prevent food waste generation.	It would work in case of visitors who are staying for more days, rather than city breakers and short-term tourists. It might be more applicable to restaurants and food providers.
22	Food donation from restaurants and hotels to charities	This measure can prevent food waste generation.	Issues with transport, expiry dates, etc. Necessary adjustments in national laws.

French regulatory framework

National policies on food waste prevention

The article L. 541-1 of the Code of environment has been modified by the law of 17 April 2015 on energetic transition for a green growth and now specifies that the national policy on prevention and waste management is an essential lever for the transition to a circular economy. The priority is given to prevention and waste production reduction by decreasing by 10% produced household waste per inhabitant between 2010 and 2020.

To achieve those objectives, the law states that experimentations will be conducted to propose new solutions to reduce waste production. In that sense, the law precises that kitchen sinks with biowaste disposal could be part of those experimentations.

Besides, the same law recommends increasing the recycled waste amounts, especially for the biowaste fraction, by defining specific objectives: 55% in 2020 and 65% in 2025 of non-hazardous waste to be recycled. To achieve those objectives, the law prescribes the local authorities in charge of waste management to develop biowaste selective collection at source to any kind of producers by 2025. To do so, the law encourages those local authorities to define technical solutions for on-site composting units adapted to their own territory. This law also specifies that local authorities will have to implement an incitative tax system for waste management in order to convince people to produce less waste.

Regulations regarding the donation of edible food to charities

The French law n°2016-138 of 11 February 2016 relative to avoiding food wastage specifies in its article L. 541-15-4 that fighting food wastage implies making all the concerned actors aware of their responsibilities and

involving them all: producers, transformers and distributors, consumers and associations. Actions to fight food wastage are described by the law with those priorities:

1° Food wastage prevention;

2° Using unsold goods that can be eaten by humans for donation and transformation;

3° Valorising those waste through animal feeding;

4° Using those biowaste for composting with the farmers, or producing energy through anaerobic digestion.

Fighting food wastage combines awareness campaigns and training sessions for all the concerned actors, mobilising all the stakeholders at the local scale and awareness campaigns for the consumers, in particular through the local prevention plans.

The article L. 541-15-5 states that food sector distributors have to guarantee their food goods commercialisation or their valorisation according the waste treatment hierarchy defined through the article L. 541-15-4. Taking the sanitary rules on food goods into account, they cannot transform deliberately their unsold food goods into inedible goods or avoid their valorisation in another way described in article L. 541-15-4. A food goods distributor that would transform unsold goods into inedible goods would receive a fine of 3,750 € and could be obliged to make the judgment public.

This law specifies that there is no contractual stipulation that could avoid the donation of food goods sold under a distributor brand by a food sector operator to an authorised caritative association whenever they have signed an agreement to do so.

The article L. 541-15-6 stipulates that maximum a year after the promulgation of the law n° 2016-138 of 11 February 2016 on food wastage, or maximum a year after their opening or the day their surface exceeds 400m², all the food goods shops with a surface that is over 400m² will have to propose to one or several associations for signing an agreement specifying how they can receive for free those food goods.

In order to accompany unsold food goods donation, the services of several ministries in collaboration with large retailers and the biggest associations dealing with food donation have written an agreement template that clarifies everyone's responsibilities in order to guarantee donation efficiency, sanitary security and food quality. This agreement also specifies the means the distributors have to employ to benefit from the fiscal reduction related to donation.

Regulations regarding the right for restaurants to make doggy bags

The law of 17 April 2015 on energetic transition for a green growth does not oblige the restaurants to make doggy bags. However, this measure can be a response to the article L. 541-15-4 of the law n°2016-138 of 11 February 2016 relative to avoiding food wastage through the point "1° Food wastage prevention" that is the first priority defined to fight food wastage.

Legislation on biowaste nature

Under the legislation, biowaste are defined as any non-hazardous biodegradable waste like garden waste or kitchen and food waste. Any kitchen and food waste, with an animal or vegetal origin, has to be ordered as an animal by-product (ABP) if it is treated through valorising processes. Animal by-products are defined by the European specific sanitary regulation (CE) n°1069/2009 on the 21 October 2009. Animal by-products are separated into three categories according to their potential risk for public health. They are presented in the table below:

Animal by-product	Category 1	Category 2	Category 3
Characteristics	Important risk for public health	Intermediate risk for public health	No risk for public health
Examples	Infected animals, animals from zoos and experimentations, pets	Dead farmed animals not intended for consumption, unsold putrefied food	Unsold food, ABP from slaughtering or livestock

If no animal by-products (ex: plants) are in contact or in the same room as animal by-products belonging to the category 3 (ABP3), they can be contaminated and are considered as ABP3. Both food waste from households and from restaurants and catering services are considered as waste containing animal by-products of category 3, thus the regulations on ABP3 apply.

The Ministerial circular of 10 January 2012 provides details on the implementation of biowaste handling. It states that while packaged biowaste is included in the scope of the legislation (and can be handled by being sent to deconditioning units), animal by-products belonging to categories 1 and 2 are excluded from the obligation of an organic recovery, as well as biowaste including raw meat and fish, liquid biowaste excluding cooking oils, and ligneous waste. Sludge, slaughterhouse waste and agricultural waste are also excluded from the scope of the obligation of the organic recovery.Thus, only ABP3 and certain types of ABP2 can be collected separately in order to be treated through valorising treatment processes: energy recovery and/or compost.

Legislation on household biowaste selective collection

The article L. 541-1 of the Code of environment is modified by the French national law n°2015-992 of 17 April 2015 on energetic transition for a green growth that expects the generalisation of biowaste selective collection at source for any kind of producers to be implemented by 2025. The local authorities in charge of waste collection have then to define technical solutions and specific schedules for implementing appropriate local composting units or biowaste selective collections on their own territory. The generalisation of biowaste selective collection at source by orienting this waste into quality organic recycling facilities makes irrelevant the construction of new mechanical biological waste treatment plants for residual waste. Thus, those installations should not be subsidised by the state anymore.

Biowaste selective collection at source can be operated on-site by using individual or collective composting units or can be managed collectively after being collected through door-to-door or voluntary systems. Currently, in France, we estimate the biowaste production around 18 million tonnes a year with:

- 6 million tonnes (mainly composed of garden green waste) managed directly at-home by using composting units or by feeding animals;
- 3.8 million tonnes of garden green waste collected within the civic amenity sites;
- 1.13 million tonnes (97% of garden green waste) collected via a door-to-door system. Kitchen biowaste selective collections are not so developed so far.

Nevertheless, biowaste represent 30% of residual waste; which amounts to almost 8 million tonnes in France every year; mainly composed of kitchen biowaste. This fraction is therefore a great potential to be collected separately and a way to achieve the objectives set by the law to be reached by 2025: a recycling rate of 65% and decreasing landfilling by 50%.This is also a way to respond the EU Directive 1999/31/EC regarding the diversion

of biodegradable municipal waste from landfills and banning the landfilling of certain waste fractions. The national waste plan forecasts that collecting selectively household biowaste at source would contribute to 10% to achieve the decreasing landfilling objective and to almost 23% to recycle at least 65% of non-hazardous waste (source: Amorce, CA du 7 avril 2016, Paris).

Legislation on biowaste big producers

The French law n° 2010-788 of 22 July 2010 called law Grenelle II and codified with the article L. 541-21-1 of the Code of environment plans that all the entities producing or possessing big amounts of waste with at least 50% of their weight composed of biowaste (excluding packaging weight) will have to guarantee its selective collection at source in order to valorize the organic matters. That law has to contribute to national objectives defined through that same law Grenelle II, which are: achieving a recycling rate of 75% for the non-hazardous waste produced by economic activities (except for the construction, the agricultural and the food and beverage industry sectors); decreasing by 15% the waste amounts sent to landfill and incineration; to achieve the national objective of doubling the capacity of the biowaste recycling facilities between 2009 and 2015. The main objective of that article is to favor the soil return of the organic matter.

Households are not concerned by this article, neither are the waste treatment facilities operators. Packaged biowaste can be collected directly into their packaging. Those biowaste will have to be unpacked in an adapted facility before being valorised. For sanitary and environmental reasons some biowaste are excluded from this obligatory framework: animal by-products from categories 1 and 2, biowaste including raw pieces of meat or fish, liquid biowaste except used-cooking oils, wooden waste that will be energetically valorised.

The main impacted sectors are the collective catering and commercial catering (restaurants, supermarkets, etc.). An entity is considered as a big producer when it exceeds the defined threshold. This threshold has been decreasing gradually till 2016. At the beginning, only the big supermarkets were concerned by such a law as the thresholds were defined as follows: 120 tonnes per year in 2012 and 80 tonnes per year in 2013. Since 2016, the threshold for biowaste is 10 tonnes per year and 60 liters per year for used cooking oils. Thus, much more businesses are concerned. We estimate that the restaurants serving more than 70,000 meals a year are concerned by this threshold. Those biowaste big producers have two solutions: on-site recovery (composting or anaerobic digestion) or appointing external contractors in charge of collecting and recovering waste by sending them to compost or anaerobic digestion. In case of non-compliance, there is a penalty of 75,000 € and a term of imprisonment of two years (source: Préfecture de la Meuse, 2016).

Deadline	Biowaste threshold	Used cooking oil threshold
01/01/2012	> 120 t/yr	> 1,500 l/yr
01/01/2013	> 80 t/yr	> 600 l/yr
01/01/2014	> 40 t/yr	> 300 l/yr
01/01/2015	> 20 t/yr	> 150 l/yr
01/01/2016	> 10 t/yr	> 60 l/yr

Legislation on biowaste bins washing, collection frequency and storage

Biowaste selective collection needs to respect specific rules such as good practices regarding hygiene, but also in order not to introduce other kinds of waste that could avoid the potential organic recycling of those biowaste. ABP3 collectors need to register themselves to their own regional department of population protection.

The storage of those biowaste needs to be conducted under the best possible conditions (limited time, right temperature) in order to preserve biowaste as animal by-products of category 3 and to avoid transforming them as ABP2 that could not be organically recycled. The obligation deals with the result itself and does not concern the means themselves. Thus, the storage conditions have to guarantee the waste stability, the absence of pests (rats, cockroaches or flies for instance) and the lack of bacteria proliferation (source: Guide de bonnes pratiques concernant la gestion des biodéchets en restauration, Geco Food services, Juillet 2017).

The storage room and the biowaste bins need to be cleaned and disinfected regularly.

Collection frequency needs to be adapted to collected biowaste volume but also to storage conditions. The contract with the collecting enterprise has to guarantee the sanitary risk management: bins and vehicles maintenance, cleaning and disinfection; appropriate biowaste treatment processes; identification of treatment by-products destination, etc. That is why it is required to get signed documents for every biowaste collection. In fact, the sections 21 and 22 of the regulation (CE) n°1069/2009 introduces the concept of traceability of the ABP with the setup of an accompanying commercial document complemented by the producer at every waste removal (source: Guide de bonnes pratiques concernant la gestion des biodéchets en restauration, Geco Food services, Juillet 2017).

Legislation on biowaste treatment

There are different ways of recovering animal by-products after sterilisation and adapted treatment: animal or human feed, oleochemical, fuel, compost or anaerobic digestion. The recovering depends on the kind of animal by-product. Regarding anaerobic digestion:

- C1 cannot be sent to anaerobic digestion or compost, as imposed by EU law;
- C2 by-products of certain sub-categories can be sent to anaerobic digestion or composting plants under certain conditions through a derogation and require a pretreatment by pressure sterilisation beforehand;
- C3 can be sent to anaerobic digestion or compost after a prior pretreatment with a sterilisation process.

Animal by-product	Category 1	Category 2	Category 3
Characteristics	Important risk for public health	Intermediate risk for public health	No risk for public health
Examples	Infected animals, animals from zoos and experimentations, pets	Dead farmed animals not intended for consumption, unsold putrefied food	Unsold food, ABP from slaughtering or livestock
Is anaerobic digestion possible?	No	Yes (under certain conditions)	Yes

Is composting possible?	No	Yes (under certain conditions)	Yes

The regulation is very complex because of many possible derogations about animal by-products. For instance, some products like milk and eggs (usually regarded as a category ABP3) belonging to category 2 because of a high degree of weathering can finally be considered as an ABP3 with a derogation (source: Ministère de l'agriculture, de l'agroalimentaire et de la forêt, 2014).

Sanitary rules for animal by-products and its derived-products are set in the Decree of 8 December 2011. This sanitary regulation imposes the waste management and treatment site to obtain a specific approval to receive animal by-products from category 3. Besides, in order to avoid risks of contamination, the regulation (EU) n°142/2011 of 25 February 2011 stipulates for anaerobic digestion units or composting units that the bins, containers and vehicles that are used for the transportation of non-treated organic matters need to be cleaned and disinfected within a specific dedicated area. The location of this dedicated area has to be chosen to avoid the risk of contamination of any other treated product. Thus, this is the treatment unit's responsibility to set a dedicated process to clean and disinfect bins and vehicles that have contained ABP3.

To be sent to anaerobic digestion or composting units, biowaste considered as ABP3 has to go through a preliminary treatment which consists in pasteurization. To be treated within an anaerobic digestion unit, biowaste need to be pasteurized at 70°C during 60 minutes.

Legislation on on-site composting

So far, on-site composting requires a specific sanitary agreement for the restaurants that would like to do so. It is interesting to note that regarding the restaurant's spatial configuration, a transitional storage is not necessary as the separate biowaste can be directly thrown into the composting unit. However, the compost that is produced on site cannot be used easily as this compost is not standardised.

Legislation on anaerobic digestion

Anaerobic digestion plants are ruled by the Ministerial Decree of 22 April 2008 which sets different requirements about the type of waste that can be treated, the location of the unit and environmental pollution controls. If the digestate is converted into compost, it has to comply with the NF U 44-051 standard according to the Ministerial Decree of 21 August 2007. It means that the digestate converted into compost is still a waste and cannot be sold or given; it has to be used by those who produced it. If the digestate remains in the same state, it will be submitted to a plan for spreading.

Anaerobic digestion is developing in France and is more and more promoted at both national and regional level through:

- The National Plan for the Support of Renewable Energy (2009–2020) that wants to promote the digestion of biowaste and by-products from agriculture, households and industries. In this context, the national agency of energy and environment - the ADEME - is in charge of financial supports. The anaerobic digestion equipment can receive a maximum of 30% of the total investments. A technical support and a promotion of the digestate and energy recovered from anaerobic digestion will also be provided.
- Call for new AD projects: in September 2014, the Minister of Environment launched a call for projects for 1,500 new AD plants within the next three years. The selected projects would be eligible for a

financial support of a maximum of 30% of the total investments. This support has a ceiling of 2M€ for all the projects except for the on-farm anaerobic digestion projects whose ceiling is 1M€.

Legislation on biogas recovering

The main text concerning the different ways of recovering biogas is the decree of 15 June 2004 related to the technical requirements applicable to the pipes and transport, distribution and gas storage connecting plants. The order from 19 May 2011 sets conditions of electricity purchase produced in the plants which recover biogas. The sale of heat produced by biogas is not regulated under pieces of regulation.

The texts allowing the biomethane injection into the natural gas grid have been made public at the end of 2011: four decrees from the 21 November 2011 and four orders from the 23 November 2011 establish rules on the sale of biomethane.

Legislation on the digestate agronomic recovering

A direct spreading is possible by respecting the spreading plan procedure which considers together the characteristics of the product to spread, the receiving soil and the brought quantity which all have to satisfy a threshold. In this case the digestate is considered as waste. If the digestate is composted, it can, according to its composition, satisfy the requirements of the standard NF U 44-051 (or NF U 44-095) and be considered as an organic amendment. In this case, the digestate is considered as a product as well as any other divested or commercialized product.

Objectives in terms of organic recycling rates

The French law n°2015-992 of 17 August 2017 on energetic transition for a green growth recommends increasing non-hazardous waste amounts to be recycled, especially into organic matter, by defining the objective of 55% recycled by 2020 and 65% by 2025.

Even if there is no specific organic recycling rate defined within that law, it is well-specified that organic recycling has to contribute to achieve the global recycling rates.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	The law of 17 April 2015 on energetic transition for a green growth does not oblige the restaurants to make doggy bags. However, this measure can be a response to the article L. 541-15-4 of the law n°2016-138 of 11 February 2016 relative to avoiding food wastage through the point "1° Food wastage prevention" that is the first priority defined to fight food wastage.	

2	Food prevention at buffets and restaurants	The article L. 541-1 of the Code of environment has been modified by the law of 17 April 2015 on energetic transition for a green growth and now specifies that the national policy on prevention and waste management is an essential lever for the transition to a circular economy. It is notified that commercial activities will have to decrease their waste production. Then, there is a real opportunity to contribute to that general effort by preventing food waste at buffets and restaurants. This law shows that this is a real concern at national scale, and it might facilitate spreading a general awareness for everybody. Besides, so far, there is no obligation on results but future laws could probably fix specific objectives in terms of avoided waste amounts, and this could be a way for the restaurants to prevent such laws.	
3	On-site composting in tourist establishments	The article L. 541-1 of the Code of environment has been modified by the law of 17 April 2015 on energetic transition for a green growth and now specifies that the national policy on prevention and waste management is an essential lever for the transition to a circular economy. To do so, the law encourages those local authorities to define technical solutions for on-site composting units adapted to their own territory. Thus, some restaurants or hotels might be able to deal with their local authorities in order to be provided with on-site composting units or at least to benefit from the composting training. Besides, if the local authorities cannot provide the hotels or restaurants with on-site composting units, they might be able to provide them with awareness campaign materials such as leaflets, posters, etc. Moreover, hotels and restaurants, as big biowaste producers, should comply with the law Grenelle II and implement a specific management for their produced biowaste. On-site composting can be a response to that obligation for them.	

5	Selective collection of biowaste from restaurants and hotels	The article L. 541-21-1 of the Code of environment plans that all the entities producing or possessing big amounts of waste with at least 50% of their weight composed of biowaste (excluding packaging weight) will have to guarantee its selective collection at source in order to valorise the organic matters. Since 2016, biowaste producers considered as big producers who have to comply with this law are the ones who produce at least 10 tonnes a year. We estimate that the restaurants serving more than 70,000 meals a year are concerned by this threshold. Those waste big producers have two solutions: on-site recovery (composting or anaerobic digestion) or appointing external contractors in charge of collecting and recovering waste by sending them to compost or anaerobic digestion. In case of non-compliance, there is a penalty of 75,000 € and a term of imprisonment of two years. This will incentive legally restaurants to implement such a selective collection.	So far in France, we cannot observe concrete control policies on that obligation. That is why we can notice that few restaurants have implemented such a selective collection for the moment. In fact, that represents high additional costs for the restaurants to implement a biowaste selective collection. Besides, the sanitary regulation that orders a strict traceability of collected and treated biowaste sometimes makes this selective collection harder for restaurants.
20	Food tracking device	The article L. 541-1 of the Code of environment has been modified by the law of 17 April 2015 on energetic transition for a green growth and now specifies that the national policy on prevention and waste management is an essential lever for the transition to a circular economy. It is notified that commercial activities will have to decrease their waste production. Then, there is a real opportunity to contribute to that general effort by preventing food waste thanks the use of a food tracking device that would help restaurateurs decreasing food wastage.	
22	Food donation from restaurants and hotels to charities	The article L. 541-15-5 states that food sector distributors have to guarantee their food goods commercialisation or their valorisation according the waste treatment. Taking the sanitary rules on food goods into account, they cannot transform deliberately their unsold food goods into inedible goods or avoid their valorisation. A food goods distributor that would transform unsold goods into inedible goods would receive a fine of 3,750 € and could be obliged to make the judgment public.	

		This law specifies that there is no contractual stipulation that could avoid the donation of food goods sold under a distributor brand by a food sector operator to an authorised caritative association whenever they have signed an agreement to do so. The article L. 541-15-6 stipulates that maximum a year after the promulgation of the law n° 2016-138 of 11 February 2016 on food wastage, or maximum a year after their opening or the day their surface exceeds 400m², all the food goods shops with a surface that is over 400m² will have to propose to one or several associations for signing an agreement specifying how they can receive for free those food goods. In order to accompany unsold food goods donation, the services of several ministries in collaboration with large retailers and the biggest associations dealing with food donation have written an agreement template that clarifies everyone's responsibilities in order to guarantee donation efficiency, sanitary security and food quality. This agreement also specifies the means the distributors have to employ to benefit from the fiscal reduction related to donation.	

Spanish regulatory framework

National policies on food waste prevention

The national Law 22/2011, of 28th July, on waste and contaminated soils, incorporated the Waste Framework Directive (2008/98/EC) into the Spanish legislation and adopted all its related targets and objectives. The Law promotes (in Article 15) the development of measures to prevent generation of food waste and encourage a more responsible consumption, as well as the creation of agreements with establishments to decrease quantities of expired food, to establish certain patterns for consumers and food providers, as well as to undertake activities with canteens so as to taking advantage of leftovers of food, and to create channels to use surpluses of food through social initiatives (such as public canteens, food banks, etc.).

In addition, there is a National Strategy on Food Waste: "More food, less waste", which has established a programme to reduce food loss and waste and to maximize the value of discarded food.

At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023), which includes the strategies and objectives stated in Law 22/2011, highlights the importance of implementing the National Strategy for "More food, less waste" and the "Guidelines for food waste reduction for consumers and education centres" as well as different awareness campaigns for responsible consumption in households, schools, restaurants and hotels.

Regulations regarding the donation of edible food to charities

The national Law 22/2011, of 28th July, on waste and contaminated soils, promotes (in Article 15) the development of activities with canteens so as to taking advantage of food leftovers, and to create channels to use surpluses of food through social initiatives (such as public canteens, food banks, etc.).

Moreover, the National Strategy on Food Waste: "More food, less waste" promotes legal measures and incentives to encourage food donations to charitable bodies.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023) promotes the creation of voluntary agreements between the Administration and social entities.

Regulations regarding the right for restaurants to make doggy bags

The national Law 22/2011, of 28th July, on waste and contaminated soils, promotes (in Article 15) the development of measures to prevent generation of food waste and encourage a more responsible consumption, as well as to undertake activities with canteens so as to taking advantage of leftovers of food.

The Waste Plan for the Autonomous Community of Cantabria (2017-2023) involves the 102 municipalities in the region and it includes the strategies and objectives stated in Law 22/2011, of 28 July 2011. One of the objectives contains the development of an awareness campaign for hotels and restaurants to encourage customers to take away their food leftovers properly packaged.

Legislation on household biowaste selective collection

According to the Law 22/2011, of 28th July, on waste and contaminated soils, the selective collection of biowaste is responsibility of local administrations and authorities. Municipal authorities are responsible for the management of municipal waste from households, businesses, offices and services, including separate collection and transport of MSW. With regards to this Law, environmental authorities must promote the separate collection of biowaste to undertake composting and anaerobic digestion treatment, especially green waste, biowaste from large generators and households.

In 2015 the Ministry of Agriculture established subsidies to enhance separate collection of biowaste, for the closure of landfills, including biogas capture, and to improve civic amenity sites.

The National Waste Management Plan (PEMAR 2016–2022) includes targets on the separate collection of certain waste materials in order to reach the objectives for recycling; especially for biowaste, and there is a number of measures proposed: i) to implement the gradual and progressive separate collection of biowaste for biological treatment (aerobic and anaerobic); ii) encourage composting practices in areas where it can be easily put in practice (home composting in urban and rural areas, community composting, composting in civic amenity sites, etc.)

At regional level, the Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to maximize the valorisation of biowaste. To do so, PTEOR encourages the separation at source and it considers the implementation of a specific container for biowaste, which would allow its selective collection.

At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023), which involves the 102 municipalities in the region, includes the strategies and objectives stated in Law 22/2011. One of the objectives in the Plan relates to increasing separation at source and waste collection. The current separate waste collection system includes packaging, paper/cardboard, glass and mixed/residual waste (including biowaste).

Legislation on biowaste big producers

There is no legal obligation on biowaste big producers.

Legislation on biowaste bins washing, collection frequency and storage

According to the Law 22/2011, of 28th July, on waste and contaminated soils, the selective collection of biowaste is responsibility of local administration and authorities. Municipal authorities are responsible for the management of municipal waste from households, businesses, offices and services, including separate collection and transport of MSW.

Legislation on biowaste nature

The national Law 22/2011, of 28th July, on waste and contaminated soils, defines biowaste as biodegradable waste from gardens and parks, food waste from kitchens and households, restaurants, hotels, food providers and retailers, as well as similar waste generated in food processing plants.

Legislation on biowaste treatment

According to the EU Landfill Directive, Member States should reduce the amount of biodegradable municipal waste (BMW) sent to landfill by specified percentages by 2006 (75%), 2009 (50%) and 2016 (35%). The targets relate to the amount of BMW generated in 1995 – 11.9 million tons in Spain. By 2006, Spain had reached the Landfill Directive target for that year, and in 2009 reached that target, with 47% of BMW, relative to 1995, going to landfill.

According to the NWMP PEMAR (2016-2022), the most common treatment for separate collected biowaste in Spain is undertaken in composting and anaerobic digestion plants.

The national Law 22/2011 states that environmental authorities must promote measures for i) domestic and community composting, ii) the separate collection of biowaste to undertake composting and anaerobic digestion treatment, especially green waste, biowaste from large generators and households, and iii) the use of compost from biowaste in agriculture, gardening or regeneration of degraded land, replacing organic amendments and mineral fertilizers.

