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INPUT PAPER FOR THE INTERREGIONAL WORKSHOP ON HOW TO RAISE AWARENESS ON PLASTIC LITTERING AND PROMOTE THE PURCHASE OF PRODUCTS FROM RECYCLED PLASTICS

PLASTECO Activity 3.3

Prepared by Bucharest-Ilfov Regional Development Agency (ADR-BI)

PLASTECO - SUPPORTING EU REGIONS TO CURB PLASTICS WASTE AND LITTERING

PLASTECO
Interreg Europe

European Union
European Regional Development Fund

Table of Contents

Abstract

This input paper provides the thematic background and guidelines for the organisation of the PLASTECO activity 3.3, titled “Interregional workshop on how to raise awareness on plastic littering and promote the purchase of products from recycled plastics”. During the activity partners will join a workshop organised by ADR-BI to discuss their experiences on how to raise public awareness on plastic littering and promote recycled plastics products and producers in their regions. To that end, the input paper includes an overview and context of the workshop, the thematic background to stimulate policy exchange, and the suggested topics for discussion. It also includes organisational guidelines regarding practical aspects of the workshop, such as participants, structure, and instructions on whether a virtual or on site meeting will take place. Finally, the input paper includes a tentative agenda and guidelines for drafting its summary report that will encapsulate the lessons learnt from the exchange of experience between project partners.

1 The PLASTECO project

1.1 Overview

The EU generates approximately 25.8 million tons of plastic waste per year, whereas 30% of which is collected for recycling. Plastic production and incineration produce 400 million tons of CO_2 annually. 150-500 ktons of plastic waste enter the oceans every year and 75-300 ktons of microplastics are released into the environment, polluting food, air and water.

In order to tackle these threats, the European Commission's has European Strategy for Plastics in a Circular Economy (2018) has been upgraded in 2020. The EC, advancing its goals for sustainable growth, has adopted a new Circular Economy Action Pan as a part of the European Green Deal.

The PLASTECO project, namely "Supporting EU regions to curb plastics waste and littering", will contribute to a comprehensive public governance framework. PLASTECO aims, through the improvement of regional environmental policies, to support regional green growth under the "new plastics economy" concept and stimulate eco-innovation, resource efficiency (i.e. minimize single-use plastics) and public awareness, for sustainable plastics value-chains.

PLASTECO aims to promote a 'new plastics' economy in which a plurality of cross-sectoral stakeholders will engage beneficially in mutually re-enforcing and interdependent practices of recycled plastics as resources, as well as to foster a culture of keeping plastics at bay, eventually stimulating the emergence of eco-innovations leading up to zero non-biodegradable plastics use.

1.2 Objectives and expected results and impact

The project aims to support the participating partners/regions to exchange experiences and solutions on curbing plastic littering and pollution in the context of the "EU plastics" strategy, and address their policy gaps and needs in protecting the environment and public health, increasing resource efficiency and kick-start the circular and green economy path of their regional growth. PLASTECO has set the following operational objectives:

- Advance the development of waste management (separation, collection, and recycling of plastic waste), and accelerate the achievement of targets for plastics recycling.
- Encourage the acceptance and uptake of plastic packaging alternative solutions and reverse logistics business models.
- Promote awareness and acceptance of use of recycled plastics in products.
- Improve both monitoring and curbing of aquatic litter.
- Suggest uses of structural funds to increase the capacities of regional value chains as concerns innovative solutions and technologies.
- Stimulate the phasing out of plastics packaging in public procurement, and develop guidelines for relevant green public procurement criteria.

The PLASTECO partnership is expected to implement activities which:

1. Improve the economics and quality of plastics recycling (waste management plans, public procurement, use of economic instruments, Extended Producer Responsibility schemes, uptake of recycled plastics);
2. Curb plastic waste and littering (regional plans against aquatic litter, fines, awareness raising, coastal waste collection, eradication of non-compliant landfills, recycling of agricultural plastics, deposit refund schemes);
3. Drive investments and innovation towards circular solutions (raising landfill and incineration costs, funding, incentives for plastic prevention and recycling).

In particular the expected impact of the PLASTECO project is to:

- Increase the capacity of 180 staff of public administrations to effectively support new growth trajectories & energy security.
- Unlock 19 million euros to support projects on plastic reuse, eco-innovation, and alternative technologies.
- Increase awareness & consensus building among plastic producers and consumers/the public.
- Promote the cooperation between public authorities and local stakeholders to address challenges associated with plastic curbing.

1.3 The PLASTECO partnership

PLASTECO brings together 8 institutional, scientific and education partners from 8 EU Member States eager to improve the implementation of regional development policy instruments on environmental protection, waste management and circular economy.

Table 1: The PLASTECO Partnership

N°	Country		Partner
1		EL	Municipality of Rethymno
2		IT	Lombardy Region
3		AT	Styrian Provincial Government
4		BG	Stara Zagora Regional Economic Development Agency
5		DE	Cluster of Environmental Technologies Bavaria
6		FR	Auvergne-Rhône-Alpes Energy Environment Agency
7		RO	Bucharest-Ilfov Regional Development Agency
8		LV	Association Baltic Coasts

2 PLASTECO activity 3.3

2.1 Overview

The interregional workshop A3.3 of the PLASTECO project is concerned with raising public awareness on plastic littering and promoting the purchase of products from recycled plastics.

To this end, the workshop will focus on the following thematic areas: a) kick-starting or intensifying efforts for plastic waste separation at the source, b) lifting off any existing misconceptions on products made from secondary raw plastics, and c) steering the attitudes of the public towards rewarding producers that bring such offerings to the market.

After the workshop's completion, a summary paper will be drafted, summarizing the main lessons learnt from the event. As a final step all partners will organize internal debriefing meetings to diffuse lessons learnt.

2.2 Added value

Interregional workshops constitute an excellent platform for interregional dialogue and present an ideal opportunity for regional stakeholders, policy makers, and experts, to communicate, share their experiences, discuss the regional issues and examine potential solutions for relevant issues and challenges related to regional policy development. Consequently, interregional workshops can play a crucial role in engendering change and further advancing the current policy framework in the project's regions. In particular, discussions, knowledge sharing and hands-on experience can facilitate the involvement and, potentially, contribution of key stakeholders in shaping action plans after the end of the project. In that regard, the interregional workshop is in complete alignment with the Interreg Europe programme that emphasizes and encourages knowledge and expertise sharing as a means to augment the capacity of regional authorities to implement efficient policies and create a more supportive policy environment.

In this context, the salient goal of the PLASTECO interregional workshop A3.3 is to bolster the capacity of partners and regional stakeholders in raising awareness on plastic littering and promoting products manufactured out of recycled plastic in the participating territories. To this end, the participants in the workshop will be provided with practical knowledge and experience, based on past good practices on the addressed thematic areas. The capacity building impact of the workshop will be subsequently augmented in the course of the workshop proceedings and discussion, enabling interested parties to embed the collected experience into their current policy framework, thus increasing its effectiveness.

In particular, during this interregional workshop, project partners will gain insights and valuable experience on the importance of improving the current state of play pertaining to waste separation at the source, along with practical advice, based on shared good practices, on effecting such an improvement in their regions. This is expected to aid regional public authorities to further advance and improve their current policies in the area. Additionally, project partners will discuss and share their experiences in identifying pathways to increasing the market appeal of products that incorporate plastic parts made out of recycled plastic. To this end, partners and stakeholders will explore avenues to engage the public in order to I) dispel any misconceptions about recycled plastics ii) raise public awareness on the environmental and economic benefits of recycled plastic. It is envisaged that the interactions and discussions that will take place in the

course of the interregional workshop will aid in more efficiently designing and conducting future awareness campaigns in this field.

2.3 Partners' involvement

ADR-BI will chair the A3.3 workshop. In addition, ADR-BI will draft the summary paper after the completion of the workshop. All partners are expected to contribute with own experiences and expertise, and to benefit from recommendations on how to stimulate public support for actions relevant to transition towards a "new plastics economy", e.g. local policies that promote the separation and sorting for recycling of plastics waste and raising awareness on the environmental and economic benefits of recycled plastics. Partners are also expected to disseminate the workshop results, inviting and informing members of the public, experts and stakeholders (prior & after implementation), as well as relevant public authorities.

2.4 Timeline & COVID-19

The A3.3 workshop is expected to take place at the end of February 2022; the exact date will be communicated by ADR-BI at a later stage and this document will be updated accordingly. Due to the current situation regarding COVID-19, it is yet unknown whether the workshop will be held online or participants will be physically present. In any case, guidelines will be provided for both cases.

3 Thematic background

This section will provide information to partners on how to a) kick-start or intensify efforts for plastic waste separation at the source, b) lift off any existing misconceptions on products made from secondary raw plastics, and c) steer the attitudes of the public towards rewarding producers that bring such offerings to the market.

3.1 Policies and practices to improve source separation of plastic waste

Separate collection, carried out by municipal solid waste management systems, is key to manage waste in a sustainable way and to evolve towards a circular economy. By setting the right incentives and facilities for separate collection, households will sort at source which results in homogeneous streams for reuse and recycling that can be valorized in closed-loop or other high-value applications.

3.1.1 Municipal solid waste management systems

Separation at source for plastic waste is part of an integrated waste management system of Municipal Solid Waste (MSW) in European countries and they can be classified based on:

a) Collected waste type: single fractions, which usually are: bio-waste, paper, plastic (or sometimes used for packaging waste), metals (sometimes included in packaging waste), and waste electric and electronic equipment (WEEE);
b) Collection level, which means: collection at the household level, bring points (recycling points) or civic amenity cites (i.e. recycling yards).

There are two different types of MSW collection systems at household level, the separate collection and the commingled collection system.

Separate Collection Schemes (SCS):

1. Two-Bin System: The first possibility is the two-bin system, in which waste is collected in two bins, a so-called dry bin, which contains recyclable material like plastic packaging, metals, textiles, minerals, and other non-sticking or wet material.
2. Three-Bin System: When three bins are used for household collection, usually the fractions of residual waste, bio-waste, and a valuables fraction are collected separately. The understanding of valuables differs from country to country. Especially in Germany, the valuables bin is for collecting packaging that mostly consists of plastic and metal packaging. This collection and recycling system is paid for by the packaging producers according to an extended producer responsibility system.
3. Four-Bin System: Collection of four different single fractions at the household level is a common scheme(e.g. door-to-door collection of packaging waste, paper/cardboard, residual and bio-waste) used in many European countries. It requires a well-developed waste management system and does not necessarily lead to the best recycling efficiency.

