



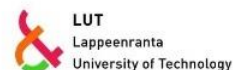
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List of abbreviations

EC	European Commission
EPR	Extended Producer Responsibility
HORECA	HOTels-REstaurants-CAfés
PET	Polyethylene Terephthalate
PPW Directive	Packaging and Packaging Waste Directive
SUP Directive	Single Use Plastics Directive
WFD	Waste Framework Directive

1 Introduction

Deliverable D9.15 is the second of the two policy reviews that are prepared within the upPE-T project. It contains an updated overview of the policy framework at the EU level for the management of post-consumer plastic packaging waste for food and beverages, prepared previously within the deliverable D9.14. The primary aim of these two deliverables is to serve as inputs for the preparation of the policy paper (D9.16) that would contain recommendations for the improvement of the legal and regulatory framework at the EU level.

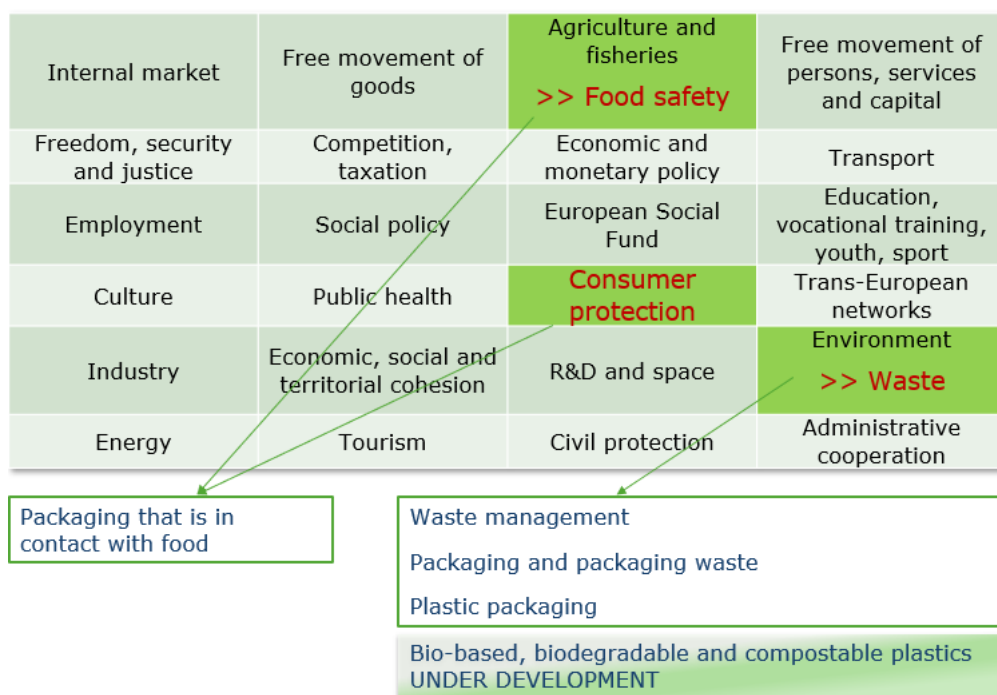
1.1 Context

Recycling of food and beverage plastic packaging waste is included in several policies at the EU level:

- First and foremost, recycling and other waste management activities, as well as specifics related to the management of packaging waste and to the use of certain types of plastic packaging, are part of the *environmental policy*;
- Safety issues related to the use of plastics in contact with food are parts of the *consumer protection* policy and the policy on *agriculture and fisheries*.

Figure 1 provides an illustration of these connections.

Figure 1: EU policies relevant for the recycling of food and beverage plastic packaging waste



1.2 Contents and structure

Deliverable D9.15 builds on the overview of provisions on the part of environmental policies that are relevant for the recycling of food and beverage plastic packaging waste already

provided within D9.14, supplementing them with announced policy changes in this area, and also providing additions related to the requirements on plastics in contact with food.