At regional level, and according to the Waste Plan for the Autonomous Community of Cantabria (2017-2023), only 25% of the biowaste generated is landfilled, which is below the maximum limit of 35% of total domestic biowaste

Objectives in terms of organic recycling rates

The national Law 22/2011, of 28th July, on waste and contaminated soils, defines the objective of – by 2020 – recycling at least 50% (weight) of domestic and commercial waste paper, glass, plastic, biowaste and other recyclables.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	There are several legal instruments promoting the use of doggy bags. The National Law 22/2011 promotes the development of measures to prevent generation of food waste and encourage a more responsible consumption, to develop agreements with establishments to establish certain patterns for	

		consumers and food providers, and to undertake activities with canteens so as to taking advantage of leftovers of food. Moreover, the National Strategy on Food Waste: "More food, less waste", also includes the promotion of measures to reduce food loss and waste. The Waste Plan for the Autonomous Community of Cantabria (2017-2023) contains the development of an awareness campaign for hotels and restaurants to encourage customers to take away their food leftovers properly packaged.	
2	Food prevention at buffets and restaurants	There are several legal instruments promoting measures to reduce food waste at buffets and restaurants. The National Law 22/2011 promotes the development of measures to prevent generation of food waste and encourage a more responsible consumption, to develop agreements with establishments to establish certain patterns for consumers and food providers, as well as to undertake activities with canteens so as to taking advantage of leftovers of food. Moreover, the National Strategy on Food Waste: "More food, less waste", includes the promotion of measures to reduce food loss and waste. The Waste Plan for the Autonomous Community of Cantabria (2017-2023) also includes the development of awareness campaigns for responsible consumption in restaurants and hotels. This could also be applied to Tenerife, where tourist establishments could benefit from advice and awareness campaigns.	
3	On-site composting in tourist establishments	Not specified for tourist establishments. However, The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies for waste prevention and minimization, promoting reuse and composting, for instance. Moreover, according to the Waste Plan for the Autonomous Community of Cantabria (2017-2023), an increase of on-site composting (domestic and community composting) is foreseen as a consequence of the current and future actions included in the Plan.	Normally, the space available in situ is reduced and a deep change of behaviour is required.
5	Selective collection of biowaste from restaurants and hotels	The National Waste Management Plan (PEMAR 2016–2022) includes targets on the separate collection of certain waste materials in order to reach the objectives for recycling (including biowaste). The Ministry of Agriculture established subsidies to enhance separate collection of biowaste.	Municipal waste collection system might need to be adapted to biowaste collection.

		At regional level, the PTEOR encourages the separation at source and it considers the implementation of specific containers for biowaste. In Tenerife, this measure could be gradually implemented if specific staff training is provided and a bring bank system is established.	
20	Food tracking device	Law 22/2011 promotes (in Article 15) the development of measures to prevent generation of food waste.	
22	Food donation from restaurants and hotels to charities	Law 22/2011 promotes the creation of channels to use surpluses of food through social initiatives (such as public canteens, food banks, etc.). The National Strategy on Food Waste: "More food, less waste" also promotes measures and incentives to encourage food donations to charitable bodies. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) promotes the creation of voluntary agreements between the Administration and social entities.	In Tenerife, there is a conflict with the sanitary regulations which do not allow donating edible leftovers.

Italian regulatory framework

National policies on food waste prevention and donation of edible food to charities

The law 155/2003 – so-called "Law of Good Samaritan" – guarantees that charity organizations distributing free food to poor people are equated to the final consumer, within the limits of the service provided.

Law n. 166/2016 pursues the aim of reducing food waste through the achievement of several goals including the enhancement of the « doggy bag » use and the recovery and the donation of food surpluses for social solidarity. This law against food waste allows food business operators to donate food surpluses to charity organizations for human consumption (to be preferred) and animal consumption. The law allows:

- Deliveries beyond the minimum storage period, provided that the packages are intact and the foodstuffs have been properly stored;
- Food surpluses can be further processed into products;
- Bakery products within twenty-four hours after their production and which do not need thermal conditioning can be donate by neighborhood stores, large-scale distribution, craft and industrial producers, organized catering, including farmhouses.

The law states that the donors must have economic incentives such as the discount on the waste fee.

Legislation on household biowaste selective collection

The legislative Decree 205/2010 (Article 182 ter) establishes that:

- To collect organic waste citizens have to use compostable bags, according to the UNI EN 13432-2002 standard;
- Regions, municipalities and local autorities, responsable to waste collection and management must develop the organic waste collection system and the diffusion of treatment plants of organic fraction.

However, for the Italian legislation, the collection of organic waste is not yet mandatory (while the collection of paper, metals, plastics and glass is compulsory), although that collection is necessary to achieve the separate collection rate targets set by law (65%).

Furthermore, the separate collection of organic waste is essential for reaching the limits for landfilling biodegradable waste, equal to 81 kg/inhab./year by 2018 (Article 5 of Legislative Decree 36/2003).

The biowaste collection is organized by the municipality and, generally, uses a door-to-door collection system or a street collection using containers. In the first case, the frequency of collection is about 2 times a week, with increases in summer season, and the bins are washed by the households. If it is foreseen a street collection system the frequency of emptying is variable. In both cases there are no national legislative recommendations.

As regards the overall collection system, organic waste can be collected and stored, for example in collection centres (if are autorized for that fraction), for a maximun time of 72 hours, then it must be sent to the teatment plant.

Legislation on biowaste treatment

In 2016, two different decrees enhancing the management of the waste organic fraction have been published. DPCM 07/03/2016 provides measures to create an adequate integrated system for the treatment of organic waste and the following decree of 29/12/2016 sets the operating-technical provisions and requirements, also for simplified authorization procedures, as regards the Italian based facilities-sites-communities that are dealing/operating/engaged in organic waste composting.

Objectives in terms of organic recycling rates

No specific recycling objectives have been set yet concerning the specific biowaste fraction.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	Law 166/2016 enhances the use of « doggy bags » by restaurants.	
2	Food prevention at buffets and restaurants		
3	On-site composting in tourist establishments		
5	Selective collection of biowaste from restaurants and hotels	Legislative Decree 205/2010 (Art. 182 ter) encourages the development of selective collection systems of organic fraction. DPCM 07/03/2016 and DPCM 29/12/2016 provide measures to create an adequate integrated system for the selective collection of the organic fraction produced by restaurants and hotels.	
20	Food tracking device		

22	Food donation from restaurants and hotels to charities	Law 166/2016 allows food business operators to donate food surpluses to charity organizations for human consumption (to be preferred) and animal consumption.	

Danish regulatory framework

National policies on food waste prevention and donation of edible food to charities

In 2015 a strategy was launched by the Danish Environmental Protection Agency (DEPA) following the Resource Strategy from 2013. The new strategy focused on waste prevention of specific waste fractions. One of the fractions targeted is food waste. Initiatives on preventing food waste as for example donation of surplus food shall follow the national regulation on handling and storage of food as well as other guidelines for food safety. The legislation is in line with the European legislation within this field.

Legislation on household biowaste selective collection and objectives in terms of organic recycling rates

In 2013 the Environmental Protection Agency (DEPA) launched a Resource Strategy setting the national goal of minimum 50% recycling of selected fractions from households in 2022 (biowaste, paper, cardboard, glass, wood and metal waste). The recycling goal for biowaste from the service sector is minimum 60% in 2018.

The municipalities decide for themselves which fractions to collect from households. For the industrial waste there are no special obligations, but the municipality can guide the industry on how to handle and sort their waste. Thereby there is no special legislation on bin washing, collection frequency or alike.

25,000 tonnes of biowaste per year from households and industry is the recycling goal for biowaste in City of Copenhagen. The goal is set to be met by 2018.

It should be noted that the goals mentioned are for amounts collected for recycling, since this is a measurable target. What is actually recycled after pre-treatment is not included in any target, neither at national or European level.

Legislation on biowaste treatment

Legislation describes how the waste handlers should store and handle the waste. This includes mandatory hygienisation of the waste. In Denmark, it is rare that biowaste is composted, and most municipalities send biowaste for anaerobic digestion. In this way the waste is hygienised and the gas can be used for energy purposes.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	This measure has alredy been implemented in some restaurants.	Tourists staying in hotels are not the target group for this measure. Most tourists in Copenhagen stays in hotels and thereby the measure is not relevant for Copenhagen. "Goodie"-bags are more relvant for locals or people staying in appartments.
2	Food prevention at buffets and restaurants	This measure has alredy been implemented in some restaurants.	None
3	On-site composting in tourist establishments	This measure is not possible, and most tourist establishments would prefer anaerobic digestion to produce energy.	This measure would not be relevant for tourist establishments in Copenhagen since this would lead to odours from the process and would take up space which could be used for recreational purposes.
5	Selective collection biowaste from restaurants and hotels	National goal on recycling of biowaste from businesses supports this measure.	Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always too high to prioritise such initiatives.
20	Food tracking device		Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always too high to prioritise such initiatives.
22	Food donation from restaurants and hotels to charities	This measure is possible if following the legislation on food handling, storage and safety.	It needs to comply with the sanitary rules on food donation (temperature, "best before" date, etc.). Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always to high to prioritise such initiatives.

Portuguese regulatory framework

National policies on food waste prevention

The Portuguese Decree Law nº 73/2011 from 17 June 2011 determines that the Portuguese Environmental Agency is responsible to promote measures to encourage:

- The selective collection of biowaste for composting and anaerobic digestion;
- The biowaste treatment ensuring a high level of environmental protection;
- The use of environmentally friendly materials produced from biowaste, in particular from composting.

The Strategic Plan for Municipal Waste *(*Plano Estratégico para os Resíduos Urbanos (PERSU) 2020*)* includes several awareness-raising campaigns for food waste.

Regulations regarding the donation of edible food to charities

There is a non-profit organization called "Desperdicio Zero" that have some projects in Ponta Delgada as well as in Lisbon that gather the leftovers from restaurants, hotels and also from big events, and forwards them to needy families.

Other eco-humanitarian community called "Re-food", is 100% voluntary and charitable, and works in Lisbon to eliminate food waste. This organization provides food rescued to those who need it at no cost to the beneficiaries. Maintain a low operating cost per neighborhood with a high food surrender income that involves all sectors of the community (responsible people, companies and institutions) - and do so strictly on the basis of goodwill.

Regulations regarding the right for restaurants to make doggy bags

In Lisbon some restaurants voluntarily give doggy bags when the customers ask for it.

Legislation on biowaste selective collection

The legislation mentioned before has been identified with regards to selective collection. Decree Law nº 178/2006 of 5 September 2006 (Decreto-Lei n.º 178/2006, de 5 de Setembro) of waste prevention, generation and management, has been modified by the Decree Law nº 73/2011 of 17 June 2011 (Decreto-Lei n.º 73/2011, de 17 de Junho) transposition of the WFD and amendment to Law Decree nº 178/2006.

The Portuguese Decree Law nº 73/2011 from 17 June 2011 determines that the Portuguese Environmental Agency is responsible to promote measures to encourage: a) The selective collection of biowaste for composting and anaerobic digestion; b) The biowaste treatment ensuring a high level of environmental protection; c) The use of environmentally friendly materials produced from biowaste, in particular from composting.

The Strategic Plan for Municipal Waste *(*Plano Estratégico para os Resíduos Urbanos (PERSU) also recommends biowaste selective collection.

However, the specific type of collection system in Portugal diversifies in each municipality. It depends on the technical solutions implemented. In Lisbon, for instance, door-to-door collection of food waste is only available for businesses (restaurants, canteens and hotels) and the service does not cover households yet, so citizens can put the organic waste on the residual waste bin. The food waste collections have specific routes for these producers and the final destination is anaerobic digestion. In Ponta Delgada there is no legal framework for the collection of biowaste.

In Lisbon, house composting is still not an official prevention measure, however, some single households actually do it. In Ponta Delgada and in Lisbon there is no legal framework for the collection of biowaste.

Legislation on biowaste bins washing, collection frequency and storage

Portugal's water and waste regulator (ERSAR) has determined that the frequency of each bin washing of the residual waste disposal service is assessed by a quality indicator that varies: from 0 to 4 times a year is unsatisfactory; 4 to 6 is median quality; from 6 to 24 is a good quality service.

In Lisbon, attending to local context and climate, this waste collection is performed six times a week to avoid unpleasant smells. Brown food waste bins must be locked to avoid contamination with waste from other producers.

Legislation on biowaste nature

Waste which may be subject to anaerobic or aerobic decomposition, in particular food and garden waste is eligible to be collected as biowaste.

Legislation on biowaste treatment

The main target of the Strategic Plan is to adopt measures to reduce biodegradable waste in landfills by 35%. The national strategy for the reduction of landfilled municipal solid waste (including biodegradable waste) was launched in 2004 and aims at increasing separate collection and establishing modern facilities for waste treatment. Under PERSU 2020, the construction of four or five more organic recycling units was expected. In 2010, 10 new mechanical-biological treatment (MBT) plants became operational in Portugal.

Objectives in terms of organic recycling rates

The PERSU 2020 aims at achieving a recycling rate of 50% of MSW from separate collection of glass, metal, plastics, paper, wood and biowaste.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	Food waste prevention measures are encouraged by PERSU.	Not specified
2	Food prevention at buffets and restaurants	Food waste prevention measures are encouraged by PERSU. The Environmental Department promotes in all islands of Azores training courses and environmental education actions on waste prevention and management.	Lack of guidelines defined by the Portuguese Tourism Organization for prevention practices.
3	On-site composting in tourist establishments	The use of compost is encouraged by the Decree Law nº 73/2011 from 17 June 2011.	It requires available space.
5	Selective collection of biowaste from restaurants and hotels	PERSU 2020 has guaranteed a legal framework for improved economic valorisation of compost/biogas. PERSU 2020 defines four national targets, two corresponding directly to the EU Directive targets of 50% recycling, and landfilling of BMW, one relating to waste prevention and another one for packaging recycling. In Lisbon, door-to-door collection of biowaste is already available for big producers (restaurants, canteens, markets and hotels).	It requires an area large enough to implement the biowaste bins in the kitchens. In Ponta Delgada there is no legal framework for the collection of biowaste.
20	Food tracking device	Food waste prevention measures are encouraged by PERSU 2020.	

			Lack of human resources that allows the implementation of this measure.
22	Food donation from restaurants and hotels to charities	There is a Desperdicio Zero national project that is in place in two Ponta Delgada parishes that gathers the leftovers from restaurants, hotels, big events and forwards them to needy families. The expansion of the Zero Waste movement to the cities of medium and small size would be an opportunity to develop this measure.	Not specified

Croatian legal framework

Legislation on biowaste selective collection

Obligation for separate collection of biowaste (food waste) is not part of the Act (Croatia Official Gazette No 94/13). The Croation Act on Sustainable Waste Management (Official Gazette No 94/13) defines the regulation on biowaste management as below:

(1) A person authorised for the management of biowaste under the acts adopted in pursuance of this Act and the local self-government unit shall ensure that their documents adopted in pursuance of this Act make provision for the separate collection of biowaste for the purpose of composting, digestion or the recovery of energy from such biowaste;

(2) A person performing the treatment of biowaste shall carry out its treatment in a manner which meets high environmental standards;

(3) The minister of environment shall, in cooperation with the minister of agriculture, lay down the criteria for the use of environmentally safe materials produced from biowaste in the ordinance referred to in Article 53, paragraph 3 of this Act, which regulates the management of biowaste.

According to data published by Eurostat and Croatian Agency for Environment and Nature (CAEN), coverage of population and municipalities in Croatia with an organised municipal waste collection increased from 86% in 2004 to 99% in 2014, which fulfilled the quantitative target for 2015 (90 %) set by the Waste Management Strategy of Croatia.

Legislation on biowaste treatment

The separate collection of green waste and kitchen biowaste, and their biological treatment, is a significant part of the waste management system. The separate collection of biowaste (compostable waste) is operated in Croatia only in the City of Zagreb, where it was initiated in 1995 as a pilot project covering two districts.

The organic waste is treated by no more than two composting plants (open composting plants) with the annual capacity of about 35,000 m^3 of waste, and by a new composting plant for tunnel composting. All of them are located in Zagreb.

Objectives in terms of organic recycling rates

According to Eurostat data, the level of organic recycling is very low, only 1% or 13,000 tonnes in 2010 and 12,487 tonnes in 2009.

It is planned to treat municipal waste by MBT plants and one incineration plant. The aim is to reduce landfilling to only residual waste. The City of Zagreb has planned a waste-to-energy incineration plant which should make a significant contribution, along with the planned mechanical and biological waste treatment plants, to reduce the landfilling of biodegradable waste by 2018-2020.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags		
2	Food prevention at buffets and restaurants		
3	On-site composting in tourist establishments		
5	Selective collection of biowaste from restaurants and hotels		
20	Food tracking device		
22	Food donation from restaurants and hotels to charities		

Cypriot regulatory framework

In Nicosia there are no specific policies in place regarding biowaste management. However, measures focusing on food waste reduction and recycling obviously have to be within the borders of the hygiene law of the European Union (i.e. EC852/2004). The measures also have to be kept within the border of the Catering and Entertainment Establishments' licensing that is required for all food providing establishments on Cyprus. These laws are audited by the Cyprus Tourism Organisations Quality Assurance Department and can be found on their website[1].

There are very few policies with a direct influence over the suggested measures, but there are practices in places that could provide an opportunity for certain measures. For example there are already a practice in place where used cooking oil are collected separately by private organisations. The waste collectors (cooking oil included) must be licensed from the Department of Environment for the collection and the transport of this type of waste. The cooking oil must be transferred to a licensed plant/facility for special treatment (in Cyprus or abroad). Additionally, based on the Waste Law 2011 (N.185(I)/2011) and the regulations and decrees that were issued based on the Waste Law, the plants which treat waste (in Cyprus) have to obtain a license from the Department of Environment of the Ministry of Agriculture, Rural Development and Environment. This kind of practice can provide both an obstacle since there is no solution to the problem yet, but also an opportunity if there are possibilities to optimise the practice in collaboration with the private organisations. Another example of a practice that could provide both an opportunity and an obstacle is that many restaurants are already quantifying their food waste amounts. This might create a situation where implementation of the food waste tracking device is unnecessary since the saving potential is already achieved, but it could also create necessary acceptance and engagement for a waste quantification measure.

Other practical obstacles are the fact that a high service level including a high fill rate of buffets can provide a serious obstacle of reducing food waste in restaurants. This might not be an official policy, but rather a practice with serious potential to generate food waste.

[1] http://www.visitcyprus.biz/wps/portal/b2b/!ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3hXN0fHYE8TIwMLP3MnAyPLIEPjIHMPIws3E6B8JE55_1ADSnS7GhPQHQ5yrVm8AQ7gaACRx-c6fPIg-_G5wBxdv7u3gbGBkVuwmaNvoIsR0AX6fh75uan6wak5-gW5oREGmZ5ZJo6KigAV_055/dl3/d3/L0lHSkovd0RNQU5rQUVnQSEhL1lCZncvZW4!/?changeLang=en

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags		This measure has to fulfill food safety regulations.
2	Food prevention at buffets and restaurants		Official or unofficial hotel policies related to service level or customer satisfaction can be an obstacle.
3	On-site composting in tourist establishments		All food businesses cooperate/keep a contract with private organizations which collect the used cooking oils.
5	Selective collection of biowaste from restaurants and hotels		
20	Food tracking device	Some restaurants keep records about food waste but they don't quantify it (e.g. per kg).	
22	Food donation from restaurants and hotels to charities		Restaurants / hotels are needed to be licensed from the municipality and specifically from the technical services and to comply with the Municipal Law in order to participate.

Greek regulatory framework

Regulations regarding the donation of edible food to charities

There is the right to donate edible food to charities as long as quality and health standards are met.

Regulations regarding the right for restaurants to make doggy bags

Restaurants have the right to provide doggy bags to customers in Cyprus.

Legislation on household biowaste selective collection

The National Waste Management Plan foresees the application of the separate biowaste collection. It requires funding on procuring biowaste vehicles and employing adequate staff. So far, biowaste selective collection has been implemented only on a pilot scale.

Legislation on biowaste big producers

There is no specific obligation for big biowaste producers to implement a selective collection for their biowaste in Greece.

Legislation on biowaste bins washing, collection frequency and storage

During summer time, biowaste selective collection bins have to be washed every 2-3 weeks. Those bins have to be collected every day.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
1	Doggy bags	It can be implemented more widely.	
2	Food prevention at buffets and restaurants	It can be implemented more widely.	
3	On-site composting in tourist establishments	It can be implemented.	It requires training of both owners and tourists.
5	Selective collection of biowaste from restaurants and hotels		There is no obligation to implement such a selective collection.
20	Food tracking device	It can be implemented.	
22	Food donation from restaurants and hotels to charities	It can be implemented.	Health and safety standards should be met.

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Stakeholders to involve

Biowaste regulation

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Through the preparation of local regulations affecting biowaste management	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	2	• Regulative support to encourage establishments to implement food waste prevention measures (for instance, by reducing waste collection service taxes).
			3	• Regulative support to encourage food waste generators to implement on-site composting (for instance, by reducing waste collection service taxes).
			5	• Regulative support to promote and encourage biowaste generators to separate organic waste and comply with the requirements of the collection service (e.g. schedule for collection, correct separation of waste at source, etc.) should be established (for instance, by reducing waste collection fees).
			22	• Regulative support and financial incentives to encourage restaurants, hotels, etc. to implement this measure so that donating food is more attractive than discarding it (e.g. tax reduction for food donors).
Regional agencies (Environmental and Sanitary agencies)	Advising regarding regulations on waste sanitation issues and donations.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	22	• Confirmation that identified and considered food donors/receivers meet all health and safety regulations.

Biowaste prevention

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Developing biowaste schemes for prevention.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	1	• Creation of communication tools targeting restaurants owners and general public.
			2	• Mapping of restaurants, hotels, canteens, etc. within the municipal boundaries. • Organization of informative meetings and training sessions for identified establishments. • Subscription of voluntary agreements and collaboration partnerships with participating establishments. • Realization of communication campaigns at local level to engage participants. • Creation of a network with restaurants/buffets applying food waste prevention measures. • Identification of establishments committed on food waste prevention thanks to a sticker/label recognizing it.
			3	• Development and update of a map locating all the restaurants/hotels composting biowaste on-site.
			22	• Mapping of restaurants, hotels, canteens, etc. willing to participate as potential food donors. • Mapping of food banks, charities and non-profit organizations involved in food donation activities as potential food receivers. • Organization of informative meetings and training sessions for identified establishments and charities.

				• Communication campaigns to engage restaurants/hotels.
Regional agencies (Environment, Health and Safety agencies)	Advising municipal governments on aspects of biowaste prevention schemes.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	1	• Advising on the selection of the type of boxes/doggy bags.
NGO's, charities and food banks	Mobilizing public participation. Creating partnerships between hotels/restaurants and charities or food banks.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	1	• Creation of communication tools targeting restaurants owners and general public.
Business associations (hotels, restaurants, trade associations)	Hotels and restaurants associations could inform members on implementation of biowaste reduction strategies. Traders, retailers or packaging companies, can influence on the amount of biowaste generated by re-designing products and processes.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	1	• Creation of communication tools targeting restaurants owners and general public. • Identification and involvement of restaurants (potential creation of an association of interested food providers) thanks to a specific sticker that can be sticked on the restaurant's front door so that customers can identify those restaurants as providing doggy bags. • Awareness rising of the customers on the use of doggy bags (and system for reuse, stamps and rewards).
			2	• Subscription of voluntary agreements and collaboration partnerships with participating establishments. • Realization of communication campaigns at local level to engage participants.

Tourist associations	Increasing awareness among tourists regarding food waste prevention actions (influencing in behaviour).	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	1	• Creation of communication tools targeting tourists and general public. • Awareness rising of the customers on the use of doggy bags (and system for reuse, stamps and rewards).
			2	• Realization of communication campaigns at local level to engage participants. • Identification of establishments committed on food waste prevention thanks to a sticker/label recognizing it.
Management or Environment, Health and Safety department within hotels and restaurants	Implementing food waste prevention strategies.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	1	• Selection of the type of boxes/doggy bags. • Identification and involvement of restaurants (potential creation of an association of interested food providers) thanks to a specific sticker that can be sticked on the restaurant's front door so that customers can identify those restaurants as providing doggy bags. • Equipment and training of the staff on the use of doggy bags. • Awareness rising of the customers on the use of doggy bags (and system for reuse, stamps and rewards).
			2	• Subscription of voluntary agreements and collaboration partnerships with participating establishments. • Identification of establishments committed on food waste prevention thanks to a sticker/label recognizing it. • Monitoring food waste behaviour and defining an action plan to address challenges identified. Considering type of waste generated and what can be reduced. • Communication campaign to all levels of organization regarding the actions to be undertaken.

				• Inclusion of staff in the decision-making process, asking them what can be done differently to reduce food waste. • Awareness raising of customers on food waste prevention actions through, for example, a sticker/label that indicates the organization's initiative. • Monitoring the food waste prevention action after being implemented and disseminating the results. • Appointing trusted employees to identify areas where cooperation is not taking place.
			22	• Appointment of the person to be in charge of food donations. • Monitoring and identification of potential food to be donated so as to define the scope of the action plan. • Ensuring compliance with all hygiene requirements. • Awareness rising within the hotel/restaurant and among other hotels/restaurants. • Being aware of where is the food destinated and how is it transported, to prevent spoilage. • Promote the action among clients with, for example, stickers identifying the business.
Kitchen staff	Having the knowledge/skills to make an efficient use of their resources.	Trainings, workshops	1	• Equipment and training of the staff on the use of doggy bags.

Suppliers	In order to implement some of the measures, certain materials should be purchased (boxes for doggy bags, composters, etc.).	Phone calls, meetings, online platforms, email, door-to-door communication	1	• Selection of the type of boxes/doggy bags.