Commingled System:

When commingled collection systems are used, different valuables are gathered in one mixed (commingled) material stream instead of the separate collection of high-quality mono fractions. Many communities allow "commingling" of non-paper recyclables (glass, metal, and plastic). This can often be seen in countries or municipalities that do not have the economic power to establish more bin collection systems, among other reasons like availability of space and public collection behaviour and awareness. Commingled recyclables are eventually separated manually, mechanically, or by some combination of both at transfer stations or materials recovery facilities.

Figure 1: Separate Collection systems used in EU Member States[1]
The Handbook of Environmental Chemistry book series, 2017, HEC, volume 63

<table>
<tr><th>Collection type</th><th>Paper</th><th>Glass</th><th>Plastic</th><th>Metal</th><th>Bio-waste</th></tr>
<tr><td>Door-to-door (single fraction)</td><td>AT, BE, BG, CY, DE, DK, FI, HU, IT, LU, LV, NL, SI, UK</td><td>BG, FI, LU, LV, NL, SI, MT</td><td>AT, LV, NL, DK</td><td>FI, NL, DK</td><td>AT, BE, CZ, DE, FI, EE, IT, HU, LU, NL, SI, SE, IE, UK</td></tr>
<tr><td>Co-mingled ...plastic + metal</td><td></td><td></td><td colspan="2">BE, BG, CY, DE, FR, IT, HU, LU, SI</td><td></td></tr>
<tr><td>...3 fractions</td><td colspan="4">RO, MT: paper, plastic, metal
UK: plastic, metal, glass</td><td></td></tr>
<tr><td>...all in one bin</td><td colspan="4">EL, IE: paper, glass, plastic, metal</td><td></td></tr>
<tr><td>Bring points</td><td rowspan="2">CZ, EE, ES, FR, HR, LT, PT, PL, SE, SK</td><td rowspan="2">AT, BE, DK, CY, CZ, DE, EE, ES, FR, HR, IT, HU, LT, PT, PL, RO, SE, SK</td><td>SE</td><td>AT, EE, SE</td><td rowspan="2">ES</td></tr>
<tr><td colspan="2">ES, HR, LT, PT, PL
(all plastic/metal in one container)</td></tr>
<tr><td>Civic amenity sites</td><td colspan="5">Primary collection: CZ (metal waste), SK (metal and bio-waste), LV (metal)
Addition collection of all waste streams: all countries
PL: rare distribution of civic amenity sites</td></tr>
</table>

[1] "Success Factors for the Implementation of Separate Collection Systems", Roman Maletz 2017, https://link.springer.com/chapter/10.1007/698_2017_51

3.1.2 Dedicated Policies in Source Separation for Plastics

3.1.2.1 European Policies

The European Waste Framework Directive (Directive 2008/98/EC) provides the general framework for European waste management policy. The Waste Framework Directive aims at preventing waste generation and encouraging the use of waste as a resource, diverting waste from landfill.[2]

Article 10(2) states "... to facilitate or improve recovery, waste shall be collected separately if technically, environmentally and economically practicable", article 11 shows the scope (all Members States) and sets the deadline for the establishment of separate collection in 2015.

The amendments on this Waste Framework Directive with the DIRECTIVE (EU) 2018/851 (articles 41 and 42)[3] aim at ensuring compliance with the obligation of separate collection deadline and elaborate on possible separate collection schemes and the key factors to opt the most appropriate scheme for each country. The development and financing of these schemes is MS is ensured as follows[4]:

a) The costs of separate collection and transport for items – covered by Extended Producer Responsibility (EPR) schemes – are fully covered by the producer that puts the specific products on the market. This will bring additional funding for municipalities to comply with separate collection obligations. The EPR fee should be sufficient to cover all the costs of collection, including in remote areas.
b) Deposit Return Systems (DRS) are implemented to positively influence citizens on practicing source separation. These typically separate collection systems which use a refund as an incentive for high return and subsequent collection rates. There are currently DRS operating in 10 MS, as a complement to the household separate collection systems also in place. Several MS passed new laws to enact more DRS in the coming years. These include Portugal, Slovakia, Latvia, Romania, and Scotland, and of course the recent expansion of the existing DRS in the Netherlands on all small plastic bottles;
c) "Pay-as-you-throw" (PAYT) schemes that charge waste producers on the basis of the actual amount of waste generated and provide incentives for separation at source of recyclable waste and for reduction of mixed waste. PAYT usually charges households on the basis of the actual amount of waste generated and provides incentives for separation at source.

3.1.2.2 National, regional and/or local policies

Following the European Framework on Plastics Policies, Member States have incorporated the mandatory EC guidelines in their policy framework and amended accordingly to new guidelines. Relevant Policy Authorities at national, regional and local level have also taken measures, formed collaborations and developed initiatives to specialize policies for plastic waste management, based on territorial and social specificities.

[2] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0098:EN:NOT
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32018L0851&from=EN
[4] https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

An overall review of literature from 2015 shows that door-to-door collection systems result in the highest capture rates and yields of recyclables but collection costs are higher[5]. Civic Amenity Sites or local collection points offer a low-cost collection method for all plastics, especially for the non-packaging plastics that are not collected door-to-door. Innovative collection infrastructure (e.g. underground bins and underground piping infrastructure) can achieve high collection rates while minimizing visual nuisance and transport externalities.

Thanks to intensive communication on sorting by the EPR organization Fost Plus, combined with existing PAYT schemes for residual waste have led to high recycling rates in Belgium: 82% for all packaging waste and 43% for plastic packaging waste in 2015.

The Municipality of Copenhagen has separately collected plastic since 2012 and the collection rates has been increasing every year. When the municipality in 2017 decided to also collect soft plastic / foils the collection rate increased with 30%, however only 10% of the plastic collected was soft plastic, therefore a simpler information on what plastic to collect can significantly increase the separating at source.

Table 2: Policies for source separation of plastic waste in consortium countries
AURA-EE Final Report in PLASTECO A1.2 (Plastics Policies Comparative analysis), 2020

Policy	Type	Year	Short description	Type of waste	Coverage	Country
Separate Collection of Plastic Fractions in Styrian Waste Collection Centres	Voluntary agreement	2010	The aim of separate lightweight packaging collection is to collect as much material as possible with as little impurities as possible for high-quality recycling.	Municipal wastes	Regional	Austria
Innovative Separate Waste Collection System for Public Space	Regulatory, Voluntary agreement	2019	The main objective for introducing improved waste separation stations in public places is to raise awareness and approach the issue of littering.	Municipal wastes	Local	Austria

[5] https://op.europa.eu/en/publication-detail/-/publication/2c93de42-a2fa-11e5-b528-01aa75ed71a1

Selective collection campaigns	Informative	2014	The purpose of these campaigns was to promote the Integrated Waste Management System project implemented in the respective county, with emphasis on the existing separate collection modalities.	Municipal wastes	National	Romania
The penalty paid by packaging producers and OTRs	Regulatory, Financial	2008	This instrument, among other objectives, aims to increase the separate collection rate including and stimulate the prevention of waste generation.	Commercial & Industrial wastes	National	Romania
AURADECHET	Financial	2013	The aim of this policy is: ▪ To help companies to invest in new exemplary equipment and solutions for sorting and / or recycling waste; ▪ To grid the territory with waste disposal/collection facilities dedicated to professionals.	Commercial & Industrial wastes	Regional	France
Rewarding Recycling	Voluntary agreement, Financial	2016	The objective of the National Collective System "REWARDING RECYCLING" is the implementation of	Commercial & Industrial wastes	National	Greece

			"Sorting at the Source", while providing reimbursement, amounting to €0.03 per plastic (or metal or glass) item of packaging.			

3.1.2.3 Policy Recommendations for the European framework

Following the European Environmental Bureau's recommendations the European Commission's (EC) efforts to develop a common separation and labelling system of waste across EU[6], Member States and the EC are advised to consider:

- Member States should introduce minimum requirements in separate collection that ensure reuse and prevention as well as high rate and high quality recycling
- Door to door collection schemes are widely applied with good results
- Good collection schemes keep biodegradable waste separated from dry recyclable streams
- Separate collection systems must enable reuse and preparation for reuse to return products and materials into the economy
- The only way to ensure the highest quality is to separate waste at source, before collection
- Deposit Return Systems (DRS) deliver the purest material fractions: They are the most efficient collection system for bottles[7], and result in net cost savings for public authorities because they no longer need to collect, process, transport and pay for landfilling/incineration of a voluminous segment of packaging waste.
- Advanced measures and financial instruments should be used in order to make separate collection more efficient: Such systems can vary from door-to-door, closed smart containers, user identification and "Pay-as-you-throw" (PAYT) schemes. Common financial instruments should incentivize citizens to better separate waste. For well implemented PAYT systems, before applying PAYT, governments must introduce a first step that ensures the system is personable and accountable for each household, most notably through a methodology of user identification.
- Separate collection targets from source separated waste should be adopted at EU level.

3.1.3 Separation at source and its advantages

Source separation is the practice of setting aside (sorting) household waste by material type at the point of generation (the household level), before it is processed, in order to prevent them from entering the waste stream destined for landfilling. Modern recycling systems are centered on source separation (see Figure 1).

[6] "Harmonisation of waste separate collection across Europe", EEB Position Paper - July 2020, https://zerowasteeurope.eu/wp-content/uploads/2020/07/2020_07_14_zwe_eeb_position-paper_harmonisation-of-waste-separate-collection_en.pdf

[7] https://www.duh.de/pwc-study-eng/

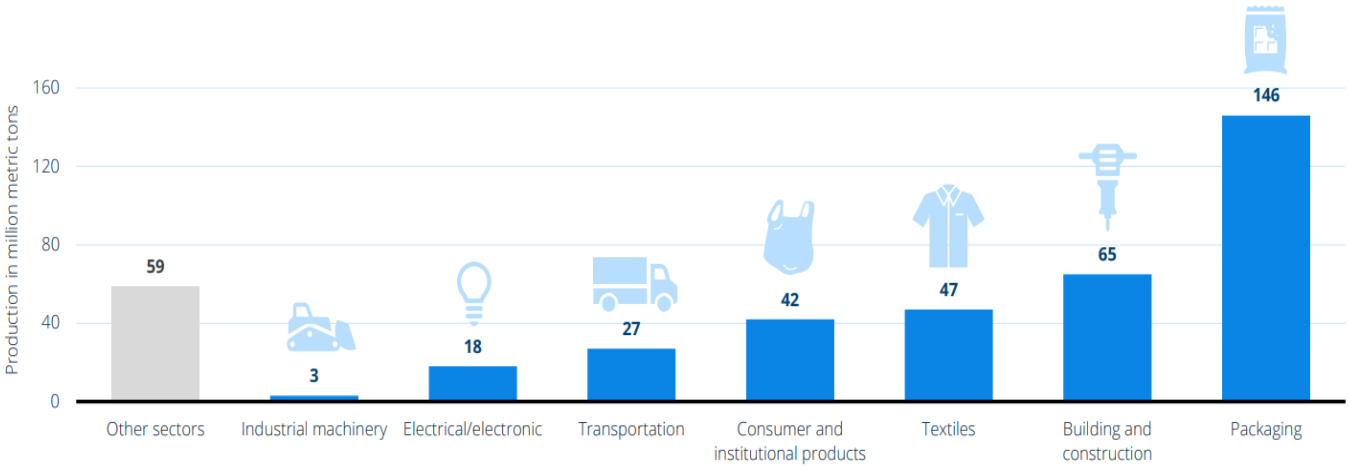
Source separation, also called curbside (or kerbside) separation, is done by individual citizens who collect newspapers, bottles, cans, and garbage separately and place them at the curb for collection. The number and types of categories into which wastes are divided usually depends on the collection system used and the final destination of the waste. The reason for separating waste at the source is for recycling purposes. Recyclables that are segregated from other trash are usually cleaner and easier to process.