Firstly, a short outline of key legislation is provided.

The second part describes legislative requirements imposed on waste management activities. General rules that apply to all waste management activities are explained, focusing on those measures that apply to food and beverage plastic packaging, such as obligations related to separate collection and EPR requirements.

Afterwards, specifics that apply to packaging and packaging waste are provided. Of particular interest are announced policy changes, expected to come in force with the adoption of the Proposal of Regulation on Packaging and Packaging Waste.

Overview of provisions applying to specific types of plastic products and plastic packaging has been partly retained from D9.14. Updates include most recent developments related to the establishment of EU legislation on bioplastics, and also announced changes related to plastic carrier bags, to come with the adoption of the new legislative framework for packaging and packaging waste.

Finally, an overview of relevant provisions related to the safety of plastic packaging in contact with food is added.

1.3 Interactions with other work packages

Work package 9.5, within which policy reviews are prepared, has significant interactions with the Work package 7.3 *Integration of SSH and gender aspects*.

Deliverables within WP7.3 contain analyses of policies that affect recycling rates of plastic packaging in selected countries, and also a comparative study that would provide policy recommendations. A significant part of the case studies relies on the analysis of legislative requirements, that need to be aligned with legislation set out at the EU level. These are first and foremost WFD and PPW Directive, that deliverables within WP9.5 (in particular D9.14 and D9.15) in particular deal with.

The interaction exists in the other direction as well, since, along with the policy reviews (D9.14 and D9.15), comparative study from WP7.3 (D7.10) would serve as an input for the development of a proposal to improve current legal and regulatory framework (D9.16).

2 Environmental legislation applying to food and beverage plastic packaging waste

Competences for the environmental policy in the EU are shared between the European Union and Member States. This means that Member States can enact legally binding acts and other measures, but only in cases when the EU does not exercise its competences or refrains to do so. When the EU enacts laws and measures, it is binding for Member States to abide by these provisions.

The **Waste Framework Directive** (2008/98/EC) (hereinafter referred to as *WFD*) is the key piece of legislation at the EU level referring to waste management activities. The key principles enshrined in the Directive are that waste management activities must be sustainable and must be conducted in such a manner to protect the environment and human health, and to contribute to the efficient and rational use of resources. The Directive is comprehensive, and is not focusing specifically on plastic packaging. However, it is highly relevant as it provides general setting for conducting the activities of separate collection and recycling; it sets out targets for the recovery of municipal waste and introduces unified methodology for their calculation; and sets out the playing ground for the functioning of EPR schemes, which are the most significant means for achieving the sustainable and circular use of plastic packaging.

Packaging and Packaging Waste Directive (94/62/EC) (hereinafter referred to as *PPW Directive*) prescribes requirements related to packaging, as well as specifics related to the management of packaging waste. The objective is to harmonize national rules, with the twofold aim: 1) to reduce the negative environmental impact of packaging waste, by preventing the generation and promoting the recovery of packaging waste (e.g. through the repetitive use, upcycling or recycling), and 2) to avoid distortions on the internal market.

An important development is that the European Commission has put forward the **Proposal of Regulation on Packaging and Packaging Waste** (European Commission, 2022d), with the intention to ensure the proper functioning of the single market, and facilitate the prevention of generation of packaging waste and its recyclability and reusability. The Proposal also incorporates changes envisaged in the proposed regulation on ecodesign of sustainable products (European Commission, 2022c), which aims to improve the environmental sustainability of a range of products (including packaging, but not applying to food and beverage products). If adopted, the new regulation would replace the PPW Directive.

Directive on the reduction of the impact of certain plastic products on the environment (EU 2019/904) (hereinafter referred to as *SUP Directive*) prescribes bans and other measures with the aim to prevent and reduce the impact of single-use plastic products on the environment, in particular on marine environments.