Biowaste selective collection

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal Solid Waste department (if publicly managed)	Providing infrastructure for the collection of biowaste, i.e. trucks, etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.
			5	• Providing selective collection system. • Knowledge exchange with other municipalities experienced in the implementation of separate collection of biowaste. • Providing a map to restaurants/hotels locating all collection points and schedules. • Municipalities could provide free biowaste collection bins to restaurants. • Placement of larger bins accessible for MSW.
Municipal Solid Waste company (if privately managed)	Providing infrastructure for the collection of biowaste, i.e. trucks, etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.
			5	• Providing selective collection system. • Placement of larger bins accessible for MSW.
Management or Environment, Health and	Deciding on the implementation of collection system.	Interviews, meetings, workshops, webinars, online platforms, phone	3	• Appointment of a responsible person for: ◦ Coordination and promotion, preparation, implementation and assessment of the measure;

Safety department within hotels and restaurants		calls, email, polls, door-to-door communication		• Maintenance of composting bins (« green team »); • Keeping periodic meetings between coordinator and person in charge of composting. Baseline analisis of food waste generation. Placement of composting bins close to where food waste is generated. Training on how to use the composting bins/electrical composters. Awareness rising and communicating of results among staff.
			5	Appointment of a responsible person for: • Coordination and promotion, preparation, implementation and assessment of the measure; • Maintenance of composting bins (« green team »); • Keeping periodic meetings between coordinator and person in charge of separating biowaste. Placement of bins close to where food waste is generated. Placement of larger bins accessible for MSW. Awareness rising and communicating of results among staff.
			20	Acquirement of the food tracking device. Training of kitchen staff on how to use the device. Use of statistical results for the improvement in food waste reduction.
Kitchen staff	Undertaking good practices at the workplace.	Trainings, workshops, polls	3	Training on how to use the composting bins/electrical composters.

			5	• Training on how to separate correctly into the bins.
			20	• Training on how to use the food track device.
Suppliers	Providing the materials needed, i.e. bins, containers, composters, bags, etc.	Phone calls, meetings, online platforms, email, door-to-door communication	3	• Providing composting containers/electrical composters. • Providing instructions for correct use of containers.

- **Biowaste treatment**

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal Solid Waste department (if publicly managed)	Providing infrastructure, i.e. treatment plants, biogas digesters etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.
Municipal Solid Waste company (if privately managed)	Providing infrastructure, i.e. treatment plants, biogas digesters, etc.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	3	• Providing composting bins/electrical composters to interested tourist establishments and in organizing periodical controls of their correct use.
Agricultural sector	Potential users for compost.	Phone calls, meetings, online platforms, email, door-to-door communication	3	• Farmers could be interested in buying the compost generated.

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3.6 Used cooking oils

Regulatory frameworks

European regulatory framework

The European Waste Catalogue (EWC) classifies used cooking oils as municipal waste (household waste and similar commercial, industrial and institutional waste) including separately collected fractions, under the code 20.01.25 (edible oils and fats). UCO obtained from waste water treatment plants is also considered as non-hazardous materials with the different code 19.08.09 (grease and oil mixture from oil/water separation containing edible oils and fats). The UCO supply chain has not been highly regulated; a few European provisions legislate the UCO collection and recovery systems. The Waste Framework Directive 2008/98/EC classifies UCO in the category "edible oil and fat" (EWC 20.01.25). Member States have to control the companies responsible for the collection and handling or treatment of UCO. This means that all operators collecting or treating UCO must obtain a permit from their country's authorities, specifying the type and quantity of waste to be treated, any necessary technical requirements, precautions to be taken, and information to be made available at the request of the competent authority (origin, destination and treatment of waste and the type and quantity of such waste). The Animal By-Products Legislation 1774/2002 forbids the use of UCO (originating from restaurants, catering facilities and kitchens) as an ingredient in animal feed. This measure is intended to protect both animal and human health, since some toxic compounds could affect final consumers as a result of bioaccumulation. UCO may only be used to produce biodiesel and other chemical products. The EU Implementing Regulation 142/2011 defines the conditions under which UCO is a suitable starting material for biodiesel production and the process to be followed, case by case. The EU Regulation 1069/2009 lays down health rules, as regards animal by-products and derived products are not intended for human consumption, and repeals the EU Regulation 1774/2002.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	WFD foresees a ban on landfilling selectively collected waste.	Limited number of companies that collect UCO.

French regulatory framework

Regulations concerning used cooking oils composition

Used cooking oils mainly consist of cooking oils to fry food such as the big amounts used to make French fried potatoes, but also the rest of cooking oils used in frying pans to cook meat for instance. Used cooking oils produced by catering services come from traditional restaurants, caterers, butchers but also collective restaurants. Used cooking oils are biowaste and are registered as animal by-products of category 3 by the regulation. That is why those biowaste have to comply with a specific regulation.

Regulations on used cooking oils nature and selective collection

The French law n° 2010-788 of 22 July 2010 called law "Grenelle II" and codified with the article L. 541-21-1 of the Code of environment plans that all the entities producing or possessing big amounts of waste with at least 50% of their weight composed of biowaste (excluding packaging weight) will have to guarantee its selective collection at source in order to valorise the organic matters. That law has to contribute to national objectives defined through that same law Grenelle II, which are: achieving a recycling rate of 75% for the non-hazardous waste produced by economic activities (except for the construction, the agricultural and the food and beverage industry sectors); decreasing by 15% the waste amounts sent to landfill and incineration; to achieve the national objective of doubling the capacity of the biowaste recycling facilities between 2009 and 2015. The main objective of that article is to favor the soil return of the organic matter.

Households are not concerned by this article, neither are the waste treatment facilities operators. Packaged biowaste can be collected directly into their packaging. Those biowaste will have to be unpacked in an adapted facility before being valorised. For sanitary and environmental reasons some biowaste are excluded from this obligatory framework: animal by-products from categories 1 and 2, biowaste including raw pieces of meat or fish, liquid biowaste except used-cooking oils, wooden waste that will be energetically valorised.

The main impacted sectors are the collective catering and commercial catering (restaurants, supermarkets, etc.). An entity is considered as a big producer when it exceeds the defined threshold. This threshold is decreasing gradually till 2016. At the beginning, only the big supermarkets were concerned by such a law as the thresholds were defined as follows: in 2012, 120 tonnes per year of biowaste and more than 1,500 liters per year of cooking oils. Since 2016, the threshold is 10 tonnes a year of biowaste and 60 liters a year for used cooking oils. This threshold has to be considered site by site and is not considered for the total production of an enterprise that would own several establishments. With the threshold that is effective since 2016, much more businesses are concerned. We estimate that the restaurants serving more than 70,000 meals a year are concerned by this threshold. Those biowaste big producers have two solutions: on-site recovery (composting or anaerobic digestion) or appointing external contractors in charge of collecting and recovering waste by sending them to composting or anaerobic digestion plants. In case of non-compliance, there is a penalty of 75,000 € and a term of imprisonment of two years (source: Préfecture de la Meuse, 2016).

Deadline	Biowaste threshold	Used cooking oil threshold
01/01/2012	> 120 t/yr	> 1,500 l/yr
01/01/2013	> 80 t/yr	> 600 l/yr
01/01/2014	> 40 t/yr	> 300 l/yr
01/01/2015	> 20 t/yr	> 150 l/yr
01/01/2016	> 10 t/yr	> 60 l/yr

The article L. 541-2 of the Code of environment stipulates that the enterprise has the responsibility of its produced cooking oils until its elimination or recycling; even if this waste has been transferred to a third party in charge of its treatment. The producer has to be sure that the treatment of its used cooking oils will comply with the current regulation.

Regulations on collected used cooking oils storage

Used cooking oils have to be stored into isolated and identified tanks or kegs, within the waste storage room before being collected by an accredited collector. Those used cooking oils must not be sullied or diluted with other products. It is also recommended to store those tanks into a bigger container if possible in order to avoid accidental leaks of oils from the collecting kegs. However, it is not compulsory to get all this equipment as used cooking oils are not considered as hazardous waste by the regulation. Nevertheless, used cooking oils storage can be submitted to the regulation relative to classified installations for environmental protection under the sections 1510 or 2716 considering the restaurant size (source: Guide de bonnes pratiques concernant la gestion des biodéchets en restauration, Geco Food services, Juillet 2017).

Regulations on used cooking oils selective collection in terms of operational steps

So far in France, we count around 15 used cooking oils collectors with big differences in terms of quality, consistency and commercial services. Used cooking oils collection has to be managed by a specialised enterprise that has to guarantee a regular and reliable service, but also the deposit of refundable collecting containers that have been previously cleaned and that are ready to collect cooking oils in particular. When the amount of non-hazardous waste that is collected is higher than 0.5 tonne per load, the waste producer has to be sure that the contracted collector has declared its activity to the prefecture as the regulation forecasts in the article R. 541-50 of the Code of environment. The waste producer has to notify within the collection contract that used cooking oils have to be sent to appropriate units to be recycled or eliminated according to the article R. 541-49 of the Code of environment. Besides, it is compulsory for the collectors to provide the used cooking oils producers with an official document stipulating the waste collection (source: Guide de bonnes pratiques concernant la gestion des biodéchets en restauration, Geco Food services, Juillet 2017).

Regulation on used cooking oils treatment

Since used cooking oils cannot be recycled into animal feeding, the main ways to recycle them are the chemistry of fats (soap or detergent production) or the energetic valorisation (biofuel, boiler fuel, or even biogas). However, a direct use of used cooking oils as biofuel is not authorised by the regulation in France. Implementing the selective collection of those used cooking oils is necessary in order to avoid throwing them into: sewers where they can become solid and damage water treatment plants or contaminate water units; household daily waste; fats containers.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	Developing collective collection points would be a way to encourage producers to implement such a selective collection but also to facilitate the respect of the article L. 541-21-1 of the Code of environment that stipulates that big producers have the obligation to guarantee biowaste selective collection at source in order to valorise the organic matters. Used cooking oils are part of the concerned biowaste in this regulation. Since 2016, restaurants that produce more than 60 l/yr of used cooking oils	The regulation is very strict regarding used cooking oils traceability. In fact, the article R. 541-49 of the Code of environment stipulates that waste producer has to notify within the collection contract that used cooking oils have to be sent to appropriate units to be recycled or eliminated. In this sense, it is compulsory for the collectors to provide the waste producers with an official document stipulating the waste collection. Thus, implementing collection points would require

		have to implement a selective collection for this waste. It is sometimes hard for the restaurants to have enough space to add new tanks to collect separately their UCO directly within the restaurant. Besides, creating collective collection points would be also a way to decrease transport distances and generate less CO2 emissions.	dedicated people on-site who could provide producers with those official documents. Besides, in case of potential contamination it is really important to be able to trace the origin of the collected used cooking oils. A solution can be to authorise collective collection points where every restaurant has to bring into a locked place its own tanks with its legal reference as a private enterprise written on the tank in order to be able to identify the origin of every tank for the traceability.

Spanish regulatory framework

Regulations on used cooking oils selective collection

The PEMAR 2016-2022 includes the following objective:

- Increase of recycling rate for the different fractions which are part of the municipal waste generated in households (including used cooking oil);
- Promotion of separate collection of used cooking vegetal oil.

The Thematic Strategy on Sustainable Use of Natural Resources recommends closing material cycles, using existing resources in an efficient way and decreasing the degradation of ecosystems, coming back to the cyclic functioning of nature.

In addition, the Ministry of Agriculture, Food and Environment signed in 2014 an agreement with the Spanish Association of Hoteliers and Waste Management (FEHR) and the Association of Edible Oil and Fats Sub-products and Waste Management (GEREGRAS). Under this agreement, which will last until the end of 2017, FEHR has informed all associates to promote and coordinate used cooking oil (UCO) separation and collection and GEREGRAS oversees and controls that legislation is fulfilled.

Regulations concerning used cooking oils composition

Used cooking oils are animal or vegetal fats (olive or sunflower oil, etc.) which – after being used for cooking in households, restaurants and similar locations – are discharged or intended to be discharged by the producer.

Regulations on used cooking oils selective collection in terms of operational steps

According to national law, UCO must be stored and delivered to the corresponding collection system. Depending on the municipality and authorised waste manager, the collecting service can require the transportation of UCO to civic ameniy sites or specific curbside containers.

The Territorial Master Plan for Waste (PTEOR) in Tenerife establishes different strategies to maximize the selective collection of waste and recycling, indicating that UCO must be delivered to any of the green/clean points available.

Regulation on used cooking oils treatment

Collected UCO can undergo different treatments in order to generate biofuels, soaps and other valuable components for the chemical industry (e.g. waxes, varnishes, etc.).

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	PEMAR 2016-2022 and the Thematic Strategy on Sustainable Use of Natural Resources already promote the separate collection and recycling of UCO (which is part of MSW). With regards to hotels, there are examples of existing agreements between UCO producers and waste managers, facilitated by the Ministry of Agriculture, Food and Environment. The establishment of collection points for UCO is already in place in the municipality of Santander. In Tenerife, it would be possible to implement such measure with the support of local and regional governments as well as the provision of collection/recycling schemes and/or waste management facilities.	A separate collection and management system is required, including the implementation of specific containers for disposal of UCO. The valorisation, final use and recycling of UCO must be clearly defined to induce improvements in the collection system.

Italian regulatory framework

Regulations on used cooking oils selective collection

Ronchi Decree (22/97) and the following TU 156/2006 (art. 233) estabilished that recycling of vegetable oils and fats (code CER 20.01.25: "edible oils and fats") and exhausted animals was obligatory. Producers of exhausted oils can give execution to the law directly through the Compulsory Consortium (CONOE).

Regulations on used cooking oils selective collection in terms of operational steps

The law 154/2016 (art.10) estabilished the amount of environmental contribution to give to CONOE from 2017 (for example 0.0102 €/kg for olive oils in containers over 5 liters). This sum is due to CONOE in the moment of first selling of the product.

Regulation on used cooking oils treatment

To promote the products derived from recycled oils, the following rules exist:

- Decree 110/2008 estabilishing the obligation to integrate biofuels into petrol and diesel;
- Law 158/2008 describing the regulation on how to apply biodiesel.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	Ronchi Decree (22/97) and the following TU 156/2006 estabilished that recycling of vegetable oils and fats and exhausted animals was obligatory. Producers of exhausted oils can give execution to the law directly through the Compulsory Consortium (CONOE).	

Danish regulatory framework

Regulations on used cooking oils selective collection and treatment

All restaurants and kitchens which generate used cooking oil have the possibility and obligation to send the oil for recycling.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	This measure has already been implemented.	Management in restaurants need to prioritise this and follow up on employees. Else the pace in the kitchen is always to high to prioritise such initiatives.

Portuguese regulatory framework

Regulations on used cooking oils selective collection

The management of used oil is regulated by the Decree-Law no. 267/2009, 29th of September, about "Óleos Alimentares Usados" (Cooking Oils).

This law establishes that the responsibility for collection, when dealing with urban waste which daily production does not exceed 1,100 liters per producer, will be attributed to municipalities. These entities may choose to undertake the collection themselves or delegate it to third parties for selective collection networks of UCO. For the year 2012, around 340 tonnes of UCO were taken over for 13 SGRU ("Municipal Solid Waste Management Systems").

In Lisbon, smaller fractions of cooking oils are only collected by one specific system (i.e. either public space facilities or certain civic amenity sites).

In Ponta Delgada, the collection of UCO is regulated as well.

The Decree-Law no. 267/2009 establishes objectives for the availability of municipal selective collection points according to the number of inhabitants per municipality. According to the data reported in 2012, a total of 2,728 municipal selective collection points were installed, of which 1,409 were managed by SGRU ("Municipal Solid Waste Management Systems"). In 2012, there was an increase in the number of municipal collection points, with

47% of Portuguese municipalities reporting data meeting the legal targets set for 2015. Of the collection points of UCO available, 67% were public waste.

There is no specific regulation on used cooking oil treatment.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	The legislation established targets for the creation at the county level of points of placement for used cooking oils. Lisbon has 111 locations for the placement of used cooking oils.	PERSU 2020 identifies separate collection as a weak area in municipal waste management.

Croatian regulatory framework

Regulations concerning used cooking oils

The quantity of about 51,000 tonnes of waste oils (categories I and II), oiled plastic packaging, filters and emulsions was generated in Croatia in 2003. A smaller portion of these waste oils is disposed of by thermal treatment. The Act on Sustainable Waste Management (OG No. 94/13, 73/17) about waste oils stipulates:

(1) The purpose of the system for the management of waste oils shall be to ensure separate collection of waste oils;

(2) If technically feasible, holders of waste oils of different categories shall not mix such oils all together and shall not mix such oils with other types of waste or substances, if such mixing prevents and/or renders their treatment in accordance with Articles 7 and 9 of this Act impossible;

(3) When waste oil regeneration in the territory of the Republic of Croatia is technically feasible and economically viable, any export of waste oils for the purpose of their treatment by incineration or co-incineration shall be prohibited;

(4) Conditions for the assessment of technical feasibility and economic viability of waste oil regeneration and other conditions of waste oil management shall be laid down by the Minister in the ordinance referred to in Article 53, paragraph 3 of this Act, which governs the management of waste oils.

The following guidelines have been defined for the improvement of the waste oils management system:

- Process waste mineral oils by thermal treatment in the existing and new thermal plants, cement factories, and in industrial thermal plants and boiler houses;
- Introduce charges/fees for oil production and import;
- Improve system for separate collection of waste oil, and enhance waste oil collectors control in order to achieve a specified and guaranteed level of quality;
- Undertake smaller rehabilitation works in plants to enable co-incineration of waste oil or to increase present capacities;
- Collect cooking oil separately and proceed to their recovery (production of engine biofuel, etc.).

The Environmental Protection Programmes and Energy Efficiency Fund (EPEEF) in Croatia collect fees from producers/importers of waste oil.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils		

Cypriot regulatory framework

Regulations concerning used cooking oils

In Nicosia all food businesses cooperate or keep a contract with private organisations which collect the used cooking oils. This is due to the requirement of the food hygiene law (EC852/2004) stating that all waste is to be eliminated in a hygienic and environmentally friendly way in accordance with Community legislation applicable to that effect, and is not to constitute a direct or indirect source of contamination. Therefore, the food businesses in order to comply with the above legislation cooperate or sign an agreement with private companies for the collection of used cooking oil. The waste collectors (used cooking oil included) must be licensed from the Department of Environment for the collection and the transport of this type of waste. The used cooking oil must be transferred to a licensed plant/facility for special treatment (in Cyprus or abroad). Additionally, based on the Waste Law 2011 (N.185(I)/2011) and the Regulations and decrees that were issued based on the Waste Law, the plants which treat waste (in Cyprus) have to obtain a license from the Department of Environment of the Ministry of Agriculture, Rural Development and Environment.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils		All food businesses cooperate/ keep a contract with private organizations which collect the used cooking oils.

Greek regulatory framework

Regulations on used cooking oils

Used cooking oil is categorized as 20.01.25 "edible oil and fat" in the European Waste Catalogue and Hazardous Waste List. All restaurants and kitchens which generate used cooking oil have the possibility to send the oil for recycling to private companies that manage cooking oils to produce biodiesel. According to the Greek legislation (Law 4042/2012) all waste is to be eliminated in a hygienic and environmentally friendly way in accordance with Community legislation applicable to that effect, and is not to constitute a direct or indirect source of contamination.

The legislation does not define specific methods for the selective collection of used cooking oils i.e. specific containers, authorised collectors etc. However, in order for private companies to select and manage any kind of waste fractions (i.e. used cooking oils) they are obliged to do so by presenting an approved management plan that takes into account all sustainability and environmentally friendly regulations according to Community regulation.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
4	Collection points for used cooking oils	Private entities manage the collection of cooking oils and use it for the production of biodiesel. The market could be further expanded if the legislation would be more specific in setting targets and used cooking oil producers could perhaps benefit from tax incentives.	There are no collection points for used cooking oils in Greece.

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Stakeholders to involve

Selective collection of used cooking oils

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal government	Providing support for the implementation of a UCO collection system.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Allocating and allowing the use of public spaces, like schools or parks, for collection of UCO. • Establishment of as many collection points as possible in highly visited areas/establishments. • Facilitation of Public-Private partnertships for collection of UCO. • Communication campaigns to keep householders, tourists and business owners informed about UCO collection points. • Delivering promotional activities to increase participation.
Waste Management Department (if publicly managed)	Providing the infrastructure for UCO collection.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Selection of the type of container and bins for collection of UCO.
Municipal Waste Management company (if privately managed)	Providing the infrastructure for UCO collection.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Selection of the type of container and bins for collection of UCO.
Private/ authorized collectors	Providing the infrastructure for UCO collection.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	4	• Facilitation of Public-Private partnertships for collection of UCO

Hotel/ Restaurants managers and staff	Supporting the implementation of UCO collection.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Registration and identification with a sticker in a visible place for the tourists. • Appointment of a responsible person for the implementation, promotion and assessment of the measure. • Undertaking a baseline analysis to identify improvements. • Training of staff on how to collect UCO. • Publication of results for staff and tourists.
Householders and tourists	Supporting the implementation of UCO collection.	Interviews, email, polls	4	• Providing information on practices regarding the handling of used cooking oil.
Suppliers	Giving input on the most efficient container/bin for the UCO collection.	Phone calls, email, polls, door-to-door	4	• Providing the specific containers and bins for UCO collection.

Used cooking oils treatment

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal government	Providing support for the implementation of a UCO collection system.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	4	• Providing regulative support for the treatment of UCO.
Energy Department	Advising on the UCO treatment methods.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	4	• Sharing with the Waste Management authorities or companies the findings on technology improvements regarding UCO treatment.
Waste Management Department (if publicly managed)	Providing the infrastructure for the UCO treatment.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Selecting the technology/methods for treatment of UCO.
Municipal Waste Management company (if privately managed)	Providing the infrastructure for the UCO treatment.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	4	• Selecting the technology/methods for treatment of UCO.
Private / authorized collectors	Providing the infrastructure for the UCO treatment.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, door-to-door communication	4	• Selecting the technology/methods for treatment of UCO.

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3.7 Environmental certification

Regulatory frameworks

European regulatory framework

Four EU backed certificates are: (i) EMAS certification[2], (ii) eco-label[3], (iii) energy labels[4], (iv) eco-design[5]. The Circular Economy Package further incentivises these certificates through economic incentives for producers to put greener products on the market and support recovery and recycling schemes (eg for packaging, batteries, electric and electronic equipment, vehicles).

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	This measure could lead to certain certifications.	
7	Substitution of disposable products in hotels	This measure could lead to certain certifications.	
9	Communication campaign on reuse through swap markets		
10	Waste sorting in hotel rooms	This measure could lead to certain certifications.	
18	Eco-event guidelines	This measure could lead to certain certifications if implemented with other standards.	

French regulatory framework

There is a wide variety of environmental labels and certifications in France. They can be especially dedicated to professional activities, but some of them can have an ampler significance. They can be related to activities,

[2] The Eco-Management and Audit Scheme is a voluntary environmental management instrument, which was developed in 1993 by the European Commission. It enables organizations to assess, manage and continuously improve their environmental performance.

[3] The EU Ecolabel was established in 1992 by the European Commission. The EU Ecolabel helps to identify products and services that have a reduced environmental impact throughout their life cycle. Recognized throughout Europe, EU Ecolabel is a voluntary label promoting environmental excellence which can be trusted.

[4] The EU Energy Label is a set of energy efficiency classes from A to G on the label, A being the most energy efficient, G the least efficient. The labels also give other useful information to the customer as they choose between various models. The information should also be given in catalogues and included by internet retailers on their websites.

[5] The Ecodesign regulation is complementary to the one on energy efficiency and is an effective tool for improving the energy efficiency of products. It helps eliminate the least performing products from the market, significantly contributing to the EU's 2020 energy efficiency objective. It also supports industrial competitiveness and innovation by promoting the better environmental performance of products throughout the Internal Market.

products, services or equipment; and they correspond to a certain standard listing, qualification or certification. In fact, products, services and enterprises have environmental impacts through raw materials consumption, consumed energy, produced waste, etc. Thus, with equivalent performance, they do not have the same impacts on environment when taking into account the way they are designed, produced and managed. The environmental certification is a way to inform clients that the enterprise respects certain environmental standards with its products, services or equipment. For the enterprises themselves, it is also a way to distinguish themselves from other enterprises by selling it as an added value. The main objective of those labels or certifications is to show the clients the environmental performance of the enterprise; but it also represents advantages for the enterprise: costs reduction, regulatory compliance, staff involvement, etc. To get a label or a certification, the enterprise needs to respect certain requirements defined by an independent third party.

The whole system of certification ISO 14000, with especially the certification ISO 14001, is an international standard in terms of environmental management that is defined by the International Standard Organisation. This certification states specific rules to integrate environmental concerns within the management of the enterprise. It can concern activities, products and services within the enterprise. To get that certification, it is required for the enterprise to:

- realise an environmental analysis to set an inventory of its current activities, the regulation that is applicable on them and the environmental impacts they have;
- define environmental strategies with a commitment of continuous improvement and pollution prevention, respect of the practicable environmental legislation and regulation;
- set the organising framework, the planning activities, the responsibilities, the procedures to be followed and the resources that will be needed to elaborate, implement, realise and maintain the environmental strategies of the institution.

This management system will be assessed every year and needs to be updated every three years.

The international certification ISO 20121 has been created to promote sustainable events. In fact, events consume lots of resources such as energy and water, have strong impacts on the environment and produce big amounts of waste. By being certified ISO 20121, the event of any kind of nature or size is integrated within a sustainable strategy. This certification can be useful for an institution when:

- implementing and improving the sustainable management system of an event;
- being sure that this event complies with the standards that have been defined within the sustainable development strategies led by the organisation itself.

The European Environmental Management Audit System (EMAS) is declined in France and known as "Système de Management Environnemental et d'Audit (SMEA)". The objective of these rules is to promote continuous improvements in terms of environmental management by:

- defining and implementing environmental strategies and planning that need to comply with the regulation;
- improving continuously the environmental performance by targeting on the results;
- training and integrating all the workers within the process;

- assessing periodically and objectively the efficiency of those environmental strategies;
- making people aware of the results through what is called an environmental declaration.