The rationale behind source separation is straightforward. Landfills are running out of space, so the waste loads needs to be reduced. This method has dominated the waste management practices because of its various positive effects:

- Less waste to landfill: Convincing people to separate their waste for recycling once generated will help minimizing the amount of waste requiring disposal. A well communicated and maintained source separated recycling program helps users to know where to place their recyclables. Reducing the amount of waste going to landfill is assisted by clear signs for recycling stations in order to achieve greater diversion. Furthermore, fewer recyclables have to be sent to landfill due to contamination of other recyclables or waste.
- Reduce Contamination: When waste is source separated, different types of recyclables aren't going to contaminate each other. For example, paper and glass are two easily recyclable materials - however, a smashed bottle can contaminate an entire container of paper, consequently will all end up in landfill. When waste is source separated, these instances will less probably occur, thus ensuring the recyclability of the waste.
- Maintain Resource Integrity: Reducing contamination and source separating recyclables will maintain the integrity of the materials and reduce downcycling. Downcycling is the process where recycled materials cannot be used for products of the same quality. Downcycling reduces the amount of time the materials are able to stay in use. Consequently they meet the landfill sooner.
- Help to Identify Problematic Materials: Observing the large amount of single-use plastics in the landfill bin (e.g. coffee cups, water bottles etc.) is a way to identify materials and products that are getting wasted frequently. This identification provides the opportunity to personally or collectively (i.e. in a working environment or a public place) address the issue, opting for a reusable drink or food container or providing reusable coffee cups for everyone.
- Contribute to the Circular Economy: The circular economy foresees materials kept in use for as long as possible, re-using, re-purposing or recycling them to obtain the secondary raw materials to close the material loop. By source separating, these materials in kept in use, and are sent back for reprocessing at the end of their life.
- Community engagement: Separation at source raises awareness of waste generation and recycling which in turn supports behavioural change. Householders or businesses that separate waste before disposal can increase their awareness of waste materials and recycling processes. This may affect consumer decisions by encouraging waste prevention and selecting of products that offer better opportunities for recycling.
- Homogenous waste increases recyclers' profits: Source separated material streams are less contaminated thus of higher quality and are easier and less costly for recyclers to recover. Therefore, source separated materials represent a higher value to recycling markets. Moreover, source separation may improve the economic efficiencies of waste treatment options.

Recyclables that residents have separated into individual containers are usually collected in trucks with compartments for each material. The collected materials are then further processed at recovery facilities (different types of recycling plants). Many businesses also separate their solid wastes. This can be as simple as placing recycling bins next to soda-vending machines in employee cafeterias or more complex separation systems on assembly lines. Recycling rates of municipal waste differ widely between MS. From 25% in Latvia and Croatia up to 67% in Germany[8].

Figure 2: Sources of Plastics
"The life cycle of plastics", Statista, 2021, p. 15



3.1.4 How to practice waste separation at home

Experience derived from communities which practice source separation of waste has formed a "how-to manual" on necessary steps for the successful implementation of the practice, either for kerbside recycling (recycling bags for dry recyclables for door-to-door collection) or drop-off site recycling (drop-off facilities for generated dry recyclables). These steps are:

- Explain waste segregation to your family, neighbours and staff (for businesses).
- Have separate storage containers for dry waste, wet waste, and garden waste (in case this exists).
- Keep separate containers for dry recyclables and wet waste in the kitchen.
- Always remember to check the product label for proper recycling instructions.
- Keep glass / plastic / metal containers rinsed of food matter and put into the dry recyclables bag.
- Keep paper and cardboard materials also in the dry recyclables bag.
- In case the scheme involves different containers or bags for different dry materials (e.g. plastic, paper, glass), keep these in the respective container or bag.
- If you are in the areas that already receive the separation at source service, take out your recycling bag on the scheduled kerbside collection day for collection by the service provider staff.
- Alternatively, take your recycling bag to the nearest drop-off facility.

[8] Eurostat, 2018

- Ensure the initial community involvement, forming a group with like-minded people, interested in environmental issues.

3.1.5 Barriers and enablers of waste separation at source

The destination for the sorted waste is to recycle, therefore only recyclable plastics need to be sorted out of the overall waste. When it is possible to recycle certain types of waste, recycling is the preferred option in comparison with energy production methods such as combustion or anaerobic digestion. The reason behind that is material recycling has positive impacts on climate change.

Each local or regional authority opts for a customized solution of the issues encountered in its territory, adopting the corresponding policy measures to implement this solution. Recycling rates of municipal waste differ widely between Member States (MS). From 25% in Latvia and Croatia up to 67% in Germany. Policy alignment methods for separate collection of waste and labelling must require that MS collect higher quantities separately and with less impurities.

Public authorities should design their policy measures carefully and inclusively. The interventions should be investigated, designed and applied so that they are proper for the local circumstances, taking into account incentives and opportunities that can create positive recycling consumer attitude and leverage private investments in the waste management sector. Each Waste Authority, in order to strongly support source separation of waste, wherever reasonably technically, environmentally and economically practicable will have to recognize that source separation provides more homogenous and higher value waste streams, allows for better resource recovery, supports the diversion of waste from landfill, reduces the volume of residual waste, supports achieving Waste Strategy targets and outcomes, is favorable in its decision making.

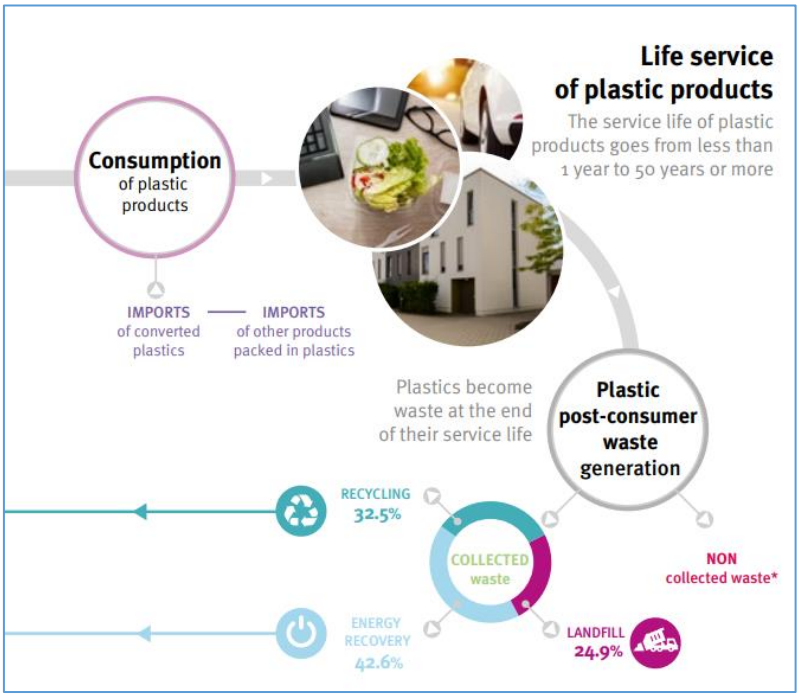
Targets are usually a good incentive for MS to implement more ambitious policies as they exist for WEEE for example. However it is always challenging to identify the right calculation method and it is not clear whether the target should be best measured at municipal, regional or country level. The EU should coordinate the establishment of a cascading system to monitor the target setting mechanisms from national to regional and municipal level, which might be the solution to the challenges of such a system, as outlined above.

Separation at source practice is enabled by the following factors:

- Policy instruments: The European policy framework and the aligned national/regional policy instruments promote separate collection on MSW and assist MS in achieving their collection targets;
- Accessibility: Easy access and proximity to sorting infrastructure, in case the scheme involves drop-off in recycling bins or facilities, is the most important, regardless the geographical locations and socio-demographic factors. Centralized in management but at the same time localized waste collection networks managed by local public authorities must be extended. A closer distance to the recycling station, an increased number of recyclable fractions collected at the drop off points improves the recycling rate;
- Collection network coverage: The extension and density of the collection network of recycle bins and infrastructure should cover the entire population of each territory. The distance to the recycling stations and having enough space at home are also factors for consideration;

- Economic incentives: They are highly important for regional and local authorities and for the citizens, in particular to promote waste prevention and intensify separate collection schemes, while avoiding support to landfilling and incineration. The aforementioned: EPR fee, Deposit Return and PAYT (charge household based on the amount it generates) are both incentives and disincentives for the generation and source separation of plastic waste.

Figure 3: The Life cycle of Plastic products
"Plastics – the Facts 2019"[9], PlasticsEurope, p. 27



- Education: Education and officially organized knowledge training about recycling can substantially facilitate the knowledge and action towards recycling. Waste sorting can change the beliefs of inhabitants about environmental issues;
- Public awareness campaigning: frequently and in particular on separate collection, waste prevention and litter reduction, and mainstreaming these issues in education and training;
- Internal attitude and intention towards recycling: Examples discussed in socio-demographic researches and surveys are pro-recycling, ascription of responsibility, attitudes towards recycling and environmental concerns. This aspect is highly age and background dependent and personalized;
- Ethical issues: Contribution to the next generation, conservation of the environment, to keep the surrounding clean, pressure from society, and to respect regulations;
- Convenience is a crucial factor for increasing participation in the recycling scheme. Convenience is relative, where different people perceive it differently. It is difficult to have a convenient waste

[9] https://plasticseurope.org/wp-content/uploads/2021/10/2019-Plastics-the-facts.pdf

sorting system that satisfies all people. At the same time, doing the task of sorting can change the attitude of how the system is convenient;

- Information: For increased participation in recycling behavior, the design of information, types of the communication channels, and the timing of dissemination are vital;
- Innovation on waste recycling technologies: Fine-tuned methods for source separated recyclables provide the cleanest materials, therefore with the highest revenues when sold.