Relevant addition is the European Commission's **Communication on the EU policy framework for biobased, biodegradable and compostable plastics** (European Commission, 2022a).

For **plastics that come into contact with food**, various EU legislation applies. Most importantly, these include directive regulating materials in contact with food (EC 935/2004), and regulation on good manufacturing practices for materials in contact with food (EC 2023/2006); legislation related to plastics in contact with food (EU 10/2011), and also the one related specifically to recycled plastics in contact with food (EU 2022/1616).

3 Waste management provisions

Relevant EU law is the *Waste Framework Directive (WFD)* (2008/98/EC). Content within this heading is to be referenced to this Directive, unless other reference is specified.

3.1 Key definitions and principles

WFD provides a definition of *waste* in simple terms, as “any substance or object which the holder discards or intends or is required to discard”¹. For the management of post-consumer plastic packaging, the most relevant type of waste is municipal waste. According to the WFD, *municipal waste* encompasses waste collected from households, but also comparable waste collected from other sources, which is in nature and composition similar to household waste (such as waste from administrative activities, education, health, retail, accommodation, food services, health and the like)².

When it comes to the *waste management*, by definition it encompasses the activities of collection, transport, recovery and disposal of waste³, including their supervision and the after-care of disposal sites.

The main principle guiding waste management is *waste hierarchy*. This means that decisions and activities in the area of waste management must abide by the following priority order of actions: 1) prevention, 2) preparation for re-use, 3) recycling, 4) other recovery, and 5) disposal. Waste hierarchy can thus be regarded as a way to achieve the sustainability and circularity of the waste management activities.

Waste prevention refers to precautionary measures, taken before waste is generated, in order to reduce the quantity or the adverse impact of waste. WFD sets requirements on Member States related to waste prevention, and these have become stricter over the years. Out of the long list of different waste prevention measures Member States are expected to carry out, those that may be most relevant for the recycling of food and beverage plastic packaging are the following:

- Reducing the generation of waste, especially the types of waste that cannot be re-used or recycled;
- Supporting innovative sustainable production and consumption models;
- Encouraging the design, production and the use of products that are durable, easily repairable, reusable, upgradable and resource-efficient;
- Setting up systems that promote re-use and repair activities, in particular for certain types of products, including the packaging (examples of such measures include support to the establishment and operation of deposit-refund schemes and return-refill schemes);
- Promoting the reduction in the use of hazardous substances, which is relevant because the presence of hazardous substances reduces the recyclability;
- Preventing and reducing littering in natural and marine environments. Marine litter is particularly relevant, because it comprises predominantly plastic packaging waste;
- Organizing awareness-raising campaigns about the waste prevention and littering;

¹ However, objects and substances that result from the production of another product are not considered to be waste, and are regarded as by-products, provided that prescribed requirements are met. These requirements specify that such objects and substances are produced as an integral part of the production process, that they can be further used without further processing, and that their use is lawful.

² Some Member States have used the same definition as the one prescribed by the WFD, and some have elaborated it in more detail. For instance, in Italy municipal waste is defined in such a manner to include a comprehensive list of all types of wastes generated by specified activities that are regarded as municipal waste.

³ Recovery and disposal of waste are often referred to as *waste treatment* activities.

- Another obligation of Member States in this regard is to monitor the implementation of all waste prevention measures (e.g. by measuring the volumes of generated waste, by measuring the re-use and recycling of products etc.).

Protection of human health and the environment is a broader environmental principle that also applies to waste management. The WFD stipulates that waste management operations must be performed in such a way that they do not harm or endanger human health and the environment, and also that they do not pose risk to the environment (to the soil, water and air, or to plants and animals), that they do not cause nuisance (by realising odours or noise), and that the countryside or places of special interest are not adversely affected.

"*Polluter pays*" principle imposes the requirement that waste management costs are to be borne by the original waste producer.