The EU Ecolabel is used in France. It can be used especially for tourist accommodation establishments, such as hotels, vacation rentals, bed & breakfast, etc. The items that are certified are: consumption of renewable energies, consumption of water and energy, reduction of waste production and improvement of local environment conditions.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	Within the EU Ecolabel, there is a specific item on reducing waste production. Thus, a restaurant that would implement actions to reduce its waste production could comply with the EU Ecolabel requirements and valorise this certified measure as a differentiating value.	
7	Substitution of disposable products in hotels	Within the EU Ecolabel, there is a specific item on reducing waste production. Thus, a hotel that would implement actions to reduce its waste production could comply with the EU Ecolabel requirements and valorise this certified measure as a differentiating value.	
9	Communication campaign on reuse through swap markets	Organising swap markets could be a measure that would be integrated within the EMAS of the municipality or any other institution. Besides, this event could be part of the certification ISO 14001 of such institution, and it could also be certified as an event ISO 20121.	
10	Waste sorting in hotel rooms	Waste sorting in hotel rooms could completely be certified within the EMAS that could be valorised as a differentiating value by the hotel.	
18	Eco-event guidelines	By using eco-event guidelines, the municipality or any other institution will be able to comply with the ISO 20121 requirements.	

- **Spanish regulatory framework**

The national Law 22/2011, on waste and contaminated soils, promotes (in article 15) the implementation and use of environmental management systems and ecolabels, for example EMAS and ISO 14001. For instance, the Royal Decree 239/2013, of 5th April, clearly defines the rules for the voluntary participation of organizations in an Eco-Management and Audit Scheme (EMAS).

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	There are several legal instruments promoting measures to reduce food waste at buffets and restaurants. The National Law 22/2011 promotes the development of measures to prevent generation of food waste and encourage a more responsible consumption, as well as the creation of agreements with establishments to establish certain patterns for consumers and food providers, as well as to undertake activities with canteens so as to taking advantage of leftovers of food. The use of specific labels for restaurants and buffets committed to food prevention could be amongst the measures to be implemented.	
7	Substitution of disposable products in hotels	The national Law 22/2011, includes the establishment of agreements with the hotelier and catering sectors, in order to encourage the introduction of reusable packaging and the integration of environmental criteria and waste prevention when procuring new materials and services. This could be translated into the establishment of specific certificates and labels for green procurement practices. Although it targets public procurement, there is a Green Public Procurement Plan with the main objective of implementing environmental friendly practices. In addition, article 16 of Law 22/2011 establishes that public administrations should promote the public procurement of reusable and easily recyclable products, as well as of recycled products complying with the required quality and technical specifications. This could pave the way for the implementation of labels for hotels. Moreover, there exist European labels, such as the EU Ecolabel, which requires a waste management plan in hotels to facilitate waste separation by guests, to sort waste and to avoid disposable products and single-dose food packaging.	
9	Communication campaign on reuse through swap markets	Law 22/2011 promotes the reuse of products and the preparation for reuse of discarded products, especially through the implementation of educational, economic and logistic measures. It also encourages the development of awareness raising campaigns, and the provision of economic and decision-making support, as well as other type of incentives. At regional level, the Waste Plan for the Autonomous Community of Cantabria (2017-2023) relates to raising awareness amongst the population in waste generation and its correct management. Therefore, there would not be a problem to implement such measure. The Territorial Master Plan for Waste (PTEOR) in Tenerife also establishes different strategies to maximize the selective collection of waste and recycling.	
10	Waste sorting in hotel rooms	There exist European labels, such as the EU Ecolabel, which requires a waste management plan in hotels to facilitate waste	

		separation by guests, to sort waste and to avoid disposable products and single-dose food packaging.	
18	Eco-event guidelines	Law 22/2011 establishes that waste prevention plans must include the development of awareness rising and information campaigns addressed to the general public, therefore the development of eco-event guidelines would be encouraged, and potentially facilitate the development of specific environmental certification or label for eco-events. In the municipality of Santander, there would not be any problem to implement such measure.	

Italian regulatory framework

In 2013 Italy adopted the National Action Plan for Green Public Procurement (G.U. n. 102 of 3 May 2013), which provides the minimum environmental criteria, representing the reference point at national level for the use of GPP by contracting authorities.

The Law 28 December 2015, n. 221 "Environmental provisions to promote green economy measures and reducing the disproportionate use of natural resources" introduces a series of important innovations in terms of environmental certifications, green public procurement and product qualification. Article 16 establishes a reduction of the guarantees normally required to companies signing and renewing contracts with the Public Administration. The reduction is: - 30% for companies with an EMAS Registration (Reg. 2009/1221/CE); - 20% for companies bearing a certification according to the UNI EN ISO 14001 or, alternatively, able to cover at least 50% of the total value of the supply with products that have been awarded the European Ecolabel (Reg. 2010/66/CE); - up to 15% for those companies that have developed a Greenhouse Gas inventory in accordance with UNI EN ISO 14041-1 or a carbon footprint in line with the requirements of the UNI EN ISO/TS 14067. The Environmental Attachment introduces the obligation for public administrations to value as element of preference the fact that an organization demanding public funding bears a voluntary certification of the European Commission (the above mentioned EMAS and Ecolabel), or in accordance with ISO 14001 (Environmental Management System) as well as ISO 5001 (Energy Management System).

Articles 18 and 19 foresee the obligation for public administrations, as well as for the central purchasing bodies responsible for public procurement, to insert the so called Minimum Environmental Criteria (MEC) within the technical documentation of public tenders. The Criteria have been defined by the Italian Ministry of the Environment for different product categories and published as ministerial decrees, in order to promote the purchase of products and services with a lower environmental impact. Some of the MECs are specifically related to the content of recycled materials in the final product: for example the certification scheme, named "*Remade in Italy*", which specifically aims at the verification of recycled content in a product, attesting the traceability of production, starting from the verification of the source of input raw materials, to the finished product.

Article 21 establishes the national voluntary scheme, called "*Made Green in Italy*", for the evaluation and communication of the Environmental Footprint of products. The scheme is based on the Product Environmental Footprint methodology of the European Commission as defined by the Recommendation CE n. 179/2013.

With the new Code of Contract (Legislative Decree 50/2016), and with subsequent amendments (Legislative Decree 56/2017), GPP is no longer a voluntary instrument but has become compulsory. In fact, article 34 introduced the obligation to apply the "technical specifications" and "contractual clauses" contained in the Minimum Environmental Criteria "for any amount of credit", for the entire value of the tender.

At the local level, in October 2012 a Memorandum of Understanding was signed between the Italian Metropolitan Cities (including Florence) aimed at the diffusion of Green Public Procurement. The object of the Memorandum of Understanding is "the collaboration, the linkage and the comparison between the metropolitan cities for better implementation of the GPP within the Entities, as well as for the effective promotion of green public purchases on the territories of competence". The agreement "will focus on the realization of joint activities, aimed at effectively applying the GPP, but also on the development of GPP diffusion actions at territorial level."

The municipal waste tax regulation of the municipality of Florence provides a discount for non-domestic users certified by EMAS and / or ISO 14001, if they implement waste prevention actions.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	The municipal waste tax regulation of the municipality of Florence provides a discount for non-domestic users certified by EMAS and / or ISO 14001, if they implement waste prevention actions.	
7	Substitution of disposable products in hotels	Although it is targeted to the public procurement, the new Italian Code of Contracts (making GPP mandatory), will promote a raising market of reusable and easily recyclable products, as well as of ecolabelled or recycled products. This could enhance the availability of affordable and qualitative products to be purchased by hotels. The municipal waste tax regulation of the municipality of Florence provides a discount for non-domestic users certified by EMAS and / or ISO 14001, if they implement waste prevention actions.	
9	Communication campaign on reuse through swap markets		
10	Waste sorting in hotel rooms		
18	Eco-event guidelines	As described for hotels, the new Italian Code of Contracts will promote a raising market of reusable and easily recyclable products, as well as of ecolabelled or recycled products. This could enhance the availability of affordable and qualitative products to be purchased	None

		by people wishing to organise eco-events. The European ISO 20121 is also an opportunity that can be developed at the national Italian level.	

Danish regulatory framework

The Nordic Ecolabel (The Swan) and the EU Flower are official ecolabels from the Nordic Council of Ministers and the European Commission respectively, and each of the bodies have developed the overall rules for the schemes. The Danish environmental authorities have drawn up a statutory order on eco-labels in Denmark. Namely, the statutory order from the Ministry of environment No. 274 of 26 April 2008 on the community and the Nordic Ecolabel. It describes the framework for the work with ecolabelling in Denmark, Ecolabelling Denmark and the Ecolabel Committee's responsibilities and tasks, as well as rules for use of the labels and what happens if companies violate the rules.

The City of Copenhagen adopted in September 2017 a new green procurement policy requiring the seven administrations to go for eco-labelled products (The Nordic Swan and the EU Flower) in all relevant procurement.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	This measure has already been implemented.	None
7	Substitution of disposable products in hotels	This measure has already been implemented in some hotels.	None
9	Communication campaign on reuse through swap markets	This measure has already been implemented. The measure brings environmental awareness about resources and waste prevention.	This measure is not so relevant for short stay tourists, but more for tourists staying longer periods who would need some equipment
10	Waste sorting in hotel rooms	This measure has already been implemented in some hotels.	None
18	Eco-event guidelines	This measure has already been implemented.	None

Portuguese regulatory framework

At national level the Portuguese Tourism Organization (*Turismo de Portugal*) encourages the development of good practices related to environmental certification, since this is one of the criteria for the allocation of stars to hotel units.

The Lisbon's Strategic Plan for Municipal Waste includes several awareness-raising campaigns, for example on the promotion of eco-labelling schemes.

In Azores, the Regional Law nº 40/2008/A, 25th of August, includes the establishment of an entity for the regulation of water and waste services (ERSARA), which is responsible for the definition of quality service criteria and monitoring goals on waste management systems.

Moreover, the Environmental Department of Azores promotes in all islands training courses and environmental education actions on waste prevention and management waste prevention and management, such as Eco-Management and Audit Scheme (EMAS) and Local Agenda 21 with the Portuguese Environmental Agency (APA).

In Ponta Delgada, the Hotel Marina Atlântico has implemented incentives for the consumption of drinks with returnable bottles, and they have placed a green flower label on the drinks that have returnable tara - therefore encouraging tourists to order them.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	The *Strategic Plan for Municipal Waste* (Plano Estratégico para os Resíduos Urbanos (PERSU) 2020 (2014-2020)) includes the development of awareness-rising campaigns are planned as informative instruments, for example on food waste or the promotion of eco-labelling schemes.	Lack of guidelines defined by the Portuguese Tourism Organization for prevention practices.
7	Substitution of disposable products in hotels	Criteria for the allocation of stars to hotel units by the Portuguese Tourism Organization (*Turismo de Portugal*). In Ponta Delgada, the new public procurement Code already has some guidelines about green procurement, but these guidelines have to be developed and specified.	Not specified.
9	Communication campaign on reuse through swap markets	The Environmental Departments promotes training courses and environmental education actions on waste prevention and management waste prevention. Within the Strategic Plan for Municipal Waste (*Plano Municipal Estratégico para os Resíduos Urbanos*), the implementation of two repair cafés in Lisbon is forecast.	Citizens' behaviours.
10	Waste sorting in hotel rooms	Portuguese Tourism Organization (Turismo de Portugal) encourages the development of good practices related to environmental certification, since this is one of the criteria for the allocation of stars to hotel units.	Financial investment of the hotels.

18	Eco-event guidelines	Lisbon City Council is developing guidelines and necessary requirements to organize internal and external eco-events. The Environmental Department promotes in all islands of Azores training courses and environmental education actions on waste prevention and management.	Not specified.

Croatian regulatory framework

No information has been found on this subject for the Croatian regulatory part.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants		
7	Substitution of disposable products in hotels		
9	Communication campaign on reuse through swap markets		
10	Waste sorting in hotel rooms		
18	Eco-event guidelines		

Cypriot regulatory framework

There are no legal requirements to adopt any environmental certification in Nicosia, but there are no legal obstacles either. There is therefore no potential obstacle or opportunity for the whole pilot case in relation to the measures below.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants		
7	Substitution of disposable products in hotels		
9	Communication campaign on reuse through swap markets		
10	Waste sorting in hotel rooms		
18	Eco-event guidelines		

Greek regulatory framework

ISO 14001 is fostered by the legislation and is even compulsory for certain types of business. Besides, EMAS and the EU Ecolabel are applicable in Greece as well. Moreover, a list of national ecolabels is available at this link: http://www.ecolabelindex.com/ecolabels/?st=country.gr.

Identification of the potential obstacles and opportunities generated by the regulatory framework

Measure	Measure description	Opportunities	Obstacles
2	Food prevention at buffets and restaurants	It can be implemented.	
7	Substitution of disposable products in hotels	It is already implemented.	
9	Communication campaign on reuse through swap markets	It could be implemented.	
10	Waste sorting in hotel rooms	It could be implemented.	
18	Eco-event guidelines	EU regulations and guidelines are already used.	

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Stakeholders to involve

Environmental certification

Stakeholders to involve	Role	Engagement mechanisms	Measure related	Operational examples
Municipal governments	Identification and engagement of relevant stakeholders and creation of networks within the municipal boundaries	Interviews, meetings, workshops, webinars, online platforms, phone calls, email	2	• Identification of those establishments thanks to a sticker/label recognizing the commitment on food waste prevention.
			7	• Regulative support to encourage hotels to replace disposable products (for instance, by applying reductions in the waste fee, or establishing a territorial label promoting hotels with such measures implemented).
			9	• Preparation for reuse: checking, cleaning or repairing recovery operations by which products or components are prepared and so that they can be reused without any other pre-processing.
			10	• Organization of informative meetings with hotels and hoteliers associations to promote the implementation of waste sorting in hotel rooms. Hotels that have already implemented such a system could be invited to explain their policy and share their experience.
			18	• Contacting stakeholders to involve them in the creation of the guidelines.
Regional agencies (Environmental and Sanitary agencies)	Advising regarding regulations and improvement opportunities	Interviews, meetings, workshops, webinars, online platforms, phone calls,	2	• Regulative support to encourage establishments to implement food waste prevention measures (for instance, by reducing waste collection service taxes).
			7	• Support of green businesses and companies supplying eco-friendly products.

		email, polls	9	• Measure participation and monitor the quantity of products reused.
			10	• Support to encourage hotels to sort their waste (for instance, by applying reductions in the waste fee, or establishing a territorial label promoting hotels with such measures implemented).
			18	• Validation of the guidelines by testing them with the organization of one or several events following the guidelines before.
NGO's, charities	Mobilizing public participation. Creating partnerships between hotels/restaurants and charities, organisations	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	2	• Subscription of voluntary agreements and collaboration partnerships with participating establishments.
			7	• Realization of communication campaigns to engage more participants.
			9	• Communication campaign with public media, press release and journalists invited to the event, display posters to inform the public and advertise via social networks and partners' channels.
			10	• Realization of communication campaigns to engage more participants.
			18	• Regular working groups to update the guidelines and obtain results and feedback.
Business associations (Hotels, restaurants, trade associations)	Hotels and restaurants associations could inform members on implementation of environmental certifications. These stakeholders can influence the content of the certification requirements such as how to improve eco-design of products and	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls	2	• Staff should be asked and interviewed for their input and assistance on what and how things can be done to minimize waste and could be rewarded for good ideas (besides increasing their participation and involvement). Including them in the decision-making process can translate into a higher productivity, better morale, lower costs, and most importantly less food waste generated.
			7	• Introduction of the requirements and objectives in all provision and service contracts to help hotels to select those products and suppliers that meet the requirements established (suppliers

	processes.			including environmental quality guarantees, ecolabels or certified against EMS will have higher chance to meet the hotel requirements).
			9	• Defining the concept and the rules: swap party, exchange market, school event, etc.
			10	• Awareness rising and training for the hotel cleaning staff as they must be involved so as to adopt the new working practices.
			18	• Identification of the available existing material and the potential material to purchase (reusable dishes, ecocups, mobile dishwasher, signaletic signs, reusable furniture, etc.).
Tourist associations	Increasing awareness among tourists regarding the requirement elements of the certifications (influencing in behaviour)	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	2	• Promotion of the new activities to customers. Clients will not only appreciate the efforts and concern from the restaurant or hotel, but they may potentially increase their support too (which would be translated into economic benefits). Restaurants could make use of a specific and common sticker/label within the city to show their clients they are operating such a measure of reducing food waste.
			7	• The hotel could use a sticker provided by also the tourist association to inform its clients about those eco-friendly actions.
			9	• Communication campaign with public media, press release and journalists invited to the event, display posters to inform the public and advertise via social networks and partners' channels.
			10	• Providing label and information to tourists to affect choice making.
			18	• Identification of the local events to target through the guidelines.
Management or Environment,	Implementing the environmental certification	Interviews, meetings, workshops,	2	• Monitoring food waste behaviour and defining an action plan to address challenges identified. Considering type of

Health and Safety department within hotels and restaurants	elements and strategies	webinars, online platforms, phone calls, email, polls, door-to-door communication		waste generated and what can be reduced.
			7	• Monitoring and assessment of waste generated in the hotel, including the identification of all waste fractions generated and their origin.
			9	• Measure participation and monitor the quantity of products reused.
			10	• Collection and separate storing of the different fractions by cleaning staff until it is taken to higher capacity containers, becoming part of the waste management system of the hotel (with different containers per fraction including waste from other areas of the hotel such as kitchen, reception, etc.).
			18	• Testing the guidelines by the organization of one or several events following the guidelines before implementing them in the whole area of implementation of the measure.
Hotel/restaurant Staff	Having the knowledge/skills to make an efficient use of their resources.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	2	• Training staff understand and be able to comply with the operational requirements of the certification, for example, food portions in the restaurant.
			7	• Communication of environmental achievements to the staff and customers so that they feel part of the initiative and become key participants in the reduction of generated waste.
			9	• Evaluation and provision of feedbacks.
			10	• Housekeeping/cleaning trolleys used by cleaning staff should be similarly divided to facilitate the work for cleaners and to speed up the process. It is particularly important to keep the same colours.
			18	• Regular working groups to update the guidelines and obtain results and feedback.

Suppliers	In order to implement some of the measures, certain materials should be purchased. The choice of the right partners is determinative.	Interviews, meetings, workshops, webinars, online platforms, phone calls, email, polls, door-to-door communication	2	• Communication campaign materials and continuous support/training should be distributed to all stakeholders involved along also the supply chain to ensure participation and a proper understanding and uptake of the measures.
			7	• Suppliers must be informed and updated on purchasing policies and initiatives taken in the hotel, as this will reinforce collaboration with them and facilitate cooperation with other hotels interested in implementing similar measures.
			9	• Measure participation and monitor the quantity of products reused.
			10	• Procurement of materials that comply with the requirements to enable efficient sorting.
			18	• Identification of the available existing material and the potential material to purchase (reusable dishes, ecocups, mobile dishwasher, signaletic signs, reusable furniture, etc.).

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4. Business models, financial balance template and costs saving opportunities

4.1 Business models

Introduction

The URBAN-WASTE project aims to propose cost-effective and at the same time eco-innovative solutions for the pilot cities and tourism related businesses to prevent, mitigate and manage better the waste their produce connected to tourism activities.

The previous deliverables collected and studied the state-of-art approaches related to concepts such as urban metabolism (Task 2.1), ecosystem services (Task 2.6) or stakeholder participation (Task 3.4), and also related to existing methodologies and indicators (Task 2.2 and Task 2.3) connected to the three pillars of sustainability (environment, society, economy). Based on these knowledge, an assessment framework has been set for the URBAN-WASTE project and the concepts and methodologies were applied in the 11 pilot cities to study the current state of their waste management practices and tourism activities, and to link these two approaches within a multiple context that considers the synergies and trade-offs with economic, social and environmental needs and interests (Work Packages 2 and 3).

This part of the project aims to utilize and bridge the academic knowledge on business models (BM) and sustainable business models (SBM), especially related to eco-innovations and waste management, with the current practices and processes of waste management and tourism activities in the pilot cities. Therefore, the document provides practical guidelines, recommendations and strategies for the sound future implementation of the measures that were developed under the project in collaboration with the partners. The study looks at these eco-innovative solutions from an economic viewpoint in order to propose economically sound and realistic guidelines for business and cities for the future implementation. Besides the guidelines, the study also develops strategic business model guidelines that can broadly be applied for different cases and contexts. These tools are based on already existing best practices related to implemented measures in the pilot cities and from internal and external partners as well as on best practices being carried out in other European cities.

The application of business model frameworks – *developed by academics* – for best practices – *planned, implemented and maintained by practitioners* – ensures the development of practically applicable tools justified by real-life cases.

Conceptual background

The main Business Model (BM) that has been applied in the project is Peter Lindgren's CUBE business model. Additionally, the value formula section has been divided into three parts following the sustainability three pillars. This resulted in a business model framework that has a focus on change processes but also considers sustainability.

In general, business models are defined in different ways, such as[6][7][8]:

- "Simplified structure of set of elements and their relationship to express the logic of value creation." (Obst, 2015);
- "System of activities and unit of analysis that captures value creation from multiple resources." (Amit and Zott, 2001);
- "A way to describe the roles and relationships among stakeholders. Identification of benefits." (P. Weill, 2001).

Beyond the scope of these definitions, Sustainable Business Models (SBM) have an expanded value dimension broadening the "traditional" BM interpretations. SBMs also consider the environmental and social impacts and consequences of the business logic, processes and activities, and the possible value creation of these. The process transforming BMs to SBMs is understood as[9]: "Innovations that create significant positive and/or significantly reduced negative impacts for the environmental and/or society, through changes in the way the organization and its value-network create, deliver and capture value or change their value propositions." (Bocken et al., 2013)

Therefore, the questions are:

- What is value?
- How to identify values?
- How to utilize these values?

In the URBAN-WASTE project, in order to make economically sound implementation guidelines, some of the partners tested and used the CUBE model (Lindgren and Rasmussen, 2013) that has a focus on the change process of BMs, with the consideration of sustainability, however still emphasising rather the economic dimension. (Figure 1)

[6]Obst, L.(2015). Utilizing the Business Model Canvas to Enable Sustainability Measurement on the Business Model Level, An Indicator Framework Supplementing the Business Model Canvas. PhD thesis, University of Twente, TU Berlin.

[7] Amit, R., Zott, C. (2001) VALUE CREATION IN E-BUSINESS. Strategic Management Journal, 22:493-520. doi: 10.1002/smj.187.

[8]M. Vitale P.Weill (2001) Place to Space: Migrating to eBusiness Models. Harvard Business School Press, Boston.

[9]Bocken, N., Short, S. W., Rana, P., Evans, S. A literature and practice review to develop sustainable business model archetypes. Journal of Cleaner Production, 65:42-56, 2014. ISSN 0959 6526. doi: 10.1016/j.jclepro.2013.11.039. URL http://dx.doi.org/10.1016/j.jclepro.2013.11.039

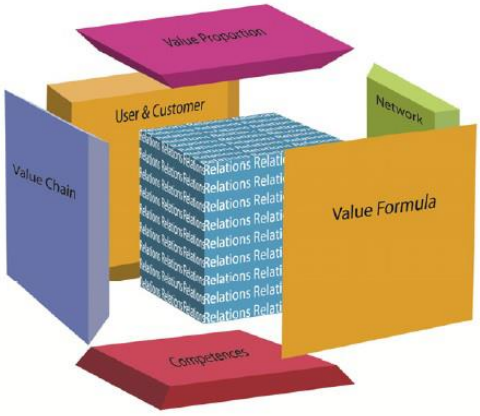

Figure 1: The seven dimensions of the BM Cube (Lindgren and Rasmussen [2])

The sustainability approach has been involved following the basic, simplified logic of the triple layered business model canvas (Joyce et al. [3]) (Figure 2). The model has three vertical layers: economic, social and environmental. The layers have the same horizontal dimension categories, adapted to the vertical contexts. These horizontal dimension categories are also vertically permeable through the layers, therefore the model resembles to a 3D matrix. For example, the *"channels"* dimension in the economic layer is compatible vertically with the *"distribution"* dimension in the environmental and the *"scale of outreach"* dimension in the social layers. Also, all of the dimensions in the layers are interrelated horizontally as well. The left sections of the layers are focusing on the internal processes of the company while the right sections are related to the external processes. The costs/impacts and revenues/benefits parts also follow the logic (value creation, delivery and capture), while the value propositions are in the hearth of the model having a central role.

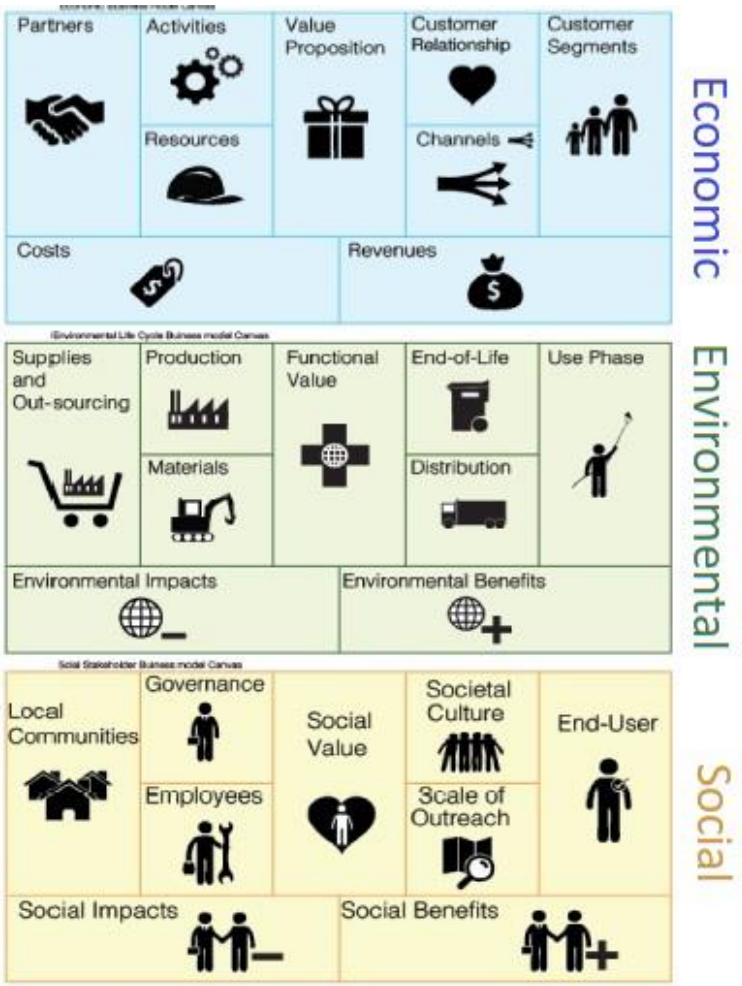

Figure 2: The triple layered BM canvas (Joyce et al. [3])

Methodology

Some of the partners (AU, CE, ORDIF, LNU) have been asked to test the applicability and feasibility of the Cube Model related to the developed URBAN-WASTE measures and the connected good practices. During this online session, the need for an expanded value understanding has been appeared; therefore as it has been mentioned before, the sustainability three pillars have been integrated into the value formula dimension. With this modification, the model has been confirmed to be applicable and useful for the development of the guidelines for sustainable business models that can be used by the pilot cities in the future implementation process.