Separation at source is hindered by the following factors:

- Low level of commitment: There is a disconnection between the high-level policy makers and the lower entities responsible for waste management (NGOs, people, industries, etc.) that hinders the commitment to the implementation of a sustainable policy and the provision of necessary resources.
- Weaknesses in governance: Uncoordinated governance and conflict of interest often occur, due to regulatory, operational, duplication and overlapping of responsibilities.
- Legislation: Several countries noted specific structural challenges within their countries with respect to how the MSW system operates. For example, lack of a responsible body for meeting targets, challenges in how competition works / is regulated in markets; Complex and sometimes contradicting legislation is also hard to implement.
- Local society objections: The local society and general public is often opposed to certain measures and policy implementation due to environmental, health, social inclusion and citizen rights concerns.
- Environmental concerns: Lack of monitoring and weak enforcement of environmental standards, leading to public health issues
- Technology issues: the high moisture (high organic content) and mineral content in waste (e.g. ash, construction and demolition waste);
- Substantial seasonal change in waste composition (i.e. changing consumption patterns according to seasonal needs).

3.1.6 Raise awareness on source separation of MSW, with examples from consortium countries

Waste is produced in all households. The citizens have a decisive impact on waste quantities and the quality of collection with their consumption and waste-collection behavior, bearing a large part of the costs through the payment of fees. The population makes an important contribution to recycling by separately collecting and pre-sorting waste. The better they do so, the more sustainable the recycling processes can be. A positive impact can therefore be achieved with awareness-raising initiatives. These initiatives can have a positive influence on sorting practices:

- Changing sorting processes to increase recovered plastic quality
- Better use of technology in households but also sorting centres, with a focus on output quality
- Increasing sorting practices of household like plastics from non-household sources, such as schools, bars, restaurants, offices, etc.
- Increase in collection levels

- Improvement the quality of collected material both from household and commercial and industrial sources.
- Meet circular economy and environmental protection targets.

The focus of the research within consortium countries revealed a number of good practices adopted for the management of MSW and more specifically the promotion of source separation practices, listed on the table below. Partners draw inspiration from these examples they shared during project workshops and stakeholder meetings.

The indicative practices shown in Table 1 have been developed on the framework of the PLASTECO Interreg project (cases 1, 2 and 3), but also as initiatives of sensitized communities active in recycling and circular economy (case 4) collaborations.

TABLE 3: Good Practices Examples for Source separation Initiatives on partners' territories

Best Practice	Country	Short Description
Sorting at Source and door-to-door collection	GR	The Municipality of Lipsi since 2014 implements an environmental policy practice for recycling and reducing plastic use in three levels. The Municipality of Lipsi implements a recycling program fully supported by the citizens & the local businesses. The Municipality distributed waste bags for temporary storage to the residents and businesses. The waste separation takes place at the source for the following materials: paper, plastic, nylon, metal/ aluminium, and glass. There are 3 recycling locations with separate collection points – including biowaste – on the main beaches of the island.
Demonstration model for prevention and recycling of household waste in the municipality of Beloslav	BG	The introduction of an innovative local system for plastic recycling in the municipality of Beloslav – as part of the global system "Precious plastic" – is aimed at encouraging the local population to separate household waste. The model will include a municipal center, a system for separate collection of plastic waste coordinated by the municipal center. Population and local businesses will actively participate. The initiatives includes campaigns and open days: a) The project will be presented to the general public and the principle of operation of the model will be explained. b) Containers for separate collection of household plastic waste will be distributed to the local community. c) The waste management company "Ecoinvest Assets AD", which cooperates with the municipal authorities, will organize an open day and a site visit in its premises in order to promote separate waste collection.

		d) A two-day training for separate waste collection will also be organized. The implemented measures have already tangibly reduced the amount of landfilled biodegradable waste and increased the share of separately collected quantities of waste on the municipal territory.
Certification project of a waste collection and reduction model within hotels and lodging places	BG	This project aims at decreasing the amount of waste generated by hotels and lodging places and optimizing the management of the waste quantities that cannot be avoided. Its successful implementation will result in establishing a national eco-certification model for responsible waste management in hotels and lodging places. The eco-certification model provides four levels of progression- bronze, silver, gold and platinum. The model will enable hotels to have an environmental image stimulus in order to expand the range of their eco-practices as well as get access to comprehensive information and a competent team of experts to guide them through the needs and requirements of the certification process. Hotels at all levels of certification are expected to collect plastic waste separately, levels above bronze are expected to establish waste reduction practices, levels above silver are expected to achieve certain quantitative criteria for waste reduction.
Sindra – Waste observatory of Auvergne-Rhône-Alpes Region	FR	Sindra regional waste observatory is a single optimized tool for monitoring indicators of the regional waste prevention and management plan. Sindra includes: - A general public section presenting a directory of regional actors, departmental and regional reviews and summaries following the rationale: “what wastes, what solutions?” both in a sorting at source and a recycling point of view. - A continuously updated database on domestic waste and waste generated by economic activities. - Indicators calculated at different scales (municipalities, local public authorities, departments and region) each year. - An extranet part to share data for local public authorities and private companies (data collected from 160 public communities and 400 private companies). Sindra will be used for studies focusing on particular territorial aspects but also on a particular theme e.g. territorial studies with a view to extending sorting instructions for plastic packaging. The tool "what

		waste, what solutions?" is designed to also sensitize individuals and professionals to the sorting of waste, by providing information adapted to the territory concerned.
Yoyo – a collaborative platform for rewarding better domestic plastics sorting	FR	Yoyo[10] is a collaborative platform that rewards inhabitants who sort more and better their used plastic bottles so that these can be directly recycled in a French-based short circuit. Yoyo works with public and private sector partners to roll out a project to double neighborhood plastic recycling rates. Yoyo.eco is a digital and human solution that rewards people who sort more and better to offset the environmental impact of what they consume. In 2018, Yoyo was operational in six cities and its 15,000 sorter residents had recycled 2 million bottles via a French-based short recycling circuit. Yoyo has proved that with resolutely positive ecology it is possible to double the amount of plastic recycled in French cities – and reduce drastically plastic pollution. The Yoyo system is simple: sorters sign up to the platform in three clicks, they then choose the Coach nearest to them, drop in to pick up their first bag, and then start filling it with plastic bottles. Once full, the bags are returned to the Coach. This is when Coach and sorter are rewarded for their involvement. The rewards system is Yoyo's number one lever: we reward careful sorting with tickets to the cinema or a soccer match, a range of environmentally friendly products, etc. Rewards are by far the leading driver for getting people involved. Once the Coach's storage space is full, we request a pick-up and deliver the bottles to the nearest recycling center, ensuring that 100% of recycling follows a short circuit and stays in France. Yoyo captures over 90% of PET flows for each person who joins the sorter community (equivalent to collection rates in Germany with the deposit system). At neighborhood level, collection and recycling rates are an average three times higher with the Yoyo system. 10000 people have joined the community, 50 member towns and cities in 2020.

[10] https://www.institut.veolia.org/en/yoyo-recycling-all-plastic-impossible-weve-already-started

3.2 Raising awareness on plastic littering and promoting the purchase of products from recycled plastics

A circular economy could increase the efficiency of primary resource consumption in Europe. By conserving materials embodied in high value products, or returning wastes to the economy as high-quality secondary raw materials, a circular economy would reduce the demand for primary raw materials. This would help reduce Europe's dependence on imports, making the procurement chains for many industrial sectors less subject to the price volatility of international commodity markets and supply uncertainty due to scarcity and/or geopolitical factors.

The European Commission announced the launch of the Circular Plastics Alliance on 11 December 2018.The launch of the Alliance followed the preliminary assessment of industry voluntary pledges for more recycled plastics. It showed that pledges from suppliers of recycled plastics were sufficient to reach and even exceed the EU target of 10 million tons of recycled plastics used in Europe by 2025.

3.2.1 Products from recycled plastics

'Secondary raw materials' are recycled materials that can be used in manufacturing processes instead of or alongside initial raw material, referred to as virgin materials. The SRMs allow many companies to use the waste and quality rejects to reintroduce them in their production chain after they have been recycled. In addition to the economic aspect, the secondary raw materials play a significant role within the environment: there is less industrial waste, therefore less pollution[11].

Thus, secondary raw plastic is identified as the raw material deriving from plastics recycling. It can be used only once for product manufacturing and then recycled to be deposited. Plastic downcycling through recycling is decisive for this material. The listed examples[12] show the potential of diversification for recycled plastic.

- Detergent Bottles: Plastic bottles for detergent, shampoo, as well as household cleaners come mostly from a recycled plastic known as high-density polyethylene. Manufacturers often leave the plastic in its natural, translucent state, that has milky white color or sometimes they add colorful pigments in order to make bottles stand out from the competition. While the recycled high-density polyethylene is being used in manufacturing milk bottles, it is best suited for non-food products only.

- Film and sheeting: Apart from high-density polyethylene, low-density polyethylene is also quite popular when it comes to recycled plastic products. It is more flexible and transparent than the high-density variety. Both types have similar ability to resist chemicals such as bases and acids. Recycled low-density polyethylene finds its way into products such as film and sheeting, as well as shipping envelopes.

[11] Recycle: Why? - Dimaplast

[12]
1. https://www.wwf.org.au/news/blogs/17-cool-products-made-from-recycled-plastics
2. https://www.wired.com/gallery/our-favorite-upcycled-and-recycled-products/
3. https://recyclecoach.com/blog/10-companies-creating-recycled-plastic-products/

- Traffic Cones: Recycled polyvinyl chloride is suitable for manufacturing resilient and flexible goods such as garden hoses, mud flaps, and orange traffic cones. Unlike fragile materials such as polystyrene, this polyvinyl chloride is tough and handles impacts very well. There, it is also used in rigid items such as decking and floor tiles, plumbing pipes, etc. Just like other types of recycled plastics, PVC is available in its clear and pure form mixed with pigments for color.

- Packing materials: Recycled polystyrene is used in manufacturing packing cartons as well as some other products that protect goods during shipment. Styrofoam is also a polystyrene but with air bubbles puffed into the material. Styrofoam can be relatively springy or rigid depending on how it's made.

- Insulation: Recycled polystyrene makes a superb thermal insulation and is used in various items.

- Trash Bags: Most trash bags are also made from recycled plastic. These bags give you the reliability and convenience of standard bags but take relatively less energy to manufacture, resulting in low greenhouse gas emissions.