The principle of *self-sufficiency* means that a network of waste disposal and mixed waste recovery facilities should be established throughout the EU, that would enable the EU to become fully self-sufficient, while *proximity* principle implies that waste should be recovered or disposed of in one of the nearest suitable facilities.

3.2 Waste management activities

As previously defined, waste management includes the activities of collection, transport, recovery and disposal of waste. Recovery and disposal are also covered by the umbrella term *treatment* of waste.

Recovery is in fact a term used for various operations whose principal result is that the waste serves a useful purpose. In the case of plastic packaging, recovery mostly refers to the preparation for re-use, recycling and energy recovery.⁴ Recovery in the form of biodegradation may also be relevant for certain types of bioplastics; however, there are no provisions at the EU level yet regulating specifically the biodegradation of plastics.

At this point, it is worth noting that, once the waste is prepared for re-use, recycled, or in other ways recovered so that it can serve a useful purpose, it ceases to be considered as waste, so it is not within the scope of the WFD anymore⁵.

1.1.1 Waste collection

Waste collection refers to the gathering of waste, including the preliminary sorting and storage. *Separate collection* is a form of collection that keeps separately the wastes of different type and nature. It is regarded as key for enabling high-quality recycling and increasing the re-use and recycling rates.

For this reason, the WFD establishes the obligation for Member States to organize separate collection at least for paper, metal, plastic and glass⁶. The 2018 amendments to the WFD have broadened this obligation, so that separate collection of bio-waste (or alternatively separation and treatment at source) must be achieved by 31 December 2023, while the separate collection for textiles and for hazardous household waste must be introduced at latest by 1 January 2025.

⁴ Recovery excluding energy recovery or reprocessing waste into fuels (e.g. by aerobic or anaerobic digestion) is also referred to as *material recovery*.

⁵ Actually, WFD specifies the so-called end-of-waste criteria that the waste needs to meet, so that it stops to be considered as waste anymore. For instance, waste that has been recycled or in other ways recovered ceases to be waste, if it can be further used for certain purposes, provided that it meets standards, technical and other requirements for that specific purpose, that its use does not harm the environment or human health, and that there exists demand for it.

⁶ Other types of waste that could be separately collected from municipal waste may also include wood, packaging, waste electrical and electronic equipment (WEEE), waste batteries and accumulators, and bulky waste, including mattresses and furniture.

Obligation related to bio-waste is applicable to certain types of bioplastics as well. Namely, although bio-waste by definition does not include bioplastics⁷, the WFD stipulates that packaging waste with similar biodegradability and compostability properties, that complies with relevant standards, may be collected together with bio-waste.

However, separate collection is not always an easy task, especially for certain types of waste, or in less populated areas. For this reason, the WFD provides for possible exemptions from the obligation of separate collection – for instance, if it is not technically feasible, if the costs would be disproportionate (e.g. organizing separate collection in remote and scarcely populated territories), or if there are alternatives which have a better environmental impact (e.g. mixed collection, which allows for the easy sorting of different waste fractions).

1.1.2 Re-use and recycling

Re-use refers to operations when the product or its components are used for the same purpose as initially conceived. In order to be re-used, products often undergo *preparation for re-use*, which includes the operations of checking, cleaning or repairing a product or its components, before they can be re-used.

Recycling, on the other hand, refers to operations when waste is reprocessed into another product, material or substance.

Member States have the obligation to make sure that waste undergoes the preparation for re-use and recycling. They must also encourage these activities, e.g. by making separate collection of certain types of waste mandatory, by offering subsidies, by supporting the establishment of collection, re-use or repair schemes, by specifying procurement criteria that favour recycled or re-used material and products etc.

One of the most prominent obligations of Member States is to make sure that re-use and *recycling targets for municipal waste* are met. The target to be achieved by 2025 is set at minimum 55% by weight; further on, targets are progressing, and are set at 60% by 2030, and 65% by 2035⁸. There also exist recycling targets for packaging waste, but they will be elaborated in point 4.5.2.