Following this, a workshop has been organised that has been conducted during the Mutual Learning Event in Nicosia. The aim of the workshop was networking and capacity building among partners to be able to apply the business model for the future implementations. The partners created groups and had the task to apply the model for given measures with the help of the mentors, with a discussion together. While the aim of the workshop was direct capacity building, questionnaires and structured interviews also have been conducted to collect data for the policy-maker and business model guidelines, in order to further support the implementation.

The structure and the targeted data of the questionnaire and the interview were the same, based on the dimensions of the used business model. In the following, the sections of the questionnaire and the interview are detailed:

- **Main challenge**: The main problem that the action addresses (i.e. unsorted public municipal waste). This section closely connected to the value proposition, since the implemented solutions aim to have a specific positive effect (sorted public municipal waste >> waste fractions >> recycling/reuse + prevention, awareness rising).
- **Overall cost of the action**: The cost of the overall implementation process (i.e. planning, monitoring, materials…). The section overlaps with the "value formula" dimension of the CUBE business model.
- **Timeline of the action**: Duration of the action, from the start to the end. It relates to the "competences" dimension as a resource.
- **Supportive policy measures**: Implemented policies that ensure the background and the afterlife of the measure. This section is also considered under the "competences" dimension.
- **Financial measures**: Source of the founding of the measure (i.e. taxes, regional funds, EU funds…). It is again, considered under the "competences" dimension, as a resource.
- **IT tools**: Supportive IT tools developed/implemented related to the action (i.e. apps, softwares…). Connected to the "competences" dimension.
- **Departments, organisations, stakeholders involved**: Relevant entities that took part in the implementation process. The section relates to more BM dimensions: "user and customer", "relations", "networks", "internal value chain".
- **Competences needed**: Human resources that have been needed for the implementation (i.e. management skills and competences…). Under the "competences" dimension.
- **Barriers**: Factors that made the implementation more difficult (i.e. collaboration issues, management issues…). Indicated data, based on the dimensions, in the given case.

- **Success factors**: Factors that significantly contributed to the positive outcome of the implementation and to overcome the barriers encountered (i.e. marketing strategy, business model…). Indicated data, based on the dimensions, in the given case.

- **Target group**: Collective of people or entities specifically addressed by the intervention. The section overlaps with the "user and customer" and the "relations" dimensions.

- **Monitoring**: Specific monitoring process of the intervention (i.e. used periodic indicators…). Additional section.

- **Sources and materials**: The main resources and materials used during the intervention (i.e. leaflets, waste bins…). Under the "competences" business model dimension.
- Environmental benefits/impacts: Decreased negative impacts (i.e. emissions, consumptions…) and/or increased direct positive effects on the environment. Under the "value formula" BM dimension.

- **Social benefits/impacts**: Decreased negative impacts (i.e. migration, poverty…) and/or increased direct positive effects (human health, community building…) on the population and social life. Under the "value formula" BM dimension.

- **Economic benefits (costs saved, revenues)**: The saved direct/indirect costs and increased revenues, business opportunities etc. under the "value formula" BM dimension.

- **Impact on policies**: Mostly in cases of private initiatives that influence the policy-making process. Considered under the "value formula" dimension.

The questionnaire has been sent to internal partners who have already implemented actions similar to the developed UrbanWaste measures succesfully; therefore, they can be analyzed as good practices. Besides the questionnaires, partners also have been invited to conduct interview in case they have doubts or need more guidance how to fill in the form. External good examples have been involved as well, who also received the questionnaire with the possibility to choose interviewing. Internet sources had been used where data was not provided by the colaborators.

Business models examples

Intelligent municipal waste management, a case study from Santander Smart City (ES)

The City of Santander, within the strategic plan "Santander Smart City", which aims at monitoring different aspects of the city in order to promote an effective management through technological innovations, has installed hundreds of sensors in bins, trucks and smartphones that allow to collect real-time data to improve waste management services. In this way, vehicle emissions, fuel and running costs are reduced as the journeys to bins are optimized at the same time than incidences for overflowing bins are also lowered.

	Description
Main Challenge	The City of Santander, through the Santander Smart City strategy, has developed a system that allows for the smart waste collection thanks to the use of technology. Hundreds of sensors have been installed in bins, trucks and

	smartphones that collect real-time data with aims at creating an integrated system that increases efficiency of the collecting service. The system connects operators and supervisors in order to support daily operations and the citizens are involved in the process through the mobile application Cuida Santander, where they can report incidences and receive information. The integrated system allows to reduce costs related to fuel consumption and operations as well as CO2 emissions and noise pollution. It optimizes the collection intervals and routes for the real needs, as the number of journeys is reduced according to the filling rate of bins. Moreover, the system allows to control the overall work and location of operators, trucks and bins, which increases efficiency in reacting to incidences.
Overall cost of the action	Since the technology is relatively new, the costs of the intelligent system are high up-to-date. The waste management company in charge of the complete service receives an annual fee of around EUR 17.000.000. From this amount, around 8% is directed to the technological part required by the strategy.
Timeline of the action	The roots of the strategy come from the EU funded project Smart Santander (2010-2013). After this project, in 2015, the City of Santander started working on the Santander Smart City plan and included waste management in the program. The waste management company in charge of the municipal waste collection is ASCAN, which is licensed to provide the service for 10 years (period extendable). There is no deadline foreseen to finish with this strategic plan, therefore, the City of Santander will continue to implement this action indefinitely.
Supportive policy measures	As aforementioned, the system is part of the Santander Smart City Plan. In this sense, as long as the strategy continues to run, this initiative in particular will do as well. Furthermore, within the plan, the data is being collected into a centralized system that allows to analyse and control all processes and the municipality intends to create a centralized scorecard that integrates data from not only waste management services but also transversal data from the rest of the aspects monitored around the city.
Financial measures	Smart Santander, the project developed before the implementation of the ongoing Santander Smart City plan was EU funded through the program FP7. However, the latter is completely financed with public funds from the municipality.
IT tools	The system comprises NFC (near field communication) tags for litter bins, RFiD (radio frequency identification) tags for mixed waste bins, volume sensors for paper and plastic fractions, activity sensors for collecting trucks and mobile sensors for environmental parameters. Furthermore, each of the trucks was also equipped with GPS and RFiD antennas, smartphones were distributed among operators and supervisors and as well as RFiD access control devices. Regarding the software, the system is running through an app developed specifically for the service and second app that allows citizens to report incidences and interact with the municipal service is available.
Departments, organisations, stakeholders involved	The different stakeholders involved in the initiatives are: • City of Santander

	• ASCAN, the waste management company in charge of the municipal service • University of Cantabria and Deloitte, providing technical support while drafting the plan. Citizens, with their participation in detecting and reporting problems with bins.
Competences needed	Setting up the whole system requires from the expertise and competences from a variety of human resources specialized in different fields. For instance, IT skills from technicians for the development and maintenance of hardware and software (sensors, trackers, signal receivers, apps, etc.). Management skills from the coordinators and supervisors for the full control of operations and knowledge from the operators to properly use the system. For the latter, the operators receive complete training.
Barriers	The network that connects all devices to the signal receivers and, at its time, to larger receivers that collect all the data from these, it's still expensive since many of the devices work with 3G connection. However, the city counts with an extended network of optical fibre and is currently striving to connect all devices to it, which is less expensive, provides a faster connection and lessens maintenance problems. On the other hand, the calibration of the devices was more challenging during the first months of implementation, until the system was more established, and all devices worked correctly. Another challenge the City of Santander faces relates to human factors. Changing the mindset of many of the operators is being challenging for both the municipality and the waste management company and they encountered problems like smartphones being thrown away or shut down. Replacing these workers is not an option, since they are hired through subrogation and, in this sense, the success of system relies on their own commitment.
Success factors	The effectiveness of the system has been a successful factor from the beginning of the service. The waste management company has improved its operations and reduced costs. Moreover, the municipality counts with the overall support of the citizens of the Santander Smart City Plan. Publicity has been given through all media channels to share the best practice in and out of the region, which contributes to attract attention and further support to the initiative.
Target group	Being a public service offered by the municipality, the initiative mainly targets Santander's general public, including citizens and tourists.
Monitoring	Besides internal indicators of the effectiveness of the system, the sensors measure different parameters such as filling level of bins, conservation state of bins or temperature among others. Currently, the collecting trucks do not include the technology for onboard weighting of waste, but the Municipality is looking into this possibility for the future.
Resources and materials	From the resources detailed in the IT tools section, the following are in place for the implementation of the initiative: • 3.000 NFC (near field communication) tags for litter bins • 2.500 RFiD (radio frequency identification) tags for mixed waste bins • 1.200 volume sensors for paper and plastic fractions

	• 27 activity sensors for collecting trucks • 30 mobile sensors for six environmental parameters • 25 RFiD antennas • 100 GPS • 150 smartphones • 15 tablets For the promotion of the action the municipality uses all media channels, including the own municipality's website, but no posters or leaflets are being printed for the purpose.

Results	Description
Environmental benefits/impacts	Since collecting trucks optmize their routes to the bins that actually need to be emptied, fuel consumption is reduced and, hence, CO2 emissions into the atmosphere. Furthermore, given that the conservation state of the bins is monitored in real-time as well, problems like overfilling or leakage are better managed.
Social benefits/impacts	The local community and tourists visiting the city enjoy cleaner streets, with less smell and leakage problems as well as reduced noise pollution since the collecting frequency is lower. On the contrary, the operators might be affected negatively in the sense that they could feel more "controlled" by the new system.
Economic benefits (cost saved/revenue)	Although the technology of the system is costly at the moment, there are important cost savings to consider. Related to the environmental benefits abovementioned, the reduction in fuel consumption is reflected in direct cost savings for the service. Furthermore, given that the collecting routes are reduces as well, less human resources are needed to deliver the service.
Impact on policies	The initiative is seen as a role model for nearby municipalities as well as at a national level. Since they started implementing the system, the initiative has attracted a number of municipalities that are interested in learning about the potential replicability.

Sharing platform of used goods, a case study from FAT LAMA (UK)

Fat Lama is a sharing platform that gives individuals quick and easy access to borrowing a wide range of high end equipment at an affordable rate, instead of having to purchase the items themselves.

	Description
Main Challenge	Fat Lama is a sharing platform with local divisions in London (UK) and New York (US). In the realm of 'access over ownership', the peer-to-peer model holds great potential, because citizens can list the equipment they're willing to share, and others pay a fee to use it. A lot of equipment owned by individuals sits idle and is used only a few hours in its lifetime, but not everyone needs to possess their own video camera or drone. When an asset is shared amongst a number of people, the impacts on resource use are profound. Renting items benefits the environment, because the users are putting the brakes on unnecessary mass-manufacturing and carbon-intensive distribution systems. The sharing platform also applies to tourists who want to avoid bringing or buying their own equipment while on holiday (e.g. bikes, cameras, campervans, golf clubs, surfboards, tents, wetsuits etc.).
Overall cost of the action	Fat Lama has received external funding from companies like Greylock Partners a.o. in relation different development projects and has also participated in the YCombinator summer '17 cohort (startup funding programme). Overall cost of establishment and operation of Fat Lama is not specified.
Timeline of the action	Fat Lama was launched in the autumn 2015.
Supportive policy measures	None – Fat Lama started up as a private initiative.
Financial measures	Outside investors/venture capital funds supported Fat Lama's startup phase by approx. £ 150.000. Fat Lama takes 15 % commission of the price set by the lenders. Part of this pays the insurance policy that covers the lenders items, and the rest finances the organisations operations.
IT tools	The Fat Lama webpage. The Fat Lama app for Android
Departments, organisations, stakeholders involved	Venture capital fund/outside investors who have supported the development of the platform.
Competences needed	Entrepreneurial, technical and business-minded: The founders of Fat Lama all had backgrounds and competences within technology and business development.
Barriers	Sharing economy relies on trust amongst people. Over the past ca. 5 years, the general attitude towards the sharing economy has become increasingly open. As a user you want to be able to borrow items quick and easy for the cheapest possible price. These criteria are met by providing a platform that is easy to get an overview of, skipping extra security deposit fees and letting the lenders set the prices.

	Before lending out belongings your need to trust, that you will get your assets back fully functional and intact. Fat Lama has overcome this potential barrier by putting an insurance on the items.
Success factors	Not specified.
Target group	Individuals, both residents and non-residents (e.g. tourists) in the local area.
Monitoring	Not Specified.
Resources and materials	Website and supporting software for the website functions.

Results	Description
Environmental benefits/impacts	Sharing (along with reuse and maintenance) represent the 'inner loops' of a circular economy, where the value of an asset is preserved. Some Fat Lama users purchase items for deliberately for lending and are more likely to choose quality products that are durable and can be repaired. There is no exact measure of the quantity of resources spared as a result of the borrowing activities since it is not possible to measure the extent borrowings relative to purchases, although it is estimated that borrowing prohibits buying behaviour by 30 %.
Social benefits/impacts	The sharing activities can develop meaningful relationships and create effective local communities. Sharing possessions with others builds up trust among people and breaks down social barriers.
Economic benefits (cost saved/revenue)	Fat Lama has more than 80,000 active users in London alone and has recently the company launched an equivalent sharing platform in New York, US. Fat Lama has attracted £2.25 million in funding to date. The sharing business model opens up new ways for citizens to participate in the sharing economy: The homepage has a 30-day leaderboard frequently showing individuals earning £3.000 or more.

Urban revitalisation to reduce waste dumping, a case study from the BownReg project (LV-LT)

Innovative brownfield regeneration for sustainable development of cross-border regions. The revitalisation of degraded urban areas reduces waste dumping in abandoned urban areas and give people opportunity to improve life quality by using revitalised areas for social activities.

	Description

Main Challenge	The abandoned degraded areas in Eastern Europe are in many towns and cities very close to city centre and living areas. Territories are characterised with ruins and abandoned infrastructure, unidentified soil and water pollution as well as attract illegal waste dumping activities. The Interreg BrownReg project develops pilot actions to revitalise such areas, reduces waste dumping and gives these areas new life, by developing open industrial parks with open office areas and public green areas with environmental education objects.
Overall cost of the action	The initial funding is received from Latvia-Lithuania cross-border cooperation program under EU Interreg. The overall cost of project is 0,8 million EUR. Nevertheless, data regarding the maintenance cost of the area is not available yet.
Timeline of the action	The ideas of urban area revitalisation were developed by Latvia University of Life Sciences and Technologies by cooperation of environmental engineers and landscape architects and Ludza Municipality and it finalised in approved project at the beginning of year 2018. The project is due to finalize on August 2019.
Supportive policy measures	The maintenance of project results will be funded by Ludza Municipality in order to ensure a successful afterlife of the project.
Financial measures	The project receives funding from the Interreg V-A Latvia – Lithuania Programme 2014-2020 equal to 646 270.69 EUR and the remaining amount of the budget is provided by the project partners.
IT tools	BrownReg homepage at Latvia University of Life Sciences and Technologies homepage and BrownReg Facebook account.
Departments, organisations, stakeholders involved	Latvia University of Life Sciences and Technologies, Ludza municipality, Environmental board, investors and local community.
Competences needed	There is need for multisectoral skills and competences: Entrepreneurial, administrative and legislative, environmental engineering, landscape designer, social behavioural sciences, public relation expert. The developers of BrownReg have all necessary skills and competences.
Barriers	The implementation at the beginning was complicated because of lack of information about historical contamination in this area. In this sense, the local community was also reluctant to the idea of excavating again the area and, overall, they considered it a waste of resources.
Success factors	Once the project was finally implemented, the public opinion shifted into positive reactions as the community understood that the initiative aims at developing local economy, reducing waste dumping and the revitalisation of the territory, which benefits them directly.
Target group	The main target group addressed by the initiative are inhabitants of Ludza city located at Latgale region in Latvia.
Monitoring	The development of area is organised in five stages: first investigation and research, second the development of design, removal of ruins and waste, third the information campaign for target groups, fourth development of open access green areas, phytoremediation and demonstration fields, and fifth the development of industrial park and open office area.

Resources and materials	The removed ruins are used as building material for roads, the removed dumped waste was collected, sorted and delivered to processing companies, the plants for phytoremediation were cultivated in laboratories of Latvia University of Life Science and Technologies. The methodology of innovative brownfield regeneration for sustainable development were developed by Latvia University of Life Science and Technologies and delivered to target groups

Results	Description
Environmental benefits/impacts	The remediated historical contamination and stopped leaching of hazard substances to Baltic Sea and removed waste dumps, increasing of green areas close to city centre improve air quality for local inhabitants.
Social benefits/impacts	Improved life quality, by open green areas, improved safety, by removing ruins, the positive impact on human health by improved air quality, the reducing poverty in region by new working places in industrial park.
Economic benefits (cost saved/revenue)	Industrial park and open office areas increase opportunity to attract investors and develop new working places.
Impact on policies	The positive example and demonstration area gives a positive impulse to develop similar areas in the region.

Surplus food supermarket, a case study from WEFOOD (DK)

Wefood supermarkets in Denmark sell food that regular supermarkets can no longer sell due to overdue 'best before' dates, incorrect labels or damaged packaging at discounted prices with aims to reduce food waste and support fight against famine worldwide.

	Description
Main Challenge	The Wefood supermarket chain is one of the DanChurchAid's initiative to fight against famine in developing countries around the world. The supermarket sells donated surplus products that has lost their value to food retailers (local supermarkets, distributors, wholesalers and primary producer mainly) due to overdue 'best before' dates, incorrect labels or damaged packaging at a 30-50% discounted price of market value. In this sense, two objectives are to be fulfilled: from one side they help reduce food waste in Denmark and from the other, they contribute to fight famine in developing countries through projects partially financed with the economic benefits obtained by this initiative.

Overall cost of the action	Among the incurred costs to set up and run the business it is to be highlighted the costs of renting the store space, fridges and furniture, electricity and the two store managers on payroll. As for the rest of workers, they are volunteers and, therefore, no other hiring costs are incurred in.
Timeline of the action	The first supermarket opened in February 2016 and before that date, their team spent 6 months researching on potential collaborators and set-up locations. A second branch was opened during 2017 and a third will open its doors to the Danish citizens in 2018. Moreover, since Wefood is part of the international network Act Alliance, they are constantly striving to find ways to expand their business models to other cities. In September 2018, there will be another Wefood branch opened in Helsinki by another network partner.
Supportive policy measures	Concerning food safety, Wefood must comply with the same regulations than the rest of supermarkets operating in Denmark (i.e. safe controls, cleaning standars, etc.). Furthermore, they also follow certain VAT regulations concerning food donations in the way that, if a traditional supermarket donates the surplus food to Wefood, they will not receive the VAT back and for this reason the chain buys certain amount to help them recover part of the taxes already paid.
Financial measures	The initiative is funded through a mix of channels. On one hand, Public funds are received from the Danish Government and the Ministry of Taxation, and on the other, they receive financial contributions from two private funds and re-invest some of the benefits obtained.
IT tools	Amongst the IT tools they take advantage of, a specific software for internal purchases, another for accounting purposes and, lastly, another one for the organization of volunteers' shifts. On top of these, they also use a platform from the Act Alliance called Act LEARN, where they can share their best practice with other partner organizations and share how they developed the initiative.
Departments, organisations, stakeholders involved	Wefood collaborates with several groups of stakeholders: the Danish Government, the Ministry of Taxation, NGO's and citizens in general. Nevertheless, the most important of them all are food retailers since they are their biggest providers of food donations.
Competences needed	Management and accounting skills are needed in order successfully run the business. Furthermore, they counted with the help of people that had experience in the food retail sector, which was key to kickstart the project. Besides, as the branches are based of voluntary work, they needed of the experience of someone with experience on managing this aspect.
Barriers	The largest challenge they encountered was related to the taxation law on VAT. Although they could solve it eventually, it took some time to understand how to fit their business model into the national regulations. Moreover, in the beginning it was more difficult to find enough providers to donate food. The demand of products was high since the start and there were not enough products to offer.

Success factors	Although the project is still at an early stage of development, several factors have contributed to its success so far. For instance, as the project develops, they have become better at managing the volunteers and provide for and the business overall. Furthermore, they put large efforts in collaborating closely with the food industry, which is essential in order to receive enough food to meet the customer's demand. Communication has also been vital to reflect in an effective way what they do and want to achieve and collaborations with other NGO's have proven to be very beneficial as well, since they never considered Wefood as competitors but rather another helpful initiative with the same objective.
Target group	The initiative is aimed directly at local citizens, which are the potential customers.
Monitoring	Internal revenue is constantly monitored and the type of products that are being sold. In this way, like the rest of supermarkets, they can understand what products are more demanded. Furthermore, they estimate the amount of food that enters and leaves the shops. At first, all the products were weighted but it turned out to be very time-consuming and counter-productive and, thus, they decided to rely on estimations instead.
Resources and materials	The resources needed for the initiative involve human resources at management and operations levels, physical space to set-up the stores, a network of collaborators to provide the products and financial support from donors.

Results	Description
Environmental benefits/impacts	During the first year of operations, in 2016, the first supermarket they opened saved 220 tonnes from the waste stream and with this the emissions associated with treating bio-waste as well as the resources needed to produce the equivalent amount of food.
Social benefits/impacts	The social benefits that the project provides are divided into 3 layers. Firstly, they provide community skills to the volunteers that help in the supermarket; secondly, they support communities worldwide with this and other initiatives with aims at alleviating famine; and thirdly, they allow citizens with low income to access food.
Economic benefits (cost saved/revenue)	Over DKK 1.000.000 (EUR 134.000 approx.) were raised during 2016. Moreover, as explained above, the organizations donating food are able to recover some of the taxes of that food that otherwise would have gone to waste. Once again, citizens with lower income can reduce shopping costs and lastly, the waste management department saves in collecting and treating costs of bio-waste.
Impact on policies	Many other non-profit organizations are helping to reduce food waste as well. However, the Danish food industry is more and more being involved into taking action as the publicity that contributing businesses receives helps them differentiate themselves from the competency, and this is stimulating the donations from the market.

Brewing beer from surplus bread, a case study from TOAST ALE (UK)

Toast Ale is an award-winning craft beer brewed with surplus fresh bread that would otherwise be wasted. All profits go to stop-wasting-food charities.

	Description
Main Challenge	In the UK nearly half of all bread produced is thrown away. A major reason is that bread sales is somewhat unpredictable. Bakeries consequently overproduce to ensure they will have enough stock for their customers. Supermarkets want shelves to always be full and dispose of edible bread that is past the sell-by or best-before date – both indicators of quality not safety. Sandwich manufacturers discard the heel end of loaves because customers don't eat crusts. *Toast Ale* produce beer by replacing one-third of the malted barley with excess bread donated by local bakeries. When sourcing bread, it must meet the following criteria: • The bread must be truly surplus: bread should be eaten, but if that is not possible, it should be used for brewing before given to livestock. • Plain bread, without additions: Seeds, nuts, fruits or veg would affect flavour and the head of the beer due to the fats they contain. Additions can also cause allergies. • The bread should be fresh, without mould and preferably sliced. • Fully traceable: brewers donate their spent grain to livestock and so they must have documentation that ensures the bread has at all time before the brew been segregated from meat and dairy. • Delivered in sealed containers Not all established breweries are running at full capacity all the time. When they're not brewing their own beer, either the equipment sits idle while the brewers control the fermenting tanks, or brew for others. *Toast Ale* cooperates with established breweries by using space, equipment, time and expertise that would otherwise be wasted, thus minimising the footprint. *Toast Ale* also encourages others to take on the initiative of using surplus bread for making beer and a homebrew recipe is available for free on the webpage.
Overall cost of the action	Working as nomadic brewers, *Toast Ale* did not require large capital costs upfront; and even now the team only has one full-time member. This keeps costs low and maximises profits, which all go towards *Feedback*, a non-profit organisation that tackles food waste.

Timeline of the action	Toast Ale was founded in 2015 by author and campaigner on environmental and social impacts of food production, Tristram Stuart. The first batch of Toast Ale was brewed in January 2016.
Supportive policy measures	Not specified.
Financial measures	Toast Ale has been financed by crowd funding.
IT tools	No special technology is used for the process, since surplus bread is simply incorporated into the brewing process with malted barley, hops, yeast and water. However, Toast Ale frequently uses social media to reach out to as many bakeries and brewers as possible and spread the use of their recipe.
Departments, organisations, stakeholders involved	Local bakeries Local breweries Stop-food-waste charities Advisory board (consisting of individuals and organisations)
Competences needed	Value chain management Brewing Marketing Logistics IT
Barriers	Not specified.
Success factors	To reduce food waste and make others do the same. Toast Ale was the first UK beer company to become a Certified B Corp, joining a global movement of people using business as a force for good. In October 2017 *Toast Ale* won the prestigious IGD Award for Sustainable Futures.
Target group	Individuals (citizens/tourists) Supermarkets (Tesco) & on-line grocery shops (Waitrose) Retailers Restaurants/pubs/cafés Caterers One-off events
Monitoring	Quantity of surplus bread utilized in beer production, profits from sales donated to stop-wasting-food charities, number of breweries joining the "rev-ALE-ution" campaign (see below)
Resources and materials	Surplus bread, yeast, malt, hobs Brewery facilities Branding material Distribution

Results	Description

Environmental benefits/impacts	By April 2018 *Toast Ale* had upcycled 15 tonnes of excess bread, brewed 178.000 litres of beer, and the homebrew recipe had been downloaded 30.000 times from the webpage. Toast is working on a campaign which they call "rev-ALE-ution", inviting brewers around the world to work with them to end food waste. The idea is that bread beer is brewed by local breweries, using local sources of fresh surplus bread and donating profits to support local charity organisations to end food waste and to fix injustices in the food system. In 2017, Toast Ale was launched in the US (New York), South Africa (Cape Town), Iceland (Reykjavik) and Brazil (Rio). Several other breweries have been inspired by them and have started to use surplus bread for beer production.
Social benefits/impacts	They have pledged that 100 % of their profits will go to the charity *Feedback*. In this way the impact on food waste will be greater than the quantity of excess bread utilized in the brewing process. *Toast Ale* license the brand globally and work with local food charities. In addition to a contribution to the company, the local breweries will donate a share of their profits to charities.
Economic benefits (cost saved/revenue)	*Toast Ale* aim to collaborate with local bakeries, who donate and deliver excess bread to the brewery, that would otherwise cost them to dispose of. This means that both *Toast Ale* and the bakeries win on the agreement. As a start-up, the initiative is not yet profitable, but forecast to return their first profits in 2019 and to donate over £3.6m to food waste organisations by 2020.