- Kitchenware: Mostly, affordable kitchenware (which is available in a wide range of fun colors) is also made from recycled plastic. Plastic cutting boards, colanders, mixing bowls, and tableware are strong enough to stand up to everyday use, and food storage containers made from recycled plastic can be reused again and again.

- Countertops: Some countertops are also made from recycled high-density polyethylene plastic. You can install these countertops in your kitchen, laundry room, bathroom, or anywhere else you need an attractive, durable work surface.

- Carpeting: Recycled plastic bottles are melted and spun into durable and soft fibres in order to make some brands of carpeting. Opportunities to recycle carpeting are rapidly increasing.

- Compostable straws: They're made of polyhydroxyalkanoate (PHA), a material created by feeding common renewable plant oils to micro-organisms. PHA straws are marine and soil biodegradable, and home compostable.

- Bags: There are multiple recycled material options they can be made of such as recycled polyester, truck tarpaulins, old climbing ropes, seat belts, wet suits neoprene and nylon. These materials make the bags durable and light.

- Shoes: Made of post-consumer plastic bottles or other recycled shoes, they can be lightweight and comfortable.

- Eco – friendly Yoga mats: Used and damaged wet suits can be turned into dense, comfortable, and attractive yoga mats.

- Skateboard, sunglasses and clothes: Discarded plastic fishing nets are a big threat to ocean wildlife but fortunately they can be turned into recycled plastic products.

- Eco Acupressure Mat and Pillow: They are made of sustainable materials like linen—which requires less water to grow than other fabrics—100 percent recyclable high-impact polystyrene, biodegradable coconut fiber filling, and biodegradable buckwheat hull.

- Tops and Upcycled Shirts: They can be made of a combination of recycled plastic bottles and recycled cotton, or water-based inks and at the same time they can be comfy and slimming.

- Sustainable Workout Leggings, puff jackets and pocket shorts: They are comfortable and made of recycled plastic bottles and recycled polyester.

- Cosmetics: Beauty industry can be made less wasteful with the use of make-up kits housed in a water-treated bamboo compact with recyclable aluminum tin.

- Toothbrushes: The handle can be totally made of recycled plastics such as yogurt cups.

- Chairs/benches and decks: Made from end-of-life carpets and fishing nets removed from the ocean these furniture can remain light and flexible in case of bending and stretching.

3.2.2 Most common false perceptions

As part of its 'circular economy' package put forward in December 2015, the European Commission presented an action plan for the secondary raw materials. In the action plan, the Commission pledged specifically to undertake the following actions[13]:

- Develop quality standards for secondary raw materials, in particular for plastics (from 2016 onwards);

- Analyse policy options to address the interface between chemicals, products and waste legislation, including how to reduce the presence and improve the tracking of chemicals of concern in products (by 2017);

- Take measures to facilitate waste shipment across the EU, including electronic data exchange (from 2016 onwards);

- Further develop the EU raw materials information system (from 2016 onwards).

However, misconceptions on products made from secondary raw plastics mainly still exist in terms of:

- Quality standards,

[13] STRATEGY for SECONDARY RAW MATERIALS | Legislative train schedule | European Parliament (europa.eu)

- Public health safeguarding,
- Food safety from packaging,
- Environmental issues.

The use of secondary raw materials presents a number of advantages, including increased security of supply, reduced material and energy use, reduced impacts on the climate and the environment, and reduced manufacturing costs. However, the use of secondary raw materials faces a number of barriers, including the absence of EU-wide quality standards for certain materials (such as plastics), difficulties linked to the trading of secondary raw materials across the EU, and potential presence of chemicals of concern in recycled materials.

As a result, in the EU, uptake of recycled plastics in new products is low and often remains limited to low-value or niche applications. Uncertainties also exist concerning market outlets and profitability are holding back the investment necessary to scale up and modernize EU plastics recycling capacity and boost innovation. Recent developments in international trade, restricting key export routes for plastics waste collected for recycling, make it more urgent to develop a European market for recycled plastics.

One of the reasons for the low use of recycled plastics is the misgivings of many product brands and manufacturers, who fear that recycled plastics will not meet their needs for a reliable, high-volume supply of materials with constant quality specifications. Plastics are often recycled by small and predominately regional facilities, and more scale and standardization would support smoother market operation. With this in mind, the Commission is committed to working with the European Committee for Standardization and the industry to develop quality standards for sorted plastic waste and recycled plastics

The chemical composition of recycled plastics and their suitability for the intended uses can also act as a barrier in some instances. Incidental contamination or lack of information about the possible presence of chemicals of concern is a problem for various streams of plastics waste. These uncertainties can also discourage demand for recycled plastics in a number of new products with specific safety requirements.

As regards the use of recycled plastics in food-contact applications (e.g. beverage bottles), the objective is to prioritize high food safety standards, while also providing a clear and reliable framework for investment and innovation in circular economy solutions. With this in mind, the Commission is committed to swiftly finalize the authorization procedures for over a hundred safe recycling processes. In cooperation with the European Food Safety Agency, the Commission will also assess whether safe use of other recycled plastic materials could be envisaged, for instance through better characterization of contaminants[14].

A number of studies have shown that attitudes towards recycled products are influenced by age, educational level, gender and cultural background. According to several surveys, there exists an inconsistency between people's inclination and the effect of source separation. The respondents ignore the operability of separation methods. Separating waste at the source directly supports material recovery by producing a more homogenous and higher value stream which is easier to recover. Based on surveys, the vast majority of respondents hold consciously positive attitudes toward participation in source separation.

[14] EUR-Lex - 52018DC0028 - EN - EUR-Lex (europa.eu)

A survey in Berlin[15], showed that people wrongfully believe that plastic packaging ends up directly in the garbage anyway, referring specifically to plastic beverage crates. The truth is that re-usable plastic bottles can be refilled up to 25 times. Plastic crates can be used up to 100 times. This corresponds to a service life of almost 21 years. In Germany, 14% of reusable packaging for beverages is made of plastic. More than 95% of all reusable plastic bottles in Europe are used in Germany.

Furthermore, another wrongful belief is that the industry does nothing to recycle plastic packaging. In reality, plastic packaging worth almost 10 billion Euros is recycled every year in the EU. The recycled plastics have a value of EUR 4.2 billion. The energy recovery achieves a value of EUR 5.1 billion. As a result of deposition, around 3.5 billion € are still lost in the EU each year.

Results from another study indicate that respondents do not believe returned bottles are recycled. Those surveyed also expressed low confidence in the recycling systems in their countries, with over two thirds reporting to believe only 50% or less of what they put into their recycling bins is actually recycled. Actual recycling of plastics never actually takes place, so they question why to recycle in general. Respondents feel like no matter how much they recycle, it's not enough to make an impact. Over half of the respondents believe that people should be educated on how to reduce their plastic waste (58%) found recycling different plastics difficult to understand.

Another misconception arises from the fact that consumers are not confident that the product is made from recycled materials. According to surveys, consumers tend to feel better about their waste habits when they purchase something made from recycled materials. Respondents admit they'd be willing to pay 29% more than the retail price of an item if they knew it is made from recycled materials.

In addition, many, wrongfully believe the required facilities do not exist. 80% of those who didn't recycle all plastic, would do so more frequently if they had more facilities and/or guidance.

The term "circular economy" in communications may not resonate strongly with the public due to a lack of understanding of the term itself. Less than one-third (31%) of surveyed adults are confident they understand what the term means. Particularly, 54% of the respondents answered that they find recycling different plastics difficult to understand. As a result, there is need to create a more transparent process and clear guidance for consumers when it comes to the development of a circular economy and better recycling practices. Only by understanding consumer beliefs, national programmes and global goals, can the industry make real progress in sustainability.

Also, the knowledge of the degradation of plastics in different environments remains limited. The difficulty is that the abundant information available from materials science, focusing on the use phase and on industrial waste management, cannot easily be translated into environmental scenarios. For instance, the term 'biodegradable', used in an industrial setting, has created the misconception that those plastics will also readily degrade in any other environment[16].

[15] https://bp-consultants.de/wp-content/uploads/2019/03/The-12-most-common-misconceptions-about-plastic-packaging.pdf
[16] A circular economy for plastics (hbm4eu.eu)

Finally, according to the ecology center organization[17], there is the misconception that all plastics that go into a curbside recycling bin get recycled. In fact, many plastics are unrecyclable, and the recyclable ones must be separated out. The rest go to waste. Collecting plastic packaging at curbside fosters the belief that, like aluminum and glass, the recovered material is converted into new packaging. However, most recovered plastic packaging is not made into packaging again but into new secondary products such as textiles, parking lot bumpers, or plastic lumber; all unrecyclable products. This does not reduce the use of virgin materials in plastic packaging.

3.3 Public and industry perspectives towards recycled plastics production and use

In the past years, EU states have consistently sought to increase the, relatively low, plastic recycling rates. To achieve that they have adopted a two-pronged approach aiming to i) build awareness among the public on the importance of recycling plastic waste and consequently on the importance of sensible waste disposal and separation ii) foster the development of a market for recycled plastic in order to motivate investments from the private sector. The former, has been the focus of most awareness campaigns over the past years. Nevertheless, in order to actually increase the current recycling rates the latter goal, is equally important. In turn, this goal entails improving the image of recycled plastic to the general public and promoting plastic recycling by providing financial incentives to plastic recyclers.

Public opinion has in general been favourable to these developments, with the majority of people becoming aware of the importance of addressing the issue of public waste. The stance of the general public on providing incentives to plastic recyclers is yet unknown, but it is likely to be positive as surveys have shown that the public views positively the inclusion of recycled plastics in products, when it is informed of the environmental benefits.

3.3.1 Incentives to plastic recyclers

There are currently a number of policies and initiatives in the EU countries, actively seeking to promote plastic recycling and provide incentives for plastic recyclers. Indicatively, a number of examples are presented below.

In Denmark packaging tax has been levied since 1978. The tax on recycled plastic packaging is significantly less than the tax on virgin plastic providing an indirect financial incentive to plastic recyclers [1]. In the same vein, in the past, Finland had imposed a differential tax on plastic containers with recycled containers having a tax of 0.17€ per litre compared to 0.67€ per litre for discarded containers[18]. Similar kinds of environmental taxes (i.e. involving tax rates that vary based on the environmental performance / impact of the product) have been introduced in a number of EU countries. These taxes have often been sufficiently high to provide an actual incentive for plastic recycling.