Rules for the calculation of the attainment of targets are prescribed at the EU level (regulated by (Commission Decision 2011/753/EU) and (Commission Implementing Decision 2019/1004)). Apart from providing a unified methodology, the rules can also be regarded as a means to increase the re-use and recycling of municipal waste. Namely, rules for the calculation of targets for 2025 onwards have become stricter in relation to the ones applied until 2020. As *Pettinao et al.* (2021) explain, previously the calculation point was at the entrance of the recycling plant, and now it is moved to the entrance of the recycling process, thus eliminating all materials that have been removed during the possible treatment activities carried out by the recycler. In particular:

- The re-use of municipal waste takes into account only the weight of products and materials that can effectively be re-used – after the operations of checking, cleaning and repairing have been completed, and without any additional sorting or pre-processing.
- The recycling of municipal waste, in general, takes into account only the weight of waste at the point where it enters the recycling process – after the operations of checking, sorting and removing the materials that are not subject to processing in the given recycling process.

⁷ WFD provides definition of bio-waste as “biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants”.

⁸ Under certain conditions, specified by the WFD, Member States may postpone the attainment of these targets. However, even then there exist minimum targets they must attain, and these are 50% by 2025, 55% by 2030 and 60% by 2035.

- Specifically for plastics, the calculation point encompasses a point at which plastics separated by polymers enter the operations of pelletization, extrusion or moulding, and a point at which plastic flakes are obtained, which do not require any further reprocessing. Similar requirements apply to plastics coming from composite waste.
- Exemptions may apply under certain conditions that allow Member States to count at the output of the sorting operation. However, any subsequent loss of material must be deducted (e.g. materials that are rejected by the recycling facility or materials that are removed during the treatment in the recycling facility).

1.1.3 Other recovery and disposal

According to the waste hierarchy, other types of recovery, and ultimately disposal, can be carried out only if the re-use or recycling are not undertaken.

Energy recovery refers to the incineration of waste for the production of heat or electricity, or instances when waste is being used as a fuel. Other types of recovery activities may include backfilling, using waste to improve agriculture land (e.g. composting bio-waste), or reprocessing of waste into secondary raw materials for the construction of roads or other infrastructure.

Disposal includes various operations where waste is not recovered for useful purposes. In the case of municipal waste most common disposal operations are incineration without energy recovery and landfilling. However, incineration applies mostly to mixed municipal waste, because the WFD prohibits the incineration of separately collected waste, unless it is not recyclable.

The WFD also provides for possible establishment of targets for disposal operations, that would aim to reduce disposal of waste. However, no such targets have been put in place so far.

3.3 Responsibilities for the organisation of waste management

General responsibility to organise waste management activities falls on the *waste producer or waste holder* (waste holder being the producer of waste or other person that is in possession of waste). Namely, they are responsible for arranging the treatment of waste, either by treating it themselves, or handling it to waste management operators.

However, exemptions from these general obligations may apply for certain types of waste.

It should be mentioned that in many countries the management of waste collected from households, and often of the broader municipal waste (which may contain comparable waste generated by entities other than households), is the responsibility of municipalities. However, since this practice is not included in the EU legislation, it will not be discussed here.

Another major exemption refers to the *extended producer responsibility (EPR)*. Member States may decide that the producers of specific products should be held liable throughout the product lifecycle. In this regard, the term “producer” applies not only to the actual manufacturer of the product, but also to sellers, importers and other persons who develop, process and treat products.

At the EU level the EPR is obligatory for several types of used products and waste, including packaging waste (introduced with the 2018 amendments to the PPW Directive). This obligation will be discussed in more detail when elaborating EU requirements related to packaging in point 4.4 below. At this point, requirements on the EPR schemes imposed by the WFD will be presented.

In general, requirements related to the EPR may encompass the obligation to accept returned products or waste left after the use of the product, to organise and/or to finance waste management operations, to publicly provide information on the re-usability and recyclability of the product etc.