Wood chip ashes as fertilizers in urban agroforestry systems, a case study from the Koceni Municipality (LV)

Innovative wood ash recycling in circular economy context. The recycling of wood ash by using it in agroforestry systems of intensive bioenergy plantations reduce wooden ash deposit in landfills. The Koceni Municipality is working on a project to reduce urban waste (wooden ash) flow from wood chips cogeneration stations to landfills by using wood ash as fertiliser in intensive agroforestry systems of bioenergy plants.

	Description
Main Challenge	The global restructuration of energy sector from fossil energy to renewable energy sources are related with additional urban waste generation. In Latvia the most popular renewable energy source is woodchips and as buy-product of burning is wooden ash. In linear economy the wooden ash is as waste and mostly transported to landfills. In circular economy, where the main goal is to achieve zero waste by considering all waste as resources, the wood ash presents itself as an opportunity to be used as fertiliser for agricultural and recreational purposes.

	In this context, the Koceni Municipality, in collaboration with two ongoing projects, is working on an initiative to promote the reuse of wood ashes locally.
Overall cost of the action	The initial funding is received from EU as research project where agroforestry field were developed by Latvian State Forest Research Institute "Silava". The demonstration plot development is in progress where Latvian State Forest Research Institute "Silava", Latvia University of life technologies in cooperation with Koceni Municipality are planning to build a research plot. The overall cost of scientific research projects was 0,8 million EUR. However, the cost of pilot area in Koceni Municipality and maintenance cost of area is not available yet.
Timeline of the action	The ideas of wood ash reuse in agroforestry systems were developed by Latvian State Forest Research Institute "Silava" since 2010. Latvian State Forest Research Institute "Silava" and Latvia University of Life Sciences and Technologies by cooperation of forestry experts, environmental engineers and landscape architects and Koceni Municipality developed the project and planned to start the development of pilot area by 2019.
Supportive policy measures	The exploitation of project results will be funded by Koceni Municipality.
Financial measures	The projects "Accelerating production of forest bioenergy in the Baltic Sea Region (Baltic ForBio)" (Interreg Baltic Sea Region) and "Developing technological and engineering aspects for the utilization of wood ashes as fertilizer in forest cultivation" (ERAF funding) serve as a combined joint force to financially support the development of the initiative, together with the municipality.
IT tools	Microsoft excel is used for data collection and a specialized analytical chemistry software is used to analyse substances in ashes. On the other hand, the project uses the Latvian State Forest Research Institute "Silava" homepage.
Departments, organisations, stakeholders involved	Latvian State Forest Research Institute "Silava", Latvia University of Life Sciences and Technologies, Koceni municipality, Environmental board, local community and private investors.
Competences needed	There is need for multisectoral skills and competences: Entrepreneurial, administrative and legislative, forestry experts, environmental engineering, landscape designer, social behavioural sciences, public relation expert. The developers of AshRec have all necessary skills and competences.
Barriers	The implementation of the project is being successful so far, but the overall costs of the system are still high. In order to tackle this, the local Municipality is planning to reduce costs by excluding wood ash from total municipal waste amount and by decreasing costs of wood chips production.
Success factors	The aim to develop local economy, reduce waste deposit and reduction of energy costs in local municipality get positive reaction from local society.
Target group	Inhabitants of Koceni Municipality. Overall, the pilot project will provide a positive impact on the society and contribute to the transition into a more circular economy in Latvia.
Monitoring	The development of pilot area is organised in three stages where achievements are periodically monitored: first investigation and research, second the

	development of agroforestry plantation design, third the information campaign for target groups, and fourth development of open access green areas on agroforestry field.
Resources and materials	The resources needed relate mainly to the machinery for recovery, incineration, warehouse, laboratories, vehicles for logistics and agroworks, hardware and software (mentioned in "IT tools" section). The wooden ash produced in Koceni municipality will be transported to agroforestry fields with 7-10 years rotation and wood harvesting plan. Latvia University of Life Science and Technologies will develop the methodology of innovative circular economy model for wooden ash reuse in agroforestry systems and deliver material to target groups.

Results	Description
Environmental benefits/impacts	The wooden ash is used as fertiliser for agroforestry plantations. In this sense, there is reduction of leaching risks, increased sequestration of carbon in energy plantation as well as small step taken towards zero waste and low carbon societies. Furthermore, there is strong evidence of increasing biodiversity in agroforestry ecosystems as a result.
Social benefits/impacts	The quality of life of the local community is improved thanks to the facilitation of open green areas available for activities, the local production of energy wood, which improves safety, and the better air quality gained, that affects human health.
Economic benefits (cost saved/revenue)	Reduced maintenance costs of local energy supply systems attract potential investors and give opportunities for existing companies to develop new working places.
Impact on policies	The positive example of cost reduction and demonstration area inspires the local municipalities to adapt the initiative proposed and to contribute to a zero-waste model.

Zero-waste lodging, a case study from Quinta do Bom Despacho (PT)

Quinta Do Bom Depacho is a hotel located in Ponta Delgada, Açores (PT) that promotes sustainable events and offers high-quality sustainable accommodation to the conscious travellers, and with it the opportunity to participate in everyday actions within their premises to contribute to their objectives. The business is managed according to the sustainable development goals and operate zero waste to landfill policies and ethical purchasing, among other actions. The lodging company is also one of URBAN-WASTE's stakeholders.

	Description
Main Challenge	Quinta do Bom Despacho is committed to inspire other businessess, and people in general, to follow their business model and values for a more sustainable way of travelling. In order to achieve sustainability in all areas, the lodging company is committed to implement inspiring actions tackling the three pillars of sustainability (economic, environmental and social), such as: • Energy efficiency; • Preferred partners (local purchasing); • Ethical Purchasing Policy; • Innovative sustainable technologies; • Maximizing the use of resources; • Increasing the product life cycle. • Corporate Responsibility; • Promote community participation in our activities and principles • Community integration; • Incorporation of disabled people; • Code of conduct with workers. • Environmental responsibility; • Organig farming; • Protection of endemic plants; • Use of environmentally friendly vehicles; • Biological Pool; Amongst all the best practices that the hotel has undertaken and regarding waste prevention in particular, a zero waste to landfill policy had been set to be accomplished in the period of 3 years. Everyday, the staff weighs the amount of waste produced in all areas of the hotel, including rooms and kitchen, and collect the data in the environmental dossies in order to better understand the improvements made, to focus efforts where needed the most and to disseminate best practices among guests and other stakeholders.
Overall cost of the action	The costs associated with the zero waste to landfill policy relate to the time that the specific staff need to carry out the task of weighing the waste and recording the data in the logframe as well as for dissemination of best practices. Furthermore, although the costs incurred in sorting bins and the weighing scale are not specified, these do not require a large investment according to the hotel's management.
Timeline of the action	The initiative started in 2017 and, thus, two more years are left to achieve the 3-year goal. Up to date, they have made great progresses and after their goal is achieved they plan to keep on implementing such policy with the same efforts, which require continuous monitoring, management and dissemination of waste reduction practices to guests and other stakeholders.
Supportive policy measures	Quinta do Bom Despacho actions are certified by the Miosotis Green Lodging Certificate and the Green Growth 2050 Global Standard certification. For the

	latter, in 2017 Quinta do Bom Despacho achieved one of the highest scores, complying with over 400 criterias.
Financial measures	All initiatives are funded privately through own funds.
IT tools	After weighing the waste generated, the appointed staff enters the data in the Environmental Dossier, which has a Windows Excell format. For now, the scale used does not collet data automatically, but the management is considering switching to a system that could do it in the near future.
Departments, organisations, stakeholders involved	The main stakeholders taking part in the action are the hotel's staff and the guests. Quinta do Bom Despacho also organizes educational trainings for children and, therefore, collaborates with schools as well.
Competences needed	At least two staff members are required to implement this initiative: one of them is responsible for the daily waste count while the other is in charge of filling the data and transferring it into the Excel file. Moreover, the latter is also responsible for marketing to guests through social networks, with the goal of disseminating good practices together with them as inspiration. Their entire team has regular training on sustainable issues.
Barriers	The main constraint the hotel faces in reaching the zero-waste goal is the type of guest they receive. It is not possible to control or restrict the amount of waste produced by their guest and for this they undertake two actions. On one side, they strive to disseminate their values and good practices among guests; and on the other, they work on marketing and social media in order to reach the right target audience.
Success factors	Not only the environmentally concerned mindset of the staff and managers is key to the success of the actions, but also the guest's collaboration. Both, internal and external, human resources are needed to achieve the objectives marked. For the monitoring of waste generated, it is essential to count with the staff's will to carry out the task properly. Involving guests in their daily tasks and promoting all the actions they take, Quinta do Bom Despacho intends to be a driver of social change and prove that responsible travelling translates into simple actions that cam be done on a day-to-day- basis.
Target group	The lodging company aims at reaching a target of specific clients, i.e. guests with environmental awareness, who are concerned with the implementation of sustainable practices in their daily life and that identify with Quinta do Bom Despacho's values. Nevertheless, they also try to involve as many stakeholders as possible in an attempt to raise awareness of the surrounding community.
Monitoring	Monitoring is done through the daily recording of waste weighing (KPI's), where they can understand almost real-time which areas of the hotel are producing more waste and which fractions.
Resources and materials	One weighing scale, several sorting bins, protection gloves, two staff members and one computer are used to carry out the task.

Results	Description
Environmental benefits/impacts	Reducing CO2 emissions into the atmosphere by reducing the amount of waste directed to landfill and, thus, diminishing the number of waste collection journeys. Furthermore, other GHG emissions normally produced in landfills and incinerators are avoided, such as methane or ammonia.
Social benefits/impacts	Creation of employment, dissemination of recycling and awareness-raising practices and, overall, change in people's mindset and inspiration to a more sustainable travelling and way of life (effect on local community).
Economic benefits (cost saved/revenue)	A zero waste to landfill policy implies the recovery (both recycling and reuse) of all products, and this translates into energy, water and other resource savings. In addition, reusing a product means that there is no need to purchase another, increasing the life cycle of that product.
Impact on policies	By setting an example of sustainable lodging, Quinta do Bom Despacho, contributes to the transition into a more circular economy as they inspire other businesses in and out of Azores throught a model that has proven to be viable.

FlyMapper app for detecting illegal dumping, a case study from ZERO WASTE SCOTLAND (UK)

FlyMapper is a tool for reporting and monitoring flytipping that has been developed to help local authorities and other land managers tackle flytipping more efficiently and effectively.

	Description
Main Challenge	Flytipping refers to the illegal deposit of waste. Flytipping is an irresponsible act where value is lost in terms of: • Damage to eco-system services, impacting the appeal of areas and landscapes • Pollution, impacting the health and living conditions for plants, animals and humans • Materials being lost, impacting the access to materials and resources • Imposing significant financial costs on the taxpayers for cleaning up, impacting the economy By mapping where incidents occur, they become easier to clear up, to prevent, and to prosecute. FlyMapper is a tool from Zero Waste Scotland, available to local authorities and other land managers to monitor and report flytipping. The tool is built as an app

	and web-based system which allows flytipping incidents to be quickly and efficiently recorded in the field and for the status of each incident to be tracked. It centralises all the data recorded in an easy-to-use website allowing advanced planning, analysis and reporting. Features: • National spatial representation of fly-tipping • Integration with CRM software through FlyMapper API • Real-time notification of incidents • Free app download for Bring Your Own Device (BYOD) users • Uses mobile phone GPS to locate incidents • Integrated management reporting, including costs, fines and enforcement actions • Offline mapping available for use when out of signal range • Heat map displays hotspots of incidents • Incidents filtered by size, type, status, organisation or electoral ward Weekly notifications of incidents requiring attention
Overall cost of the action	In 2013 in Scotland there was an estimated total direct cost of at least £11m related to the clearance and disposal of flytipped waste. These costs do not include expenses for the investigation and prosecution of large scale and serial flytipping offences, dealt with by either the Scottish Environmental Protection Agency or the police. The cost of clearing up and preventing flytipping on private land in Scotland are not known but are presumed to be considerable.
Timeline of the action	FlyMapper was launched in 2015
Supportive policy measures	In Scotland flytipping is a criminal offence that can be issued with penalties or prosecution. Fines range from £200 to £40.000. FlyMapper is supported by Dumb Dumpers, which is a web-based reporting tool where citizens can report flytipping incidents directly to Zero Waste Scotland. FlyMapper is managed by Zero Waste Scotland, funded by the Scottish Government. Zero Waste Scotland works closely together with The Scottish Environment Protection Agency on Scotland's Zero Waste Plan, which sets out the Scottish Government's vision for a zero-waste society.
Financial measures	FlyMapper is a fully user-led project with functionalities being determined by the user community. The partnership nature ensures that the system is upgraded every year, with the cost of upgrades shared across the user community. Ideas for new features can be submitted at any time, with final decisions about what to include based on the available budget and user demand. The price of each license per year is £811- £2.384 but is funded by Zero Waste Scotland and, therefore, provided free of charge to local authorities and private land managers.
IT tools	FlyMapper has two components: FlyMapper Web and FlyMapper Mobile, which views onto the same dataset.
Departments, organisations, stakeholders involved	Joint initiative between Zero Waste Scotland and Fly Tipping Action Wales, developed by exegesis. FlyMapper combines field recording of incidents via a

	mobile application and the management of data through a central database which is shared by multiple organisations.
Competences needed	The app has been designed to be easily used by the waste management department staff to report and monitor the incidents in only three steps. The subsequent analysis and formulation of solutions involve a series of analytical and managerial skills.
Barriers	The majority of flytipping by weight is deposited in association with larger scale incidents, suggesting that offenders are often organised. The low probability of being caught appears to be a main barrier to changing the behaviour of those with low levels of guilt towards flytipping and to whom economic margins and perceived inconvenience are strong behavioural drivers. Another key barrier for why people wouldn't report flytipping is that they would not know how or prefer to let others deal with it. Parts of the public also seem to feel more accepting towards flytipping in places, where the user is charged for what they may perceive should be a free service, e.g. recycling centres, bulky uplifts, or where there is a lack of space to store larger waste items conveniently. There is also evidence that incidents like leaving a black bin bag near a bin store, are not even perceived an offense, and may not be reported at all.
Success factors	The fact that Zero Waste Scotland promotes the use of FlyMapper as the national tool to report and monitor flytipping drives local authorities to engage in implementing it.
Target group	Local authorities and other land managers mainly. FlyMapper is currently being used by over 25 local authorities with further authorities to join.
Monitoring	FlyMapper Mobile downloads onto most mobile devices and allows fly-tipping incidents to be rapidly recorded and photographed in the field, and existing incidents to be viewed and edited. It automatically synchronises with FlyMapper Web, which allows full editing, analysis and reporting of incidents.
Resources and materials	The app should be embedded into existing procedures for dealing with flytipping and, therefore, should not require any additional resources except from the user's mobile phones.

Results	Description
Environmental benefits/impacts	In 2013 it was estimated that at over 26.500 tonnes of waste was illegally flytipped in Scotland and dealt with by local authorities, with estimated more than 61.000 incidents occurring.
Social benefits/impacts	People value a clean environment and flytipping impact people's quality of life. The related social cost can be considerable but is difficult to monetize with a high degree of certainty.

Economic benefits (cost saved/revenue)	FlyMapper highlights the problems within a specific area and as a result you can prioritise the officer's time and give more resources to a specific area so that our actions can be targeted more effectively"
Impact on policies	Each country has a separate FlyMapper website that is used by all relevant local authorities and national agencies. Incidents in FlyMapper Web are visible to all local authorities, thus facilitating joined up management, but the ability to edit incidents is restricted to the authority in which they occur. Private organisations can also use FlyMapper to record and manage incidents, providing a much fuller regional picture than otherwise possible. Local authority incidents are not viewable by private organisations.

Circular furniture design, a case study from VAN DE SANT LTD. (NL)

Van de Sant produces sustainable design furniture made from recycled plastic with aims to reduce deforestation and plastic waste being littered into the environment while creating local jobs. The company strives to create a fully circular business model from the collection of resources until the final product is manufactured. Although they offer their designs to everybody, their target market focuses on the hospitality sector in high touristic areas.

	Description
Main Challenge	Van de Sant creates a fully circular model in their business by upcycling and recycling plastic waste and converting it into design furniture. In this sense, the company contributes to reduce the production of new plastics for furniture designs and to avoid plastic waste being littered into the land and ocean while creates local job, collaborates with local organization in reduce waste and, in essence, uses the final cycle of plastic to give them a new life. Moreover, by substituting wood for recycled plastic into their designs, they also help to alleviate deforestation. The company does not collect nor recycle the plastic waste themselves but collaborate with local recycling companies and NGO's to acquire the resource. Also, customers are offered the option of returning their furnitures once they do not need them anymore in order to reuse and recycle all materials and create new products once again.
Overall cost of the action	Since acquiring the recycled plastic is more expensive than wood, they must incur in higher costs than traditional furniture designers and, therefore, the overall selling price of their designs is also higher. Nevertheless, the final added value and quality of the products is appreciated by their customers. For the designing and manufacturing process, different machines are used but the most important and the ones that require more investment are the cutting

	machine (EUR 200.000 approx.) and the 3D printer (EUR 500.000 approx.). The latter is still very expensive because is a relatively new technology for high volume prints but as it develops further it will become less costly.
Timeline of the action	The project started 7 years ago while the first year consisted in testing and prototyping mainly before the company started commercializing their products.
Supportive policy measures	Van de Sant does not follow any particular policy at a local or national level but implement their own sustainability plan at a company level and try to make not only the final product sustainable but also the whole production process by exploring green energy and sustainable water management.
Financial measures	The initiative is 100% privately financed through own funds.
IT tools	Several specific softwares are used for different tasks: cutting design, 3D design, 3D printing, bookkeeping, etc.
Departments, organisations, stakeholders involved	The company collaborates with local recycling companies and NGO's but also founded and participates in a Working Group of different industries that gather to debate open source solutions to fight land and marine plastic pollution called Next Wave. It is the first cross-industry, commercial-scale global ocean bound plastics supply chain.
Competences needed	Different set of competences are needed in all phases of the initiative. For instance, planning skills, product development and designing skills, 3D designing skills, marketing and communication skills among others.
Barriers	The production process demands a lot of energy at the moment and they are looking into possibilities to reduce it. Moreover, communicating what type of furniture they are producing is difficult as they have learned that the first impression that people get is that the furniture produced is made from normal plastic. Therefore, the company is working hard on communicating better what is the actual value of their designs and the story behind it.
Success factors	One of the main factors that contribute to their success is the quality of the products they offer and their added value as sustainable furniture. Furthermore, they collaborate with known designers as well and release signature designs to attract higher income customers. However, changing people's mindsets remains the main focus from the beginning of the project.
Target group	The initiative is addressed to everybody but during the past two years they have been focusing on the hospitality sector, as the demand is higher. Although corporate organizations, hospitals or government buildings are part of their market as well.
Monitoring	Van de Sant applies internal indicators related to the production and commercialization mainly.
Resources and materials	The main resource to produce their designs is the recycled plastic, which price varies depending on the supplier. Moreover, as already mentioned in the "overall costs of the action" section, different machines and softwares are needed for the entire designing and production process.

Results	Description
Environmental benefits/impacts	With this initiative Van de Sant is helping to alleviate deforestation, by replacing wood for recycled plastic as a resource, to reduce the amount of plastic that is already littered into the environment and to avoid potential plastic pollution. As an illustrative example, one chair contains around 25kg of plastic waste.
Social benefits/impacts	On the one hand the company helps create local jobs as they collaborate with local collectors and recyclers. On the other hand, they contribute as much as possible to change people's mindset into a more sustainable consumption and an overall transition to a circular economy.
Economic benefits (cost saved/revenue)	Despite the large initial investment required, the business opportunities are wide, and the company assures that since the beginning of operations their turnover has been steadily increasing.

Measure 3 – On-site composting in tourist establishments, a case from Silo restaurant (UK)

Implementing an on-site composter in tourist establishments like hotels and restaurants with aims to minimize the food waste generated and transform it into a resource -compost- to be used to produce more food. By doing so, the amount of waste diverted to landfill or incineration treatment is reduced.

	Description
Main Challenge	The objective of on-site composting is to eventually reduce the amount of food waste generated while receiving in return a source of material to fertilize crops organically. To do this, Silo restaurant has an electrical composter that produces up to 60kg of compost every 24h. Since their food waste is minimal due to the way their menu is conceived, they offer its services to neighbours and commercial. In this sense, Silo restaurant strives to make an example for the future and combines this initiative with many others in order to comply with their zero waste strategy.
Overall cost of the action	The purchase of the electrical composter itself had a cost of £20.000. Then, there is also the cost of electricity to run the machine, which can be elevated at times. As for the rest of initiatives of their zero wastestrategy, these do not cost much. Mainly, it is a matter of spending time trying to find ways to reduce the waste produced in relation to food waste and packaging. You need to spend a lot of time trying to find ways to not to have packages.

Timeline of the action	Silo restaurant started operating in 2014. The electrical composter was installed from the beginning of their operations and it is planned to keep running indefinitely.
Supportive policy measures	No supportive policies have been considered for the implementation of the initiative.
Financial measures	The composter was financed at the same time than the set-up of the restaurant. From all the investment to start their business, £60.000 was own-financed and £30.000 through "crowdfunding".
IT tools	No IT tools used for the composter itself, but Silo restaurant uses social media to disseminate their actions.
Departments, organisations, stakeholders involved	Silo's management and staff, neighbours and commercials.
Competences needed	No special competences needed, since the functioning of the composter is simple. However, the staff needs to be well informed on the waste that can be used in the machine. For instance, they have had troubles with biodegradable bags in the past.
Barriers	The composter requires a lot of space, but it is not a major challenge. Furthermore, another barrier could be the way they obtain benefits back from the use of the composter. Nevertheless, in their case they provide it to local food growers who give organically produced food back to the restaurant.
Success factors	The engagement of the staff and the customers.
Target group	Customers and citizens in general.
Monitoring	Nowadays Silo restaurant do not monitor the amount of compost produced. They found out years ago that this amount rounded up to 60kg per day.
Resources and materials	The electric composter and electricity.

Results	Description
Environmental benefits/impacts	By composting all the food waste produced, Silo restaurant contributes to reduce GHG emissions and electricity related to the landfilling of the waste that would otherwise end up there.
Social benefits/impacts	Their initiative feeds the connection between different people, like neighbours and restaurants, which boosts community building. Moreover, the owner of the restaurant often gives talks in schools and other institutions to increase awareness and share their good practices.
Economic benefits (cost saved/revenue)	There are cost savings related to the avoided collection of waste.

Measure 6 – Partnerships between hotels and charities for re-use initiatives, a case study from Technology for Everybody (ES)

The TxT (Technology for everybody) non-profit organization, through their daily activity and the Reutilitza Program, repair and donate electronic equipment with the objectives of reducing electronic waste that could potentially pollute the environment and raising awareness among citizens.

	Description
Main Challenge	The main challenge is to bring back to life electronic and IT equipment and components to prevent further pollution due to electronic waste and to raise awareness about this type of pollution.
Overall cost of the action	The work is done mainly by TxT (Technology for Everybody) volunteers. Students of the Bachelor Degree in Informatics of the Barcelona School of Informatics carry out the practices of some subjects within the program. In addition, some students of medium and higher level of vocational training carry out their unpaid internships (350 hours / students) within the program. The only attributable cost is a scholarship of 15 hours per week. This grant is used to manage the warehouse, deliveries and collection of computers by the entities.
Timeline of the action	In 2003, TxT (Technology for Everybody) was founded. From then on, several projects have been carried out in more than 10 countries and 3 continents with reused equipment. Also, the daily activity of TxT includes the reception, repairing and donation of obsolete equipment to several charities and social entities.
Supportive policy measures	Every equipment donation they make is given under the condition that, once the equipment is in fact obsolete and cannot be further reused, the entity that received the donation takes care of the proper recycle of the equipment and components they had.
Financial measures	The main funding sources come from Catalonia's local administration and from the Universitat Politècnica de Catalunya. Other sources of resources are the Barcelona School of Informatics, which provide spaces to perform their activities, and the several entities and individuals that donate equipment.
IT tools	To facilitate the management of the equipment they use an open source inventory system developed by their fellow entity e-Reuse. At every equipment repaird, they always install open source software (Ubuntu, LibreOffice, etc.) in order to maintain coherence with their principles and values.