Extensive Producer Responsibility (EPR) schemes concern the responsibility of the manufacturer for the disposal and recycling of waste. Germany initially developed the concept in the late 80s, with a focus on

[17] PTF: MISCONCEPTIONS | Ecology Center

[18] Currently the law has changed and containers are exempted from tax if the producer is participating in approved deposit-refund schemes.

packaging waste. Subsequently, the scheme was introduced, in various forms, in most European countries. The fees paid by a producer introducing a packaged good into the market, go towards collection and recycling of the packaging, benefiting the recyclers. For example, in Czech Republic producers contributions (amounting to 20€ per tonne of packaging put in the market), are used to reimburse municipalities for the collection of the household packaging waste and to contract waste management companies to ensure proper treatment and recycling of the collected packaging[19].

Another policy option to support and incentivize plastic recyclers is Green Public Procurement (GPP), whereby public authorities introduce environmental criteria in their public procurement, favouring products with a lesser environmental footprint. For example, in 2006 the Basque government, in the context of its procurement of eco-designed office furniture, prioritized offers that included furniture with recycled plastic components[20].

Finally, plastic recyclers are financially supported by EU and the national states, either through providing grants for projects that advance plastic recycling technologies and promote recycled plastics or through loans to recyclers that seek to increase their recycling capacity. As an example, the European Investment Bank has recently provided a €30 million loan to Carbios in order to support the strategic industrial and commercial development of Carbios technology of PET enzymatic recycling[21].

Despite these policies and schemes, the current plastic recycling capacity in EU is below the present needs, with plastic recyclers citing the lack of sufficiently strong incentives as a barrier to investing in increasing their recycling capacity.

3.3.2 Awareness campaigns

Consumers' willingness to purchase recycled plastic is paramount to increasing the recycling rate of plastic waste. Related barriers, with regards to public opinion, concern consumers, possibly, viewing the quality of recycled plastic as inferior to that of newly manufactured plastic and conversely the willingness to pay, at times a premium, for recycled plastic. The latter constitutes a barrier since plastic production costs depend on natural resources (primarily oil), while recycling costs depend on the collection, separation and recycling costs. Producing plastic is a relatively low-cost process and at times that oil prices are low it might be difficult for recyclers to achieve competitive prices.

Consequently, awareness campaigns are vital in order to create a market-fuelled demand for recycled plastics which is essential for increasing the overall plastic recycling rates. To this end, awareness campaigns need to focus on the following objectives: i) dispel any public doubts on the quality of recycled plastic, and ii) highlight the environmental benefits and the reasons that make recycled plastics more beneficial to the society, compared to newly manufactured plastics, in the long term.

[19] https://www.oecd.org/environment/outreach/EN_Policy%20Manual_Creating%20Market%20Incentives%20for%20Greener%20Products_16%20September.pdf

[20] http://www.plastic-zero.com/media/50849/green_public_procurement__manual_on_plastic_waste_prevention__final_.pdf

[21] https://www.eib.org/en/press/all/2021-476-the-eib-with-the-support-of-the-european-commission-is-financing-a-eur30m-loan-for-carbios-enzymatic-recycling-technology-to-support-the-circular-economy

Relevant awareness campaigns promoting the use of sustainable (including recycled) plastic are presented in the following paragraphs as examples.

3.3.2.1 Example: "Recycled plastics in new electronics" campaign, PolyCe project[22]

In the context of the Horizon 2020 project "Post-Consumer High Tech Recycled Polymers for a Circular Economy", an awareness campaign on the benefits of the recycled plastics in new electronic products to the environment, was conducted. The campaign aimed to convert willingness to make sustainable choices to actual sustainable purchases and increase the demand for electronics with recycled plastics, motivating manufacturers to use more recycled plastics in their products, ultimately aiming to stimulate the market demand for products that contain recycled plastic. The campaign strategy was based on the findings of an EU-wide survey conducted by the project partnership, on the consumer behaviour and attitudes towards recycled plastics and their willingness to consume ethically. Consequently, the campaign has been built upon, and highlights the following values: i) sustainability, ii) environment, iii) responsibility, iv) ethics, v) empathy. Based on the above, the key messages of the campaign are the following:

- Consumers should consider recycled plastics in electronics, they have the same quality, safety, appearance, price and functionality with an environmental benefit
- Consumers should make a purchase that prefers products with recycled plastics
- By purchasing products made of recycled plastics, consumers are helping the environment

The campaign was carried out through the following means, aiming to maximize its visibility and impact:

Social experiment

A social experiment was created and filmed, during which, consumers were faced with a purchasing choice situation and they needed to select an appliance based on their needs and priorities: durability, design, upgrade possibilities. Two products with similar features are presented, one with recycled plastics and one without. A directed interaction took place and a campaign video was produced on the basis of the content gathered. The video was designed to be open-ended, though the direction made sure to present recycled plastics in a very favorable way, and break main stereotypes about recycled plastics. The interaction was created to take place in an open space, where a lot of people would pass by and would have an opportunity to participate.

Interviews

Interviews were provided with thought leaders, aiming to debunk stereotypes about recycled plastics and highlight their environmental benefits.

Teaser video

From the material gathered by the social experiment and interviews, a teaser video was created, briefly presenting the issue and the project and announcing the campaign.

[22] https://www.polyce-project.eu/results/

The campaign primarily targeted the mainstream European consumers, reaching beyond, supporters of sustainability and educated elite, aiming to reach 5% of EU citizens.

Another example: "Museum out of plastic", Madrid (ES)

In the context of the project "Museum out of plastic", a temporary museum was built in May 2021 in Madrid, Spain that was 100% made out of recyclable plastic. Its exhibits paid tribute to various plastic creations. After 10 days the museum was subsequently closed, with the entire museum being recycled. The recycled plastic would be turned into products, would be part of the collection "I used to be a museum" and would be available on the museum's online store. The purpose of the museum was to highlight and raise awareness on the importance of sustainable solutions for plastic waste, promote recycled plastic as well as make the advances in the ecological aspect of plastics technology more well-known to the public.

3.3.3 Common concepts for designing awareness campaigns

Firstly, it is essential to identify the actual concepts / values that the campaign will be centred around. These are determined by the current public perception of recycled plastic and are related to the lack of knowledge or even doubt about the quality of the recycled plastics, and the long term environmental and economic benefits of recycling plastic waste. Therefore, it is important to reflect these priorities to the key messages of a campaign.

A desk research on relevant literature provides a number of effective strategies for awareness campaigns along with strategies that should be employed with caution, due to potentially adverse effects and common mistakes that should be avoided. In particular:

Effective strategies

- **Customizing the campaign**. Different people require different approaches. Those that design the awareness campaigns should be aware of their target groups and plan the campaign accordingly.
- **Using good norms.** People imitate others, particularly those with recognised status. Involving celebrities or persons that are viewed positively by the general public or the campaign's target group will increase the impact of the campaign.
- **Specifying action.** The campaign needs to be specific on what people can do and provide a clear direction to them.
- **Catalysing commitments.** The campaign should challenge people to make a public or private commitment to do something specific. This will increase the odds that they will actually shift their habits over time.
- **Tap into positive emotions.** Campaigns should tap into people's positive emotions (e.g. hope, optimism) and relate them to sustainable habits.
- **Showing people that their actions matters.** If people believe that their actions can actually make a difference and engender a positive change, they are more likely to alter their behaviour and habits.

Cautions

- **Fear.** Fear can be productive when someone can do something about the issue at hand, otherwise it can lead to passivity.
- **Highlighting incentives.** Incentives can work but people will revert back to their initial habits once the incentives are gone. Therefore, basing a campaign on advertising the incentives that are provided might not be the best option if these incentives are temporary.
- **Utilizing humour.** A funny and clever campaign might attract more attention and be more memorable. However, incorporating humour in the campaign might not translate to actual behavioural or habit change and sometimes might lead to the opposite result as the situation might be considered less important or serious.
- **Altruism.** While tapping into people's altruistic values might work, a lot of people make the choices based on their needs and wants instead of those of the group or even their future needs.

Common mistakes

- **Not going beyond awareness.** Raising awareness should be a part of the campaign. However, assuming that simply making people aware of an issue / problem will necessarily make them change their habits is usually not the case. People may acknowledge that plastic waste is an issue but most of them will require additional motivation to change their actual behaviour.
- **Making people feel guilty.** Framing the campaign around people feeling guilty about their behaviour will create resistance in many people, leading potentially to the opposite effect.
- **Reinforcing bad norms.** Social norms are effective at shaping behaviour. Therefore, showcasing undesirable behaviours and highlighting their frequency might have the opposite effects.
- **Allowing the problem to feel distanced.** People are less prone to act and change their behaviours when an issue is viewed as distant, not impacting them, or is just based on statistical data instead of images and stories.
- **Focusing on statistics.** Citing statistics (e.g. volume of plastic waste) might have a purpose but when campaigns are based on statistical facts they often inadvertently lessen their impact, as it feels distant and does not emotionally engage people. For example, the strategy employed in the campaign that took place in the context of the "Post-Consumer High Tech Recycled Polymers for a Circular Economy" project, included videos of discussions and reaction from people making the message feel more relevant to the target audience.

Concluding, future awareness campaigns promoting recycled plastic will need to address the issues of recycled plastics quality and the environmental and economic benefits of recycling plastic waste. At the same time it will need to incorporate the lessons provided by the general literature in this area, in order to more effectively reach and influence their target groups.

4 Suggestions on discussion topics for the workshop

This section provides the thematic areas that are expected to be addressed in the course of the interregional workshop. This list is not final and subject to modifications and/or updates (if necessary), following the review and feedback from the hosting organisation.

The term 'thematic areas', as indicated below, refers to a broad theme each one entailing a number of discussion subtopics. Three distinct thematic areas have been identified for the interregional workshop. Each thematic area comprises some indicative topics, around which the workshop's presentations and discussions shall revolve. Guest speakers are encouraged to draw on the research findings and new provide new ideas and perspectives for the topics under examination.

Thematic area 1: Kick-starting or intensifying efforts for plastic waste separation at the source

This session aims to aid policy makers and other stakeholders in promoting waste separation at the source. To this end, it will present examples of policies and practices that have been utilized to effect increased rates of waste separation, which is essential for efficiently recycling plastic. In this context, indicative topics to be discussed and examined in the workshop are the following:

- Importance of waste separation for efficient recycling.
- Barriers and enablers to increasing the separation of plastic waste at the source.
- Discussion on ways to advance and improve current regional policies in this area.
- Discussion on efficient ways, based on past experience, to raise public awareness on the issue.

Thematic area 2: Identifying existing misconceptions on products made of recycled plastics.

The aim here is to identify, discuss and debunk misconceptions on the quality of recycled plastics. The results will be used to enrich the dissemination efforts of the project and will be incorporated in future awareness campaigns. Indicative topics are the following:

- Discussion on the current state of play regarding the public opinion on recycled plastics.
- (Successful) examples of products incorporating parts made of recycled plastic.
- Discuss (and dispel) common misconceptions on the quality of recycled plastics.