In cases when producers have the obligation to be financially (or financially and organisationally) responsible for the waste management of the product, we are talking about the *EPR scheme*. The WFD imposes minimum requirements for the EPR schemes, with the aim to reduce the costs of functioning and improve the performance of the EPR schemes. The minimum requirements were set with the 2018 amendments to the WFD, and include obligations of both Member States and producers:

- Member States must ensure the following:
 - Roles and responsibilities of producers, waste operators, municipalities, and other entities related to the waste management of products in questions are clearly defined;
 - Targets are set (e.g. recycling targets);
 - Reporting system on the products placed on market and on the waste management activities is put in place;
 - SMEs or producers of small quantities may be exempted from certain measures.
- Producers of products and operators of the EPR schemes are obliged to meet the following requirements:
 - To organise waste collection systems for designated products, and to have sufficient number of collection points;
 - To apply self-control mechanisms, related to the financial management and the data collection (referring to data on products placed in the market, on waste collected, recycled etc.);
 - To make information on the attainment of prescribed targets publicly available;
 - Operator of the scheme is also required to make information on membership, financial contributions of members, and procedures for the selection of waste management operators publicly available.

When it comes to the financial liability of producers, the WFD stipulates that they are required to pay financial contributions that cover at least 80% of the necessary costs. Necessary costs should at least include the costs of separate collection, transport and treatment; costs of providing information to waste holders; and costs of the required data collection and reporting.

Member States are free to put in place economic incentives or regulatory obligations to encourage waste holders to deliver waste to designated locations organised within the separate collection systems. They should also make sure that waste holders are well informed about the waste prevention measures, available collection systems, re-use centres etc.

Compliance with the above-described provisions on EPR schemes became obligatory as of 5 January 2023.

4 Provisions on packaging and packaging waste

Relevant EU law is the *Directive on Packaging and Packaging Waste* (94/62/EC). Content within this heading is to be referenced to this Directive, unless other reference is specified.

In November 2022, European Commission put forward the *Proposal of Regulation on Packaging and Packaging Waste* (COM(2022) 677), to replace the current Directive. The rationale is to ensure the proper functioning of the single market, which has, when it comes to packaging, been fragmented due to different approaches of Member States in regulating certain aspects of packaging. The specific objectives of regulation are declared to be the reduction of packaging waste (by reducing the amount of packaging, and especially of excessive packaging), and providing that recyclability and reusability of all packaging becomes economically feasible.

4.1 Definition of packaging

Packaging is defined as any product that is used to contain, protect, handle, deliver or present other materials or goods, from producer to the user or the consumer, provided that it satisfies the following *criteria*:

- Object is considered to be packaging if it fulfils the above-mentioned definition, unless it is the integral part of the product, with the intention to be used, consumed or disposed of together with that product.

Examples of such objects are listed in Annex 1 of the WFD. Those that can be regarded as food and beverage plastic packaging include sweet boxes, beverage capsules for coffee that are left empty after use, or pouches, trays and other materials used as a sterile barrier to preserve the product. On the other hand, examples of objects that are not considered to be packaging include tea bags, sausage skins, or coffee capsules, coffee filters or foil pouches that are intended to be disposed of together with the product.

- Object that is designed and intended to be filled at the point of sale, and which fulfils the packaging function, is considered to be packaging.

Examples of such objects are also listed in Annex 1 of the WFD. Those types that can be regarded as food and beverage plastic packaging include plastic carrier bags, disposable plates and cups, sandwich bags, plastic foils etc. On the other hand, examples of objects that are not to be considered as packaging include disposable cutlery and beverage stirrers.

- Components of packaging and ancillary elements integrated into packaging are considered to be packaging. Ancillary elements that are directly hung or attached to a product are also considered as packaging if they fulfil the packaging function; however, if they are an integral part of the product, and are intended to be used or disposed of together with the product, then they are not considered as packaging.