Departments, organisations, stakeholders involved	The InLab (Center of Computing of the Barcelona School of Informatics - FIB), in collaboration with the Center for Development Cooperation (CCD) of the UPC, are the main stakeholders involved, providing resources and room. This initiative was started in 1998 by members of the InLab on a voluntary and altruistic basis. Later, a group of FIB students and teachers motivated by cooperation were added to it and created TxT. TxT is currently formed by university teachers and staff, student volunteers and scholars that share evenly the different responsibilities of the program.
Competences needed	There are different profiles: General competences: helpdesk skills, able to speak to unknown people, documentation skills and planning skills. Hardware technician: should know about OS management, general electronics and computer hardware troubleshooting. Software technician: should know about web development and file managing.
Barriers	Variability of donations across the year is one the main barries faced. They cannot always meet all the demands of the entities because they do not always have all the equipment requested. When this happens, they try to satisfy the requests based on the computers that are available. This problem occurred mainly in the first years of program execution, but for two years they have been able to meet the demands of the entities requesting equipment without any problems.
Success factors	The Reutilitza Workshop is a biannual week of conferences and workshops that raises people's awareness and mainly contributes to spread our vision and values throughout the university community. It is usually a source of inspiration for some that end up volunteering with them in order to contribute to the cause. Students of the Bachelor Degree in Informatics of the Barcelona School of Informatics carry out the practices of four subjects within the program in this workshops
Target group	Any social entity or charity that has no political nor economic motivation is their target, since their goal is not only to repair broken computers but to put them to good use in the society.
Monitoring	From its beginning, TxT has had as main indicator the number of processed equipment (i.e. the number of equipment received, repaired and successfully donated and that have had several more years of lifespan). Until now, they have processed and given more than 2000 computers and electronic components.

Resources and materials	In their daily activity, they mainly use reused containers (cages) where we deposit electronic waste for proper disposal. In special occasions, they print some leaflets and sticker logos in order to make them known among people.

Results	Description
Environmental benefits/impacts	An invalid computer for a company (because it is considered as obsolete) can extend its useful life if it is donated to a less demanding environment such as NGOs, schools or other entities, thus having a positive impact on society and on the environment, increasing its amortization and decreasing pollution due to yet reusable equipment.
Social benefits/impacts	Because of the donations made, they help either non-profit entities themselves that cannot afford to buy electronics but need them to perform their activities and the environments where they are used, mainly collectives at risk of exclusion and people with special needs.
Economic benefits (cost saved/revenue)	Since TxT is a non-profit entity, there is no economic benefit that can be directly accounted to their activity.
Impact on policies	Thanks to their experience with the program, some TxT members are involved in national and international projects to define and improve resource reuse policies.

Measure 7 – Substitution of disposable products in hotels, a case from Conca Park Hotel, Sorrento (IT)

Substitution of disposable products with reusable ones in hotels in order to reduce the amount of waste generated: for instance, the substitution of single-use shampoo for refillable dispensers.

	Description
Main Challenge	"Conca Park Hotel" strives to increase recyclability by separate collection and reuse of various waste fractions. The hotel aims at reducing the overall waste production and, by doing so, become a leader in the sustainable tourism of the area.
Overall cost of the action	No planning costs and no extra management costs. The cost for disposable materials has been replaced with the cost for sustainable alternatives. No extra monitoring cost since the staff is so involved in the effort and help with the monitoring.

Timeline of the action	The initiative started in 2014. There is no deadline; the main goal is to keep improving.
Supportive policy measures	Communication is critical**;** through display all over the hotel and information given by the staff, guests become involved in the effort.
Financial measures	Virtually nothing. The effort has resulted in a reduction of 15 % on the waste tax
IT tools	Not specified.
Departments, organisations, stakeholders involved	Senior management and staff; some gimmicks have been adopted to make sustainability more accessible to guests.
Competences needed	Management skills and teaching the staff good environmental practices.
Barriers	Without an appropriate communication, guestscould hardy accept sustainable alternative instead of the classic ones.
Success factors	High interest in green economy, not acting like teachers, putting an effort into making sustainability fun and easy.
Target group	Primarily the hotel guests, but there is no a specific target group set.
Monitoring	Energy and water consumption is registred weekly. Food leftovers and waste produced from every part of the hotel is recorded and registred every day.
Resources and materials	Refillable dispensers are used for sugar, marmalade, honey. Designed bins make separate collection unmistakable. There is a water dispenser where guests can refill their recycled water bottles for free. Old table cloths are resewn into washable, reusable napkins. The hotel has a compost machine, a glass grinder machine, and has applied smart technologies.

Results	Description
Environmental benefits/impacts	The hotel has reduced its overall waste production by 50 %. 95 % of the waste is collected seperately and 90 % of the food leftovers are recycled. Waster consumption: 260 l/guest night Electricity consumption: 11 kWh/guest night No plastic bottles, only recyclable bottles are used for drinking water. Buying in large quantities and using refillable containers/cloth napkins reduces unnecessary packaging waste and saves 300 deliveries to the hotel per year. Locally produced food is always preferred and the hotel has its own vegetable garden and olive grove, thus transport is kept at a minimum. The hotel kitchen has conceived smart menu to avoid food waste; they search for the greenest possible products, buy only what's necessary, reuse leftovers as much as possible and compost raw inedible peels and leftovers. Grinded glass is used for swimmingpool filters.
Social benefits/impacts	The hotel also collects clothes and care products left by guests. Every month the items are given to a local charity association. By 2017 the hotel had collected 200 kg clothes and care products for charity.

	Food products are bought from local businesses only, which benefits employment in the local community.
Economic benefits (cost saved/revenue)	Advantage on waste tax, energy saving, long term investments.
Impact on policies	Not specified.

Measure 8 – Reuse initiative in camping sites, case studies from Vendée and the Baltic States

Providing "give boxes" to tourists in camping sites so that they can donate items that they no longer need or take a needed one, in order to reduce the amount of waste to be treated.

	Description
Main Challenge	Reducing solid waste through prevention and reuse of items by other incoming tourists.
Overall cost of the action	In Baltic States similar initiatives have the cost 50.000-200.000 € for several months and then municipalities overtake the process.
Timeline of the action	In Baltic States have been such average length 3 – 6 months and then proceeded with different success
Supportive policy measures	Municipalities initiative and NGOs
Financial measures	Local municipalities + camping sites themselves, voluntary work
IT tools	For Vendée: webinars, software for organization, accountancy tools, design programs for posters and brochures. No specific data bases organized in Baltic States
Departments, organisations, stakeholders involved	5 municipalities in Vendée; 25 camping sites in Vendee, NGOs. Examples of similar actions in Baltic States show that everybody is interested in when municipality is enthusiastic and cofinance activities, then also NGOs help with organizing.
Competences needed	Organizational and managerial mainly. Progressive thinking inhabitants and locals necessary. Educational support via schools
Barriers	Lack of awareness at times; lack of know-how to implement it in easy and operational way.
Success factors	Most of success came within the voluntary and enthusiastic actions in order to maintain sustainable operations, diminish resources, therefore people had

	enthusiasm in most cases to implement and to use if such opportunity is provided
Target group	250.000 tourists annual in region, however, pilot cases were intended to promote use of sustainable practices broader – that is in Vendee have no more information rather than in internet based. Baltic States examples showed 100.000-500.000 tourists a year where this was implemented, making costs of action 0,5-2€ per tourist a year.
Monitoring	Municipalities follow-up camping sites initiatives.
Resources and materials	Give boxes, leaflets, information in municipalities and tourist information, schools

Results	Description
Environmental benefits/impacts	Mostly, benefits are environmental awareness and making camping sites greener in general. Waste reduction is less quantitatively significant. No information on tourist growth due to actions. More interest of locals to clean up annually in cleaning activities because people understand the progress and see it
Social benefits/impacts	Campaigning was a team-building experience and implementers acquired more knowledge among on sustainability issues
Economic benefits (cost saved/revenue)	Not calculated in Baltics. Cost of 0,5-2 € per person. Environmental benefit of circularly reused material not defined, but rather bigger assumed if broader circular benefits are taken into account.

Measure 9 – Communication campaign on reuse through swap markets, a case study from the City of Copenhagen (DK)

Organisation of swap markets in public places to promote reuse initiatives as well as to raise awareness on waste generation. Every exchanged or reused product (e.g. clothes, books, toys, etc.) translates into waste prevented.

	Description
Main Challenge	From the waste hierarchy waste prevention is prioritised. It is known that a lot of goods are disposed off when people get tired of them despite the goods are still in good condition and can be used for many years. To prevent waste in City of Copenhagen swap markets are arranged. The event is held in the square in front of the city hall once a year. Citizens can bring goods and clothes they want to give away to others. The swap market is open for everybody. By the end of

	the day all remaining goods and clothes are collected by charity organisations who then sell them in their charity shops. If some clothes are in a bad condition the textile is send for recycling via the charity organisations.
Overall cost of the action	The cost depends on the size and ambition for the event. If the weather permits the event could be held outside, if not a tent or rooms are needed. Some equipment is needed tables, signs (showing different categories like children's clothes, games, plants). Volunteers helped for the event in Copenhagen, but a guard was hired to be sure people behaved and followed the rules. The salary for the guard should be included in the budget. Also, coffee and bananas were served for free since the event was combined with the promotion of fair trade products. One way to serve food or drinks is to invite local producers to show and maybe sell their products.
Timeline of the action	Time is needed to plan the event, arrange with volunteers to help during the day, arrange with charity organisation to pick up left over goods, book location, book tent, tables and print signs.
Supportive policy measures	Not specified.
Financial measures	Not specified.
IT tools	Not specified.
Departments, organisations, stakeholders involved	Municipality NGOs volunteering to help Charity organisations Local producers for promoting local products
Competences needed	Planning of large events Organisation of volunteers Knowledge about reuse and charity organisations
Barriers	Not specified.
Success factors	Not specified.
Target group	Citizens of all ages to educate people about resources and reuse as well as giving them the possibility of swapping goods and clothes.
Monitoring	At the entrance people were counted and if they brought things to swap these were weighted. People were encouraged to bring goods and clothes but were also allowed in if they did not bring anything. One rule was introduced from the beginning – one can only take what one can carry, meaning it is not allowed to fill a truck.
Resources and materials	The event should be advertised by the most suitable channels available for the city. If the weather permits the event could be held outside, if not a tent or rooms are needed. Some equipment is needed tables, signs (showing different categories like children's clothes, games, plants). Think about if any refreshments should be provided.

	Staff/helper shirts for all the people helping during the event – in this way the visitors can easily find a person ask if they are in doubt about something. Signs to put outside the event to attract people who do not know about it.

Results	Description
Environmental benefits/impacts	Saved production of new products since goods and clothes are directly reused.
Social benefits/impacts	Swap markets gives all citizens an opportunity of getting goods and clothes for free. In Copenhagen all kinds of people came by, and they all both gave and got some things.
Economic benefits (cost saved/revenue)	Since citizens get clothes for free, they save money. At the same time, waste collection costs are saved.

Measure 12 – Sorting bins in public and touristic places, a case study from the City of Florence (IT)

Implementation of waste sorting bins in touristic public areas (city center, historical districts, tourist offices, beaches, train stations, airports, harbours, museums and parks) to increase the amount of waste sorted and recycled coming from the tourists and the residents.

	Description
Main Challenge	The main problems to be resolved with the adoption of underground stations in the historic center are the following: to provide sufficient volumes for the delivery of waste by domestic and non-domestic users; to improve the decor and the hygiene of the old town with the elimination of road containers, objects of waste abandonment and improper use; extending wide-spread throughout the historic center a separate collection, also extended to the collection of organic waste; to offer an appropriate service to the needs of waste production sustained by a growing tourist presence in a small historic center
Overall cost of the action	The costs incurred for the transformation of the collection service in the historic center, through the extension of underground stations, are mainly related to the investment by both the municipality and the waste management company, in relation to fixed infrastructures (excavations, prefabricated boxes and road structures) and mobile equipment (metal footboards, conveyor turrets and underground storage). The investment, to be activated within 10 years, for the realization of c.ca90 underground waste stations, within the historic center of Florence, amounts to about €5,000,000. Design costs are internal to the waste management company that is equipped with an appropriate structure designed for the planning, design and construction of waste management infrastructure.

	The design of underground stations is only a part of the activities carried out within this structure, which consists of an average of 6 technicians, with an annual cost of around 300,000 euros a year.
Timeline of the action	The project began with a first experimental mixed installation, in Piazza Santa Maria Novella (compactor and non-compact units) in 2009. From 2010 until today, the project i has developed with a standard model that has privileged 5 mc underground bins, without compaction, on three categories of waste (UW, Organic and heavvy Multimaterial: plastic, glass and metal cans). From 2010 to 2017, in seven years of activity, 47 underground station were carried out, with an average of about 7 jobs per year. The extension plan should be continued and completed by 2020, with the creation of 90 locations across the historic center.
Supportive policy measures	Project support policies are of a cultural and managerial nature. The project is supported and wanted by the municipal administration of Florence, also as a support activity for the actions to preserve the peculiar features of the Old Town, declared UNESCO's heritage. The management part, however, is entrusted with the communication and control exercised by internal staff over the underground stations, through continuous contact with domestic and non-domestic users, to improve the behavior on the separate collection, to reduce the waste generation. One of the actions put in place to support communication, especially for the benefit of tourists and occasional attendance in cities, is to create a multilingual APP, to be made available to all accommodation facilities, which can provide useful information, both on how splitting waste, both where and how to convey them in the urban sphere.
Financial measures	Funding sources for the project implementation, apart from an initial contribution from the Tuscany Region, are undergoing the start-up of activities, are entirely autonomous (self-financing) by the waste management company. The investment costs, along with the depreciation thereof, as well as the costs of the operation, are reversed to the Municipality, which covers them by collecting the specific municipal tax (TARI) of domestic and non-domestic utilities.
IT tools	The projects put in place to support the underground station project are two: the first one to build a multilingual APP for tourist information support on how to split waste, where and how to convey it in the urban area; the second is the realization of the volume sensors to be inserted inside the underground stations, which are able to provide in real time the degree of filling of the containers, for each type of waste, the operation of the waste towers, as well as providing of the indications that are useful for the optimization of the collection rounds, in relation to the maximization of the volumes to be collected and the reduction of fuel consumption and emissions in the collection vehicles.
Departments, organisations, stakeholders involved	The stakeholders involved in the project are different: first of all, the municipal administration of Florence, which has promoted the project; The Unesco office of the City of Florence, which closely follows the development of the project; The archaeological Superintendence of the Tuscany Region, which has seen in the surveillance of the yards a useful and unique opportunity to carry out reliefs, excavations and surveys on a widespread archaeological heritage of the city; consumer associations and citizens who see, in the progressive implementation

	of the project, the solution to many decorative hygiene problems in their city, as well as an effective control of collection costs, in spite of a significant increase in separate collection; traders' associations, who see the project as a viable and sustainable waste management solution, useful to both their business and the city's décor.
Competences needed	The skills to develop such action include, in addition to having specific expertise in the methods, techniques and designs for the design and development of integrated waste management, a knowledge of the urban structure, the ability to analyze the factors of use of the city (social, economic and cultural factors), ability to tackle and solve complex problems such as waste management in a structured, stratified and complex system such as the city of Florence.Additional skills are typical for executive architectural design and for conducting urban sites for the realization of infrastructure and network services.
Barriers	The factors that make it difficult to implement such a project are mainly related to the consultation and analysis of the opinions of all stakeholders involved in the Services Conference, a procedure for the approval of the submitted projects. In some cases, opinions are discordant with respect to possible locations, with aesthetic, social, cultural and economic motivation, in other cases there are obvious constraints on the underground presence of complex systems and networks to be avoided or road traffic problems. These factors lead to postponing and re-introducing alternate project hypotheses, thus lengthening the time for the realization of the hypothesized positions. Despite extensive consultation in Service Conferences, often open-site sites find us challenged by private individuals or public entities who do not approve of their choice and who seek in all ways to hinder the execution of the work. This too is a constraint that is solved in the elongation of time and authorization procedures.
Success factors	The actions that have contributed most to the overcoming of the obstacles to the implementation of the project are mainly those related to the results obtained. Every relocated site, beyond the difficulties and controversies surrounding the site's choice, once put into operation, has also convinced the most pervading opponents in relation to improving decorative conditions, hygiene and efficiency of the service, with extended benefits to a much larger area than the one bounded by the single station. The same result was achieved with the "showcase" effect that the city of Florence offered to the new collection system, which is photographed and advertised in the world by individual tourists who appreciate the model adapted to the architectural peculiarity of the city of Florence. The inclusion of the project in the actions for the protection of the protection of UNESCO's historic center has also determined a success factor and attributed a greater value to the UWC project.
Target group	Users who pose major problems, and who have been contacted individually to address their specific problems, are non-domestic users, with particular regard to catering facilities and to a lesser extent to commercial businesses in general. These are the major production managers of waste generated in reduced spaces and with dysfunctional conditions. In many cases this type of utilities is offered an ad hoc collection service for some categories of waste, to prevent their

	specific production from having a negative impact on the volumetric reception capacity of the underground station to be realized.
Monitoring	Monitoring is carried out every day, both with the collection service, sometimes carried out several times a day, and with the cleaning and maintenance of underground plots. This allows you to check the performance of the service day by day and to have specific actions, both for cleaning and maintenance of the devices. In addition to the kind of monitoring that we can define as a service, we also carry out inspections through Environmental Inspectors, the quality and quantity of waste provided by individual users, and also increased penalties for incorrect transfers or abandonment of waste outside the containers.However, statistics on the quality and quantity of waste production are carried out on a semi-annual basis to verify the actual trend of waste and separate collections compared to the targets set for any project implementation phase.
Resources and materials	The most used tools to encourage communication on the state of progress of the project, are in succession: Press conference; ads on the website; leaflets attached to the individual waste bins to be eliminated, according to the new underground location; exceptionally neighborhood assemblies.

Results	Description
Environmental benefits/impacts	The main environmental benefit has been achieved with a substantial progression of Separate Collections in the UNESCO historical center, where from 2011 to 2017 a total increase in recycled materials ranged from 31% to 60%. A leveling of total waste production, in spite of the steady increase in the shareholdings for over 15% over the same period. The benefit in terms of emissions is therefore particularly relevant to the amount of undifferentiated waste extracted from landfills. With regard to the emissions generated by the means of collecting the benefits, only the best performance of the vehicles used in the last generation of emissions in terms of emissions can be reported. The additional benefits have been gained in terms of operating costs, with the extension of the robotic mono-operator service, instead of the traditional rear-loader traditional waste collection service, provided for the use of a team of three people (driver + 2 operators).
Social benefits/impacts	Positive social impacts are attributable to the greater communicative capacity of the separate collection system, especially for the weaker and extra-community social strata, often used in commercial and catering shops. The system has had an effective impact on understanding and sharing on these social strata, well beyond the difficulties of communication and management posed by other systems, such as the "door-to-door".Social benefit is therefore a cultural growth of some social strata that had difficulty understanding and collaborating on green economy strategies.
Economic benefits (cost saved/revenue)	The economic benefits are deductible from the following projection with respect to the total waste production within the historic center of Florence (Unesco Site). With an annual output of around 42,000 tons of municipal waste, make separate collection with a yield of over 60%, the service performed with underground stations has a total cost lower than the door-to-door, around the

	19%. With the same level of separate collection and annual production of waste, compared to an annual cost projected on the door to door service of about 10.9 million Euros, the underground stations system would have an annual total cost of approximately 8.800.000 Euros, with a saving for the community of about 2,100,000 Euros.
Impact on policies	The impact on city management policies, especially in relation to private initiatives, has been positive. Both inside UNESCO's historic center and outside this area, private individuals presenting redevelopment, restructuring and reuse of important building complexes are invited to present in their projects the location of underground stations to adapt to the separate collection of waste in that urban area. The projects are then approved with the implementation of underground stations, of which the private is eligible for the relocation cost for the building part, as a contribution to urbanization costs. In this manner, the UWC project has led to the development of a virtuous system in which redevelopment of public spaces sees both public and private contributions.

Measure 14 – Waste sorting instructions translated, a case study from Kymenlaakso Jäte (FI)

Translation of waste sorting instructions from collection points' signs and brochures to be distributed and shared online in order to better inform foreigners and tourists and, thus, improve recycling rates in the region.

	Description
Main Challenge	*Kymenlaakso Jäte* is the regional waste management authority that manages waste collection and treatment from households of the 7 municipalities that integrate the region. Among all the measures that they conduct, the translation of waste sorting instructions in other languages is one of them. *Kymenlaakso Jäte* intends to increase the citizen's awareness regarding waste sorting in order to reduce the amount of waste generated, addressing immigrants or tourists coming or living in the region. For this, they included translated information in "eco-points" (currently, only the names of the different fractions, but not the detailed information underneath), and they developed brochures to be distributed among interested users, available under request or in their website. The local language is Finnish, and the translations are made in Swedish, English and Russian.
Overall cost of the action	The translations are subcontracted from a local company, and the costs of this service are around 2.000 € per year.

	The brochures are developed by the workers from the "Information to public" department. Therefore, there is not any additional cost regarding this rather than the regular workers' salaries. For the printing and distribution of brochures, there is no available data.
Timeline of the action	The whole action takes between 2 and 4 weeks to be delivered, including the design of the brochures, translation, printing of brochures and uploading in the website. As for the translation itself, it normally takes between 1-2 weeks to be done.
Supportive policy measures	For their general activity, *Kymenlaakso Jäte* follows a more general sustainability policy from the national government, but focuses on their own policies, which are more detailed and specific. Nevertheless, they do not follow any specific policy for the translation of waste sorting instructions.
Financial measures	The funds acquired for this initiative comes from the "eco-payment" fee that households pay monthly within each municipality. In this sense, the funds obtained are purely public.
IT tools	No specific IT tools used.
Departments, organisations, stakeholders involved	The following stakeholders were involved in the implementation process: • "Information to Public" Department – for the design and upload of brochures in website • Local private companies – one for the translation of brochures and another one for printing these.
Competences needed	Language skills are required for the translation of the instructions. In this case, *Kymenlaakso Jäte* subcontracts this service from an external company. As for the production of the brochures, the team in charge of this task is formed by two workers, but no special expertise for the designing was required.
Barriers	No barriers identified.
Success factors	The quality of the translation service was essential, as well as the efficiency in relation to time and cost.
Target group	Tourists visiting the region and immigrants living there permanently, that do not speak the local language.
Monitoring	*Kymenlaakso Jäte* conducts surveys regularly to monitor the impact of their activity. However, these are targeted mainly to the Finnish-speaking community, since tourists are scattered around the region instead of being concentrated in one area in particular.
Resources and materials	The main resources used are: • Brochures • Signs • Human resources for translation, design and distribution

Results	Description
Environmental benefits/impacts	All of the actions conducted contribute to reach high levels of waste recycling. At the moment, around 95% of the waste produced in the region is either reused, recycled or converted into energy. Thus, the amount of waste produced is reduced, lowering the environmental impacts overall.
Social benefits/impacts	The translation of waste sorting instructions helps to keep citizens well informed.
Economic benefits (cost saved/revenue)	Having well informed citizens and tourists regarding waste sorting increases the amount of waste recycled, which in turn saves costs for the extraction of raw materials for the production of new goods.
Impact on policies	*Kymenlaakso Jäte* is publicly owned.

Measure 17 – Pocket boxes and ashtrays against litter, a case study from City of Copenhagen (DK)

The distribution of small containers (i.e. small boxes, pocket ashtrays) to tourists to raise awareness on littering and its effects and give them a concrete solution to handle litter.

	Description
Main Challenge	The main challenge is litter in the city. Pocket ashtrays and pocket dispenser for waste bags are handed out during summer to prevent litter in the form of cigarettes and small pieces of waste. This creates awareness about waste in the city as well as gives citizens the opportunity of helping to keep the city clean.
Overall cost of the action	Cost of the ashtrays and pocket dispensers as well as distribution and communication.
Timeline of the action	In City of Copenhagen the action runs during summer since most people use the open space during that period. Litter is a problem when a lot of people are gathered outside.
Supportive policy measures	Not specified.
Financial measures	Not specified.
IT tools	The campaign has been supported by the Facebook page of keeping the city clean. The slogan is "REN kærlighedtil KBH" ("Clean/pure love for Copenhagen", in English).
Departments, organisations, stakeholders involved	The pocket ashtrays and waste bag dispensers can be distributed via local shops. Also the ashtrays can be distributed during events.
Competences needed	Not specified.

Barriers	Not specified.
Success factors	One success factor is cleaner streets; another is that the ashtrays themselves are not disposed off.
Target group	The target group is people spending time outside smoking cigarettes or having a picnic.
Monitoring	Not specified.
Resources and materials	The goods themselves; pocket ashtrays and pocket bag dispensers. Communication campaign is needed. In City of Copenhagen it was included under an existing campaign.

Measure 19 – "Awareness campaigns against marine litter", a case study from Promemar (ES)

Launching of awareness campaigns against marine litter in order to create a more conscious mindset among citizens regarding the preservation of the marine environment.

	Description
Main Challenge	PROMEMAR in an environmental non-profit organization located in Tenerife (Canary Islands, Spain) that started operating in 2013. Their work encompasses environmental education and trainings in schools and in other organizations focused on children as well as the development of projects and actions against marine litter, like the organization of awareness campaigns with beach clean-ups to reduce it. The awareness campaigns that focus on environmental education normally consist of an information stand where interested people receive information on recycling practices or workshops held at schools. For the clean-up campaigns, these always take place at the beach and include 2 types of cleaning teams: scuba divers for litter at sea and a ground team for the litter around the beach.
Overall cost of the action	Depending on the magnitude of the awareness campaign, the costs vary. However, the materials needed to carry out one clean-up campaign usually are: - Bags - Underwater cleaning bags - Safety gloves - Refreshments: food and drinks - Diving equipment maintenance - Civil liability insurance for the ground team (prorated). Scuba divers must issue their own insurance for their normal activity.