Thematic area 3: Strategies and policies to support / promote plastic recyclers - Raising awareness among the public on the benefits of recycled plastics

The goal of this thematic area is to a) identify past and current policies to support plastic recyclers with the aim of identifying policy gaps and improving the current policy framework, and b) improve the effectiveness and impact of future awareness campaigns in this field. To this end, past campaigns will be presented and evaluated and suggestions for further improvement will be made. Indicative topics are the following:

- Presentation, discussion and evaluation of policies that support plastics recyclers.
- Presentation, discussion and evaluation of past awareness campaigns promoting recycled plastic.
- Suggestions for further improvements of the future awareness campaigns based on past experiences and thematic knowledge.

5 Organisational details

5.1 Participants

ADR-BI will host the interregional thematic workshop on public awareness on plastic littering and on the environmental and economic benefits of products from recycled plastics. The workshop will last one day. The working language will be English, participants need to have sufficient knowledge of the language to be able to fully participate in workshop discussions.

A list of important regional stakeholders has been provided in the PLASTECO Application Form. Nevertheless, project partners are expected to identify and invite those regional stakeholders who are the most thematically relevant to the topics addressed by the workshop. Indicatively, but not limited to, these stakeholders can include interested institutions from across Europe such as environmental agencies, regional development agencies, higher education institutes, and research centres, chambers of commerce, professional associations and public authorities. As mentioned, project partners have the freedom to expand this indicative list if they deem it conductive to increasing the overall impact of the workshop. Effort should be made to invite stakeholder that have already participated in previous project activities and are thus more invested in the project and more aware of its scope and objectives.

5.2 Structure

There are several different methods and techniques from which ADR-BI can choose from to engage participants in workshop activities and proceedings. To facilitate knowledge sharing and capacity building, the workshop could be structured to deliver the following sessions: a) oral presentations b) round table discussions (panels), c) interactive exercises.

a) Oral presentations are brief discussions of a defined topic delivered to a group of listeners to impart knowledge and stimulate debate. There are four different types of oral presentations: a) the informative presentation, seeking to convey information and promote understanding of an idea or concept, b) the demonstrative presentation, showing the process of how to accomplish a task or activity, c) the persuasive presentation, which aim to influence a change in the beliefs, attitude, or behaviour, stimulating the uptake of actions, and d) the motivational or inspirational presentation, designed to create an emotional connection between the topic and listeners, while encouraging the latter to go after their objectives.
b) Panels represent a flexible form of discussion employed at workshops and conferences to facilitate participants' interaction and exchange of ideas. A small number of participants are seated around a table to discuss in-depth a particular topic of interest, seeking to resolve issues of disagreement; extract useful conclusions, and decide and plan future actions. The roundtable discussion format allows participants to interact with each other, promoting networking and equal participation/contribution, and allowing for faster decisions.
c) Interactive exercises are defined as a structured set of facilitated activities for groups of participants to stimulate creativity and knowledge sharing through collaborative working. The purpose of interactive exercises is to facilitate the demonstration and application of skills and techniques, which will enable participants to find new ideas regarding potential policy measures on raising

plastic awareness. Project partners and key regional stakeholders will explore procedures that encourage involvement and cooperation, promoting knowledge sharing and capacity building, leading to useful outcomes for participants with diverse experience but also with common needs and shareable solutions.

5.3 Tentative Agenda

The following is an indicative agenda for the workshop.

Workshop on awareness raising on plastic littering and promoting the purchase of products from recycled plastics

WORKSHOP AGENDA

Venue and date: [To be confirmed]

February, 2022

09.00 – 09.15	Log in to Microsoft Teams – Technical check [if online]
	Establishment of connections and preparation of audio-visual settings
09.30 – 09.50	Welcome and introduction
	Formal welcome Official welcome and opening statement Introduction to the workshop, agenda overview
09.50 – 11.30	1st Thematic session – Policies and practices to kick-start/intensify efforts for source separation of plastic waste
09.50 – 10.20	Separation at source practices and examples
	Presentation of ADR-BI region best local activities and examples
10.20 – 11.10	Separation at source policies: gaps & enablers
11.10 – 11.20	Raise awareness on source separations: successful campaigns
	Presentation of few selected successful campaigns on source separation
11.20 – 11.30	Coffee break

11.30 – 12.30	2nd Thematic session – Misconceptions on recycled plastics products
11.30 – 11.45	Typical misconceptions on recycled plastics products
11.45 – 12:00	Products from recycled plastics: quality and design
	Invitation to a relevant company Q&A session
12.00 – 13.30	3rd Thematic session - Public and industry perspective towards recycled plastics production and use
12.00 – 12.15	Awareness raising campaigns' how-to
12.15 – 12.30	Awareness campaigns themes
12.30 – 12.50	Q&A session
12.50 – 13.00	Wrap up and conclusion of the workshop

5.4 Summary report guidelines

To conclude PLASTECO activity 3.3, ADRBI will deliver a summary report. The report will present the outcomes of the workshop and will be used by project partners as the main input for diffusing the lessons learned within their organisations and to promote storytelling.

Summary reports are short written communication documents, which aim to convey information related to the discussions and activities carried out during study visit proceedings. The summary report should include the following aspects:

- Document the interventions of participants and the overall discussion within each session.
- Draw conclusions from the discussions and the debates in each session of the workshop.
- Briefly present policy recommendations for the development of activities based on the interventions of the participants and the conclusions drawn from the discussion.
- Present an evaluation of the workshop based on the comments and feedback from participants.
- Present the metrics of the workshop (number of registered participants, type of participants, duration).

The following guidelines have been developed to provide assistance and guidance to ADRBI on how to summarise and present the main conclusions drawn from the visit; the summary report should be drafted as follows:

1) Develop short summaries for each session of the workshop. The summaries should include: a) the context and objectives of the session, b) key argumentation from the interventions of participants, and c) conclusions and findings extracted from the overall discussion.

2) Review the evaluation (feedback) forms and present the main conclusions. The author should summarise the key pitches and ideas as drawn from the forms completed by workshop participants. It is highly recommended that any idea (i.e. policy advice) that could contribute to the improvement of regional policies in the field should be integrated.

3) Juxtapose the key arguments/conclusions drawn with any relevant results and findings from PLASTECO thematic studies and guides on similar policy aspects. Identify convergences and divergences between findings.

4) Provide guidelines (in the form of policy recommendations) on how to utilise the key conclusions drawn to design policy measures and activities to promote the adoption of policy measures that lead to EU region's plastics littering reduction. The guidelines on how to integrate the lessons learnt in the PLASTECO activities, as well as any policy advice that may be derived from the analysis of evaluation forms, should be described in a way that is simple, brief, and easy to follow.

5) Draft the summary report. The workshop summary report should be drafted clearly and concisely, focusing on the conclusions drawn from knowledge sharing and consultation processes that took place during the workshop sessions. To meet its purpose, the summary report should include the following:

    a. Overview and statistics, i.e. the number of participants and the type of organisations represented.

    b. Summary of the main observations and lessons learnt from the workshop and the key discussion points and conclusions from topics discussed.

    c. Brief presentation of policy recommendations for the development of awareness raising activities, based on the interventions of the participants and the conclusions drawn.

    d. The evaluation of the workshop, based on participants' feedback.

Annex I: Feedback form

This feedback form is proposed to evaluate the participants' conclusions and assessment on the workshop results.

Evaluation Form				
PLASTECO A3.3 – "Interregional workshop on how to raise awareness on plastic littering and promote the purchase of products from recycled plastics"				
Organised by ADR-BI				
Name:				
Organisation:				
Please answer the following questions, relevant to different aspects of the public consultation meeting, by rating on a 1 to 5 scale.				
How would you rate the exchange of the workshop's overall organisation?				
1	2	3	4	5
☐	☐	☐	☐	☐
Do you think that the time allocated to each topic was sufficient?				
1	2	3	4	5
☐	☐	☐	☐	☐
How would you rate the quality of the presented topics?				
1	2	3	4	5
☐	☐	☐	☐	☐
How would you rate the quality of the discussion during the workshop?				
1	2	3	4	5
☐	☐	☐	☐	☐
How relevant to your organisation's operations were the topics addressed?				
1	2	3	4	5
☐	☐	☐	☐	☐
The workshop will lead to improvements in the proposed policies				
1	2	3	4	5
☐	☐	☐	☐	☐
The workshop, as a whole, has been appropriate and productive.				

1	2	3	4	5
☐	☐	☐	☐	☐

Are there any issues related to the topics of the workshop that have not been addressed? Please briefly describe them.
Click here to enter text.
Do you have any suggestions for the organisation of future workshops?
Click here to enter text.

Annex B: Organisation of a virtual workshop

Virtual events offer a viable alternative in cases where physical attendance is not an option, such as the current Covid-19 outbreak. This appendix provides guidelines for the organisation of an online workshop, as a viable alternative, seeking to guarantee the project's seamless implementation and continuity.

Maintaining the schedule is essential for virtual events, as delays and technical problems can be more usual than face-to-face events. Thus, the organisers should make sure that the workshop will start and end on time. Also, breaks should be scheduled every 45-60 minutes, to maintain the attendees' attention; virtual events require rigid scheduling. Taking into consideration the limitations associated with virtual communication in comparison to physical communication and live events, the virtual events are expected to have a decreased duration, not exceeding 5 hours, to remain productive and efficient.

There is a wide selection of virtual conferencing tools available, both free and paid, offering the technical possibilities to support the purposes of the workshop, such as Google Meet, Zoom and Microsoft Teams.

The hosting organisation (ADRBI) will decide in which online platform the workshop will be held. The example below is using Microsoft Teams platform.