	Adding up all these expenses, the average cost of a single awareness campaign is about 400€.
Timeline of the action	The first step that PROMEMAR takes is to request permission to the City Council and Coast and Ports authorities to comply with the legal and administrative requirements. This process could take between 1 and 3 months. Once permission is being granted, a dissemination campaign takes place during the 2 weeks previous to the event. For this, a poster is created and published on social media (Facebook and Twitter), and a press release is launched on TV, radio and newspapers. The day of the campaign, the whole activity normally starts at 10 a.m. and finished at 16 p.m., depending on the place where it is organized. After the event takes place, another press release is launched to disseminate the results obtained.
Supportive policy measures	PROMEMAR does not follow any local, regional or national policy in particular.
Financial measures	Most of the funds that PROMEMAR receives come from the environmental organization "ECOEMBES". Nevertheless, some funding from "Loroparque Foundation", "Constructalia S.L." is also received. Therefore, only private funding is received to run their activity.
IT tools	During the beach clean-up all the litter collected is weighted on a scale to determine the number of kilograms according to different types of waste at sea and at the beach. Afterwards, the results are uploaded into the "MARNOBA Platform" app, developed by the "Zero Waste Association". This app compiles, stores and shows data regarding marine litter at national level with contributions from citizens and organizations. The application is free of charge.
Departments, organisations, stakeholders involved	Apart from the funding organizations previously mentioned, PROMEMAR collaborates with other organizations like: - "Mojo de Caña" association, that helps teenagers with social inclusion problems. - "CordiCanarias" association, that coordinates activities for inclusion of disable people. - The firefighter's department - "DISA" group - Corporate volunteering
Competences needed	For the organization of the campaign there is no special expertise needed as well as for the ground clean-up of the beach. However, for the underwater cleaning, volunteers must be in possession of a diving certificate.
Barriers	Practically most of the difficulties encountered in the organisation of the awareness campaigns from PROMEMAR relate to the administration of permissions with the local government. Sometimes, the process is slow and bureaucratic. Other times, there is conflict between the different authorities and the process is hindered and could lead to denied permissions.

	However, other difficulties faced relate to organizational factors. The first few campaigns launched were more chaotic in this sense and communication more difficult. Nevertheless, PROMEMAR quickly improved on these aspects and the following campaigns became easier to organize.
Success factors	People's mindset is essential for the success of campaigns against marine litter. PROMEMAR finds that, in general, people is already concerned about this issue but that the key factor is to provide them with a tool to get involved. Furthermore, for PROMEMAR a good dissemination and communication strategy is highly important, paying special attention to social media. Thanks to this, the number of volunteers attending their campaigns are increasing every time, as well as the number of organizations/companies contacting them.
Target group	The awareness campaigns are targeted to everybody: citizens, organizations, companies, etc. PROMEMAR believes that "everybody with a good attitude is welcome".
Monitoring	For every campaign, PROMEMAR uses different indicators to monitor its impact: - Type of litter - Kilograms of litter collected - Number of bags used to collect litter - Number of volunteers attending for both sea and beach clean-ups
Resources and materials	As explained above in the section "Overall costs of the action"

Results	Description
Environmental benefits/impacts	PROMEMAR's awareness campaigns increase consciousness among the society in regards of littering. This helps keeping the marine environment clean, which translates into a healthier marine and coastal ecosystem.
Social benefits/impacts	The fact that PROMEMAR provides a tool for all citizens to get involved in the preservation of the marine and coastal environment, creates a stronger sense of collaborative community among them.
Economic benefits (cost saved/revenue)	The economic impacts of awareness campaigns are difficult to measure and not very high at the level of the campaigns that PROMEMAR organizes. The municipal waste department is in charge of the cleaning of the beach areas, and since PROMEMAR helps with this task, it could be considered that there are some cost savings for them. As for the impact on tourism, the cleaner the beaches are the more tourism the city of Tenerife will attract, which in turn will affect positively the local economy.

Measure 19 – Awareness campaign on marine litter, a case study from the City of Santander (ES)

Raising awareness of tourists on marine litter to prevent littering and its impacts. Informing the tourists on the damages caused by littering to influence positively their behaviour to a more eco-friendly attitude. Informing them on the waste facilities and the legal framework when relevant (e.g. fines for littering) to influence them to better manage their waste.

	Description
Main Challenge	The Municipality of Santander organized workshops for children, for entertainment mainly. The focus was on recycling on the beaches. In these workshops the aim was to teach the children how to collect different types of waste, in order to increase awareness. The action took place, during in the summertime, in 3 main cities.
Overall cost of the action	Difficult to calculate since these workshops are included in the contract of the waste management program of the city as dissemination activities
Timeline of the action	The action took place during July, August and September. The planning process started 2 months before the workshop. In the case of the Municipality of Santander, the initiative is connected to the URBAN-WASTE project and it was organized only once. However, due to the success it will be included into the municipality's activities, always considering the best months to organize it considering the weather.
Supportive policy measures	There is support from the Council of Environment and the Department of Services, as they are committed with these types of activities and programs, so they include it into the procurement.
Financial measures	The procurement for the waste management department includes different actions. The supplier of the service, which is in charge of the waste collection of the city, have obligations in regards of the cleaning of children parks (including the ones located at the beach). Therefore, not only funds for the cleaning tools and maintenance is provided but also dissemination activities like the workshop discussed.
IT tools	The dissemination of the action was carried out through the municipal website.
Departments, organisations, stakeholders involved	The stakeholders that were involved in the initiative were mainly: • Municipality of Santander • Environmental department • Material suppliers
Competences needed	Training sessions for the people working on the beach with children have been organized. In these, the municipality explained the purpose of the workshops and prepared the materials and the agenda.
Barriers	The weather was a determining factor for the organization of the workshop. The first activity at the beginning of the summer had to be cancel due to the rainy weather.

Success factors	The schedule of the agenda played an important role, since the municipality strived to organize dynamic activities to keep children entertained during the whole action. In this sense, different activities from selecting waste to drawing were programmed.
Target group	The initiative was mainly targeting children (locals and tourists), but their parents were also involved. In order to engage them URBAN-WASTE postal cards were delivered in different languages and a lot of parents showed interest.
Monitoring	The number of postcards distributed was an indicator considered. Furthermore, the number of attendees through previous registration for the activities.
Resources and materials	Postcards to disseminate, materials for drawing (paints and paper), sorting bins for the recycling activities and a tent to protect from the weather.
Departments, organisations, stakeholders involved	The main problem the action addresses. (i.e. decrease food waste, raise the awareness on citizens, etc.)

Results	Description
Environmental benefits/impacts	The increased awareness might reduce the amount of waste generated
Social benefits/impacts	Education of children on good practices, which might influence in their parents. Moreover, the tourists are more aware of the information collected during the URBAN-WASTE project.
Economic benefits (cost saved/revenue)	No significant cost savings identified. It depends more on the efficiency of the cleaning service.
Impact on policies	The action carried out serves as an example of good practice to nearby beaches. Nevertheless, in Santander the waste is collected by the waste management department, where in other areas it is the regional department, which other policies are applied.

Measure 20 – Food Tracking Device, a case study from the Bingham Hotel (UK)

The Bingham hotel implemented a food tracking device developed by FoodSave, which allowed to identify the type and amount of food waste generated by the hotel. The objective was to reduce the amount of biowaste in the kitchen by improving the staff's habits and practices.

	Description
Main Challenge	Reduction food waste and raising awareness; breaking the established unsustainable habits from kitchen staff

Overall cost of the action	Not specified
Timeline of the action	The action took place in 2014, during 4 weeks
Supportive policy measures	Own organization's initiative with Food Save organization support
Financial measures	The initiative was financed entirely by the organization, with the benefits obtained from their marketing strategy of green enterprise.
IT tools	Conventional programs of Microsoft, Winnow's Waste Monitor System
Departments, organisations, stakeholders involved	Sustainable Restaurant Association, Bingham hotel, NGOs
Competences needed	Competence of organization's managers, communication team, kitchen staff labour. Furthermore, discipline and will from the staff was key to shift their habits.
Barriers	Breaking those established habits.
Success factors	Control volumes; regular stock takes of food; monitoring fridges to reduce spoilage; separating food waste, which helps to reduce it as it raises awareness among kitchen staff; encouraged staff to separate food waste.
Target group	Organization's staff, including kitchen staff. Once the successful results were disseminated via web and TV, a wider public audience was targeted, including social groups and other companies.
Monitoring	The *FoodSave* team monitored kitchen waste using the Winnow Waste Monitor System for four weeks. During the audit, all food waste was measured including inventory spoilage, preparation waste, and plate waste. The system required minimal time and caused no disruption to service. The FoodSave team met with *The Bingham* hotel weekly to review the results and identify actions for waste reduction. The heightened staff awareness of food waste meant that everyone got involved in identifying opportunities for waste reduction.
Resources and materials	Winnow's Waste Monitor System, bins, weights for scaling, books for registering
Departments, organisations, stakeholders involved	*FoodSave* organization, *The Bingham* hotel, *Sustainable Restaurant Organization*, targeted audiences after dissemination

Results	Description
Environmental benefits/impacts	As a result of*FoodSave*'s iniviative implemented in *The Bingham* hotel, food waste weight was reduced by 30%, representing an annualised reduction of 2.4 tonnes, or 6.5 tonnes including associated packaging. Due to the weekly reports performed, the kitchen staff also reduced their bread orders and started making bread in-house so they had tighter control on volumes.
Social benefits/impacts	Decreased negative impacts in general perspective. Kitchen teams and managers understand financial gains hand in hand with environmental gains and good environmental behaviour practice showing to other firms.

Economic benefits (cost saved/revenue)	£109 was saved in food waste costs per week representing a saving of £7,581 annually. The largest savings came from reduced inventory waste representing 53% of saved weekly costs. Furthermore, the organization obtains marketing competitive advantages as a green company
Impact on policies	Company food waste reduction policy elaborated. Shown as good practice to others

Comments on the results

The practical application of the CUBE business model to gather data about the good practice examples that can help in the future implementation of the chosen measures had some limitations under the project scope. This is due to confidential information in some of the cases or the complexity of the implemented action that would need more comprehensive cause-effect investigation. Therefore, the contents of the template sections are not homogeneous in sense of the deepness of the provided data and details. Still, using this general guideline that is based on real cases and adapting it to the given context, companies and organisations can support the design and innovation of their own business model related to the developed measures. It results in not just environmentally conscious actions that have a positive effect on the local population and in the long-term on the global society but ensures also economically realistic and profitable developments.

To support the calculation of cost-savings by the implementation of the measures, a financial balance template has been developed.

4.2 Financial balance template

Generally, waste prevention and management strategies imply cost savings opportunities due to the fact that the less waste generated, the less costs incurred in when dealing with it. Nevertheless, in order to reduce the potential waste generated, often happens that one must incur in other expenses. In this sense, it is important to

evaluate the economic and environmental impacts of implementing a specific strategy in order to evaluate whether it is cost-effective.

Therefore, the following tool has been developed with aims to support policy makers in the assessment, in monetary terms, of implementing the waste prevention and management strategies proposed within the URBAN-WASTE project. The method chosen consists of a cost-benefit analysis that takes into account economic and environmental impacts.

Specifically, a cost-benefit analysis (CBA) is a policy assessment method that quantifies in monetary terms the value of all consequences of a policy to all members of society. More generally, CBA applies to policies, programs, projects, regulations, demonstrations, and other government interventions[10]. In this context, the proposed tool attempts to apply the concept of CBA to the implementation of specific strategies.

Traditionally, a CBA includes social impacts as well. Due to the complexity of the matter and aiming at maintaining an operational focus throughout the whole study, a simplified model has been developed based on a traditional CBA, where social aspects have not been considered. Furthermore, since estimating and monetizing environmental costs and benefits can be a complex task, it is advised that municipalities or promoters of strategies use indicators that apply to other countries whenever this data is not available at a national or local level, to be used as reference.

In *Table 1*, examples of possible costs incurred in the implementation of every waste prevention and management strategy proposed within the project have been identified and categorized in order to be able to apply it to the CBA tool. In the same way, *Table 2* presents the cost savings opportunities and revenues.

The CBA template developed is presented below:

ECONOMIC COSTS	Year 1	Year 2	Year 3	Year 4
1/ Capital costs				
2/ Operating costs				
Material purchase				
Transportation				
Labour				
Other				
Total Economic Costs				
ENVIRONMENTAL COSTS	Year 1	Year 2	Year 3	Year 4
3/ GHG emissions				
4/ Resources used				
Water				
Electricity				
Raw materials				
Total Environmental Costs				

[10]Boardman, A. E., Greenberg, D. H., Vining, A. R., Weimer, D. L. (2011). *Cost-Benefits analysis: Concepts and Practice. 4th Edition*.

TOTAL COSTS				
ECONOMIC BENEFITS	Year 1	Year 2	Year 3	Year 4
5/ Revenues				
Sales of recovered/recycled materials				
Compost				
6/ Cost savings				
Landfilling				
Incineration				
Total Economic Benefits				
ENVIRONMENTAL BENEFITS	Year 1	Year 2	Year 3	Year 4
7/ GHG emissions abated				
8/ Resources saved				
Water				
Electricity				
Raw materials				
Total Environmental Benefits				
TOTAL BENEFITS				
NET COST/BENEFIT (TOTAL BENEFITS – TOTAL COSTS)				

Note: this CBA template considers a lifespan of four years as a mere example. It could be applied to a shorter or longer lifespan.To be decided by the promoter of the strategy.

1/ Capital costs

These costs refer to the initial investment and setup costs of implementing a given measure. The promoter of the measure will incur in these expenses only one time, at the beginning of the implementation of the measure. It is also referred as fixed costs and could be, for example, the installation of fountains to promote drinking water or the setup of infrastructure for the separate collection of different waste fractions.

2/ Operating costs

Refer to the recurring costs of maintaining operations. In the context of URBAN-WASTE, these have been categorized in *material purchase, labour and transportation*. It must be considered that the implementation of some measures implies material purchase exclusively, where for others it would imply also labour and transportation costs. This will depend greatly on the nature of the measure selected. For example, the

implementation of recycling advisors for tourist establishments (measure 11) will, most likely, involve contracting new personnel to deliver the task or appointing existing personnel to be solely in charge of this specific task. On the other hand, for the implementation of doggy bags in restaurants (measure 1) it is unlikely to require new personnel for this task. As previously mentioned, Indications on examples of the type of costs and cost savings to consider are described in *Table 1* and *Table 2*, to serve as reference.

Thus, four sub-categories of operating costs have been included:

- **Material purchase**; related to the acquisition of materials necessary for the normal operation of the measure implemented.
- **Labour**; related to the personnel costs that the promoter of the strategy must incur in order to implement it, whenever personnel must be allocated specifically to carry out the task.
- **Transportation**; when the strategy requires transferring good from one location to another, related to reuse measures mainly.
- **Other**; like communication campaigns, fees collection or software maintenance, for instance.

3/ GHG emissions

Correspond to the environmental costs in terms of GHG emissions produced by the implementation of a measure. This cost is expected to be very low, since the measures developed aim to the reduction and improved management of waste generated, rather than to generate waste. However, even if it is at a low scale, the implementation of some measures will involve the generation of waste and, thus, GHG emissions associated to the treatment of these. For example, even if the use of doggy bags (measure 1) contributes to the reduction of food waste, these will become waste after its use and will need to be treated. Nevertheless, these costs will be difficult to calculate and likely insignificant.

4/ Resources used

In the same way than the costs associated to GHG emissions, the implementation of some measures will involve the use of resources in terms of water, electricity and raw materials. Following the same example than above, these costs would relate to the environmental costs of producing doggy bags as of water, electricity and raw materials use. Likewise, it is a complicated task to calculate these values.

Apart from the environmental costs mentioned above (GHG emissions, water, electricity and raw material use), there are many other environmental effects not considered in this analysis for the sake of simplification, like biodiversity loss, land occupation, water erosion, nitrogen and phosphorus eutrophication or deforestation pressure, to name a few[11].

[11] Schmidt, U.J. (2014). Cost benefit analysis of selected food waste mitigation measures (Master thesis). pp 47. Retrieved from https://geo.uni-greifswald.de/fileadmin/uni-greifswald/fakultaet/mnf/geowissenschaften/Arbeitsbereiche_Geographie/Nachhaltigkeitswissenschaften/Seite_Mitarbeiter/Publikationen/Schmidt/MT_-_FoodWaste_-_UtaSchmidt_-_FINAL.pdf

5/ Revenues

Refer to the direct benefits obtained through the implementation of a given measure. For instance, if restaurants carry out on-site composting of food waste (measure 3) and decide to sell the compost obtained to an interested stakeholder, this would be considered a direct benefit.

6/ Cost savings

These correspond to the costs avoided by implementing a measure. Since most, if not all, measures relate to waste prevention or management in order to reduce the amount of waste generated, it can be considered that a common cost saving to all of them is the cost associated to landfilling or incineration. In other words, if less waste is generated due to the implementation of a measure, there will be less waste needed to be treated.

The costs of landfilling or incineration vary greatly from country to country, and even from municipality to municipality. In this sense, each municipality should calculate such costs internally.

In order to calculate landfilling or incineration costs the following should be considered[12]:

- Land acquisition;
- Requirements for engineering or treatment of flue gas, respectively;
- Scale of the landfill or incineration plant;
- The utilization rate;
- Costs for daily cover/restoration or ash treatment, respectively;
- Requirements for gas collection and sales, and efficiency of energy recovered and sales, respectively;
- Financial provisions and aftercare;
- Taxes on landfilling and incineration, respectively.

As an illustrative example, the average costs of landfilling and incineration in EU estimated by the IPCC are[13]:

- Incineration of residual waste: 64€/tonne
- Landfilling residual waste: 56€/tonne

7/ GHG emissions abated

[12] Hogg, D. (2001) *Costs for Municipal Waste Management in the EU*. Final Report to Directorate General Environment, European Commission, pp. 55 and 68.
[13] Intergovernmental Panel on Climate Change (IPCC). Waste management and mitigation costs and potentials. Retreived on 05/12/2017 from https://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch10s10-4-7.html

In contrast with the GHG emissions produced by implementing a given measure, these correspond to the GHG emissions avoided in relation to the waste reduction or prevention strategy. Typically, the costs of mitigating GHG emissions from waste are based on landfill methane (CH_4) as the baseline.

As an example, break-even costs for GHG abatement from landfill gas utilization range from about –20 to +70 US$/$tCO_2$-eq, with the lower value for direct use in industrial boilers and the higher value for on-site electrical generation, 240–270 US$/$tCO_2$-eq for composting and 270 US$/$tCO_2$-eq for incineration[14].

8/ Resources saved

Through recycling and reutilization strategies the production of new goods is reduced and, thus, resources needed for its production in terms of water, electricity and raw material use. Only taking as example the cost of virgin plastic in EU for potential savings, this ranged between 1.125€ and 2.070€/tonne in EU, depending on the type of polymer, in September 2017.[15]

4.3 Economic costs, cost savings and revenues per measure

The following section includes a list of potential costs, costs savings and revenues of implementing each of the measures, indicating the corresponding cost or benefit category in order to be applied to the CBA template provided above.

Measure	Costs	Category
1	• Doggy bags kit: bags and boxes	Material purchase
2	• New re-sized dishes • New signs	Material purchase Capital cost
3	• Electric composter/composting bins	Capital cost
4	• Specific containers for UCO collection • UCO collection service	Capital cost Capital cost
5	• Sorting bins for food waste • Biowaste collection system	Capital cost Capital cost
6	• Transportation of goods to charities	Transportation cost
7	• Dispensers	Capital cost

[14] Delhotal, K. C., de la Chesnaye, F.C., Gardiner, A., Bates, J. and Sankovski, A. (2006). Mitigation of Methane and Nitrous Oxide Emissions from Waste, Energy and Industry. *The Energy Journal*: Multi-Greenhouse Gas Mitigation and Climate Policy, Special Issue 3, p. 45-62.

[15] Source : http://www.plasticsnewseurope.com/article/20171211/PNE/171219995/eurean-petrochemical-feedstock-contract-prices

	• Reusable products (cloths, napkins, etc.)	Material purchase
8	• Give boxes (if reused, associated costs would be zero)	Material purchase
9	• Communication campaign • Logistics (tables to place goods, tents, etc.)	Other Material purchase
10	• Sorting bins for different waste fractions • Separate waste collection system	Capital cost Capital cost
11	• Salary of advisor(s) • Training material (leaflets, posters, etc.)	Labour Material purchase
12	• Separate waste collection system	Capital cost
13	• Installation and maintenance of drinking fountains • Maps indicating sources of drinkable water • Reusable bottles	Capital cost Material purchase Material purchase
14	• Translation services • Signs, posters, leaflets, etc.	Labour Material purchase
15	• Sorting bins for different waste fractions in marinas • Separate waste collection system	Capital cost Capital cost
16	• Collection fees from port authorities	Other
17	• Pocket boxes/ashtrays • Salary of personnel in charge	Material purchase Labour
18	• Salary of personnel in charge (if drafted internally) • Cost of service (if subcontracted)	Labour Labour
19	• Communication campaign • Material purchase (if a beach clean-up: bags, safety gloves, etc.)	Other Material purchase
20	• Development of food tracking app (provided by URBAN-WASTE project) • Maintenance of food tracking app (provided by URBAN-WASTE until end of project) • Scales and tables (provided by URBAN-WASTE project)	Capital cost Other Material purchase
21	• Development of WasteApp (provided by URBAN-WASTE project) • Maintenance of WasteApp (provided by URBAN-WASTE until end of project)	Capital cost Other
22	• Transportation costs from hotel to charity	Transportation

Table 1: Economic costs of measures proposed under URBAN-WASTE project

The table below reflects possible cost savings and direct revenues from the implementation of the different strategies:

Measure	Cost saving/revenues	Category
1	• Landfilling or incineration costs	Cost savings
2	• Raw ingredients • Costs of storing food • Value of food wasted	Cost savings Cost savings Cost savings
3	• Fertilizer (if restaurant grows own food) • Compost (direct sale) • Landfilling or incineration costs	Cost savings Revenue Cost Savings
4	• Disposal costs • Sewerage maintenance costs	Cost savings Cost savings
5	• Landfilling or incineration costs	Cost savings
6	• Bulky waste collection costs • Landfilling or incineration costs	Cost savings Cost savings
7	• Buying in bulk reduces costs (dispensers)	Cost savings
8	• Landfilling or incineration costs	Cost savings
9	• Landfilling or incineration costs	Cost savings
10	• Landfilling or incineration costs	Cost savings
11	• Landfilling or incineration costs	Cost savings
12	• Landfilling or incineration costs • Raw materials	Cost savings Cost savings
13	• Landfilling or incineration costs • Raw materials	Cost savings Cost savings
14	• Landfilling or incineration costs	Cost savings
15	• Landfilling or incineration costs • Raw materials	Cost savings Cost savings
16	• Landfilling or incineration costs	Cost savings
17	• Street cleaning costs	Cost savings
18	• Landfilling or incineration costs	Cost savings
19	• Beach cleaning costs	Cost savings
20	• Raw ingredients • Costs of storing food	Cost savings Cost savings

	• Value of food wasted	Cost savings
21	• Landfilling or incineration costs	Cost savings
22	• Landfilling or incineration costs • Tax credit system or deductions	Cost savings Revenue

Table 2: Economic cost savings and revenues of measures proposed under URBAN-WASTE project

It is important to mention that the costs and cost saving opportunities listed in *Table 1* and *Table 2* would vary greatly depending on factors like the scale of the action, the suppliers, the salaries assigned to personnel needed, the cost of landfilling and incineration, etc. In this sense, local costs must be taken into account as well as resources available to finance the implementation of the strategies.

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Conclusion

This deliverable 4.2 of the URBAN-WASTE project aims to be an operational tool for local stakeholders when supporting the implementation of the proposed measures of the project. The policy makers' forms, the common financial balance template and the examples of existing business models should accompany pilot cities and their local stakeholders in the operative phase of implementation. This document does not aim to be seen as a reference in itself but much more as a compiling document to help orientating stakeholders' reflexions on their measures implementation.

The regulatory parts can be used as legislative tools for them to support more strongly the implementation of the measure, but it is also a way for them to be aware of the limits of certain measures on their own territory because of a potential unfavourable legislative context. The common financial balance template has to be perceived as an operative tool for them to assess all the ensuing costs and revenues generated by the measure implementation itself. By assessing them in detail, they might be able to design a more efficient business model at their local scale. That is why this template is completed with the presentation of already existing business models of the proposed measures. By studying those examples and contacting people in charge of their previous implementation, pilot cities and their local stakeholders might be able to be better prepared to overtake the common barriers met while implementing a specific measure, and they might identify better the interesting levers to make the measure implementation more efficient.

The main difficulty of this deliverable has been to gather homogeneous information on regulation at national scales and on the existing business models. In fact, as it has already been explained, even if the common regulatory framework on waste management is the same European one for all the Member States, every country has developed specific legislative tools to respond the European legislation. Some countries such as Spain, Italy, Portugal or France have already implemented lots of objectives in terms of selective collections and recycling rates. However, we can notice that Croatia for example is developing a new wider national waste management plan only since 2017. That is why we faced difficulties in this deliverable in having homogeneous information and objectives on the national regulations that define waste management. However, a common aspect that can be noted is that in general the current national regulations are in favour of the proposed measures of the URBAN-WASTE project, and the pilot cities might not have difficulties in implementing those measures regarding the law. Concerning the examples of existing business models, the same issue has been faced, as already explained previously, as it was hard for the participating stakeholders to always exactly fulfill the template they have been provided with. In fact, they did not always have that detailed information, and sometimes the required information was considered as confidential. However, those examples have to be used as supports to feed pilot cities and local stakeholders' reflexions on their measures implementation at local scale.

The idea of that deliverable is not only to accompany the pilot cities of the URBAN-WASTE project but also to be able to be used by other touristic cities that would like to duplicate the URBAN-WASTE concept on their own territories. In fact, through that deliverable, eight national regulatory frameworks have been presented and can be used as tools for other cities. Besides, the common financial balance template is also a replicable tool. The operative implementation phase of the work package 6 of the URBAN-WASTE project will be an interesting exercise to test the usefulness and the understandability of those developed tools.

URBAN WASTE

URBAN STRATEGIES FOR WASTE MANAGEMENT IN TOURIST CITIES