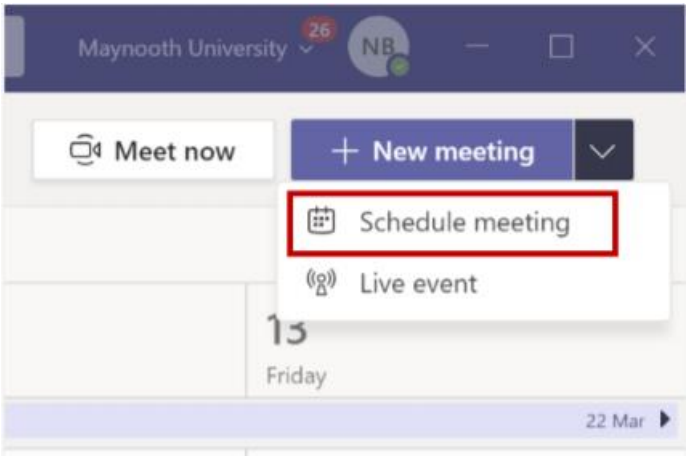
How to schedule a workshop in Microsoft Teams

An online workshop can be scheduled any time before its due date and time. A reminder can be sent out to attendees at any time by opening your calendar, selecting the event, getting the attendee link and sharing this with the current or additional attendee/s. The link can be shared by posting to a channel in the relevant team, emailing or other. To schedule an online workshop:

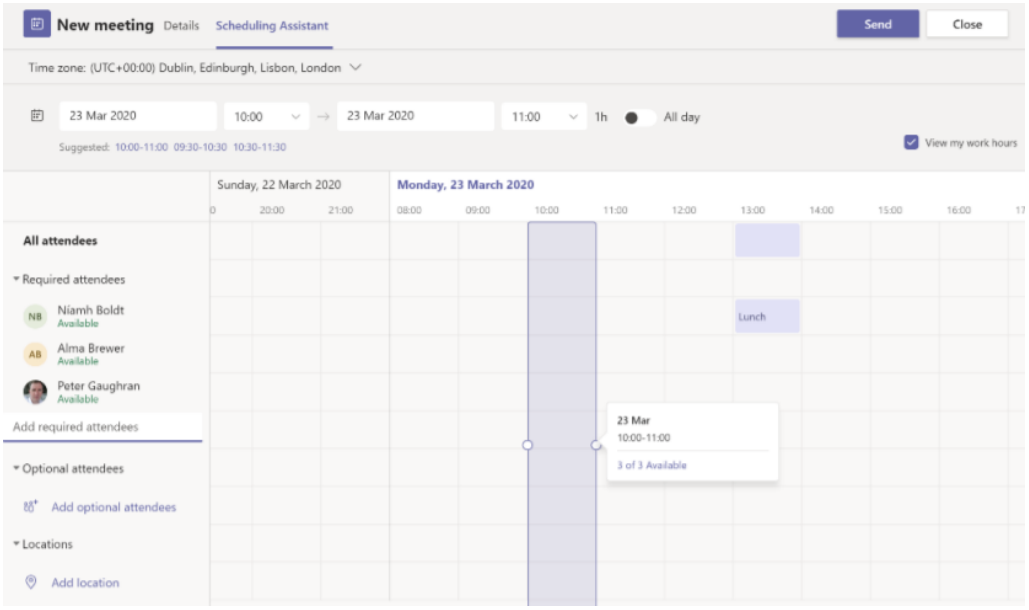
i. Open Microsoft Teams desktop app. If you do not yet have Microsoft Teams installed on your machine, navigate to the following link and download the relevant app for your operating system: https://teams.microsoft.com/downloads#allDevicesSection

ii. Select *Calendar* from the navigation panel on the left

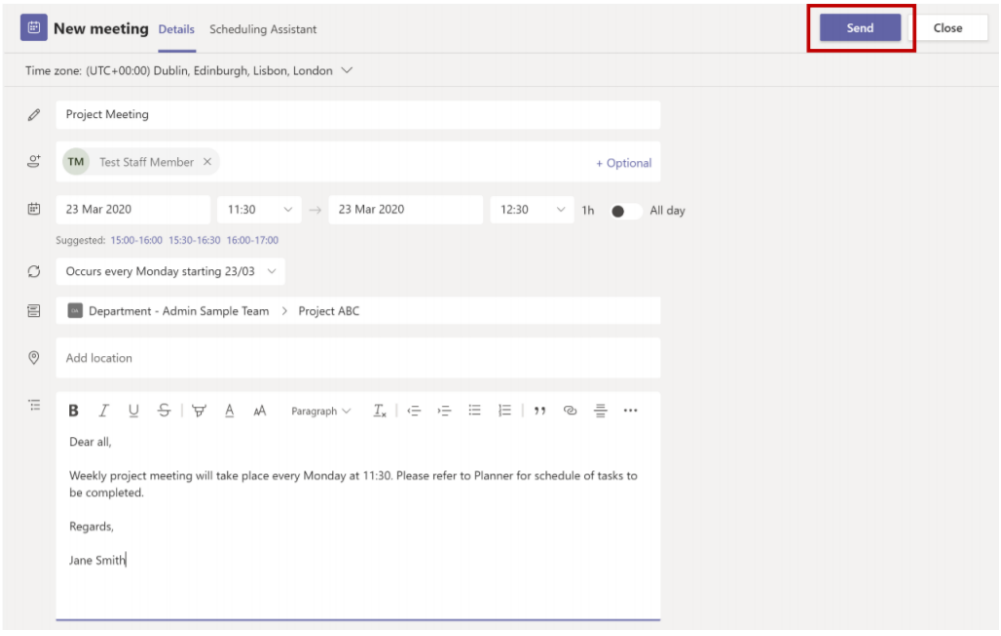
iii. Select *Schedule Meeting* from the New Meeting drop-down menu.



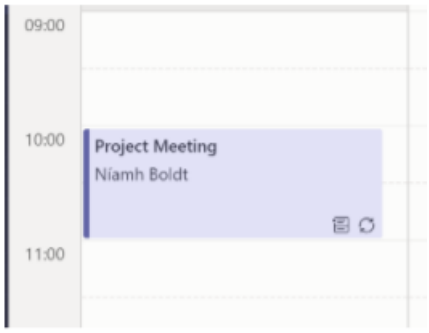
iv. If the workshop will be scheduled according to attendee's availability, select *Scheduling Assistant* to select a time to suit all or most attendees. Once an appropriate time is selected, click *Details* to complete the *New Meeting* request and then *Send* the invite.



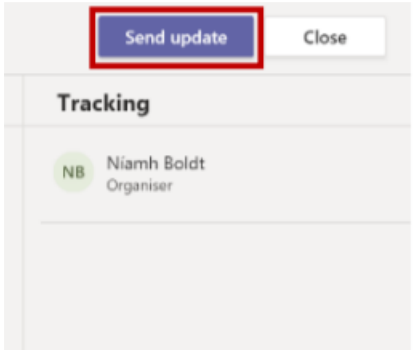
v. If the workshop is due to take place at a set date and time, complete the *New Meeting Details* as required and click *Send*. Note: Scheduling Assistant would not be required in this case.



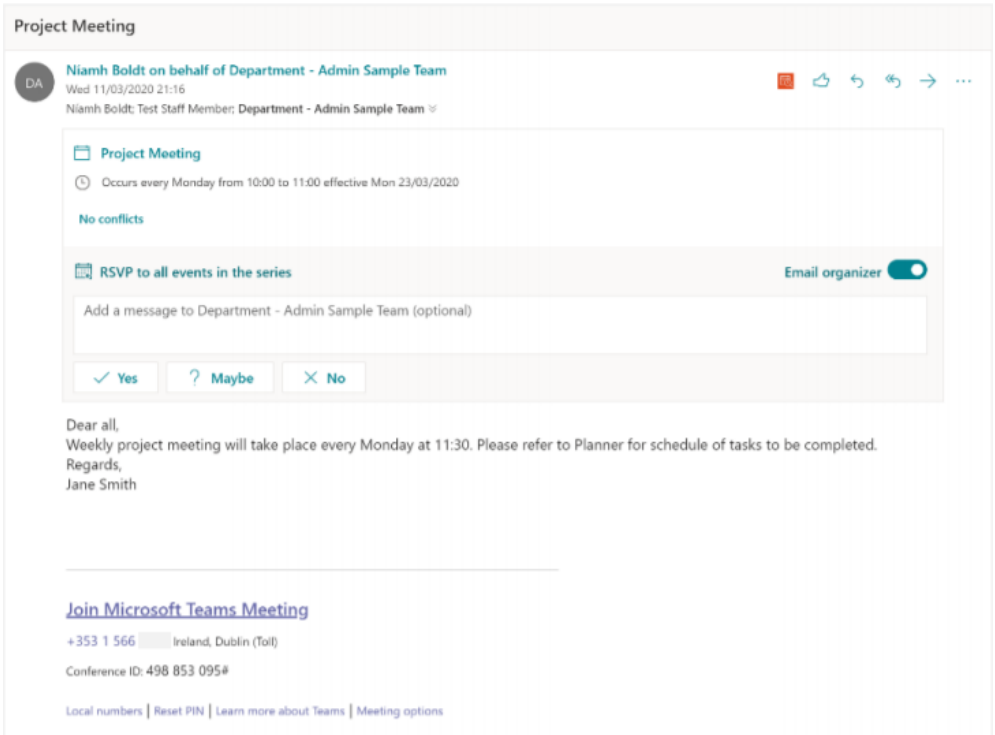
vi. The workshop (meeting in Microsoft Teams) has now been scheduled. This will appear in your *Calendar* in Microsoft Teams and Outlook. To edit this meeting at any time, open your *Calendar* and select the meeting request.



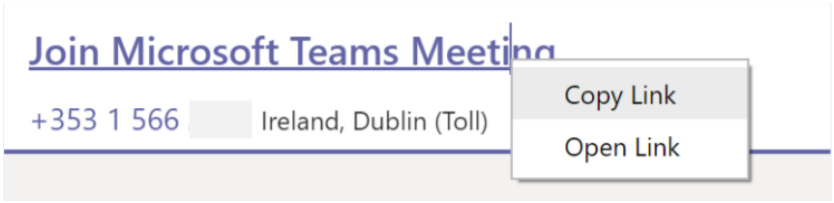
vii. To edit this scheduled meeting at any time, open your *Calendar* via Microsoft Teams and select the meeting entry. Edit the meeting event as required and click *Send update*.



viii. All invited attendees will receive an email similar to that shown below. Attendees will be required to RSVP to the meeting.



ix. A weblink to the online workshop (meeting), along with the direct dial information can be copied and shared with existing or new attendees, if required. To do this, right click on the *Join Microsoft Teams Meeting* at the bottom of the *Meeting Details* and click *Copy Link*.



How to join a Microsoft Teams meeting as a participant

Option A: Join a Teams meeting from the Microsoft Teams application.

i. From your **Calendar**, select **Join** on an in-progress meeting.

ii. Choose the audio and video settings you want.

iii. Select **Join now**.

Option B: Join a Teams meeting on the web

i. In your email invite, select **Join Microsoft Teams Meeting**. You can also use a dial-in number and conference ID from the email to call in.

ii. **Choose to join on the web**: Join a Teams meeting on the web.

iii. Type in your name.

iv. Choose the audio and video settings you want.

v. Select **Join now**.

Depending on meeting settings, you'll get in right away, or go to a lobby where someone in the workshop (meeting) can admit you.