Examples of packaging and packaging components, according to this criterion, are labels attached to a product, plastic sleeves, detergent caps that are also used for measuring dosage, or mechanical querns that are used in non-refillable packaging which includes the main product (such as pepper mills containing pepper).

The definition of packaging is rather complex and comprehensive, because it is intended to cover all sorts of packaging – packaging applied at the point of production as well as the one used at the point of sale, packaging for both a single item and for a group of products, packaging that is intended to preserve the quality of the product, or only used for carrying it etc. To make distinction between *different uses of packaging*, it is further classified in one of the three categories:

- Sales (or primary) packaging, which is packaging containing a product sold to the final user at the point of sale;
- Grouped (or secondary) packaging, which refers to the packaging that is used to store a group of products at the point of sale, and which can be removed without affecting the characteristics of the product;
- Transport (or tertiary) packaging, which encompasses packaging that is used to facilitate the handling and transport of a product or group of products. Containers are not considered as transport packaging.

Composite packaging is defined as those made of two or more layers of different materials (including plastics), which form a single integral unit and cannot be separated by hand.

Proposed changes. *Proposal of Regulation on Packaging and Packaging Waste* provides a somewhat restructured definition of packaging, on the grounds that additional clarifications are required to better understand the concept.

Packaging is defined as “*items of any material that are intended to be used for the containment, protection, handling, delivery or presentation of products...*”. The definition further differs from the current one, by listing different types of items that are considered as packaging, instead of providing different criteria that packaging needs to fulfil. Apart from items satisfying the core definition, packaging is also stated to refer to packaging that is used throughout the lifecycle of the product, but is not an integral part of the product; components or ancillary elements of packaging; items that perform a packaging function and are intended to be filled at the point of sale; and tea and coffee bags, as well as coffee and tea capsules. Examples of such items provided in Annex I are comparable to the ones currently used.

New proposal contains a somewhat more detailed definitions of sales, grouped and transport packaging (terms primary, secondary and tertiary packaging are not mentioned anymore), which are set separately from the general definition of packaging. An addition, which is relevant for post-consumer plastic packaging waste, is the definition of *contact sensitive packaging*, which, *inter alia*, refers to packaging that is or is expected to come into contact with food⁹.

4.2 Requirements for packaging

The PPW Directive imposes essential requirements that the packaging placed on the EU market must meet. These requirements relate to the composition and manufacturing of packaging, and also to the possibility that the packaging can be reused or recovered.

- Requirements related to the composition and manufacturing of packaging:
 - Weight and size of packaging must be limited to the minimum level that is sufficient to provide adequate level of safety, hygiene and acceptability;
 - Presence of heavy metals must be minimal. For that part, maximum concentrations of lead, cadmium, mercury and hexavalent chromium is limited to 100 milligrams per kilogram of packaging. Certain exemptions are established, such as for packaging made of lead crystal glass and for plastic crates and plastic pallets kept in closed and monitored product loops.
 - Design and manufacturing must enable packaging to be reusable or recoverable.
- For the packaging to be reusable, the following conditions must be satisfied simultaneously:
 - Physical properties of packaging are such that allow for the repetitive use,

⁹ Contact sensitive packaging also encompasses packaging that comes into contact with animal food, cosmetic products, medical devices, medicinal and veterinary products, or is related to the transport of dangerous goods.

- The processing of the used packaging complies with the health and safety standards at the workplace, and
- Once the packaging cannot be further reused and becomes waste, it must meet the requirements related to recoverable packaging.
- Recoverable packaging must meet one of the following requirements:
 - It is recyclable, which means that it contains a certain percentage of materials that can undergo the process of physical recycling,
 - It is recoverable in the form of energy recovery, which means that it has a certain calorific value,
 - It is compostable, which means that it is sufficiently biodegradable, so that it does not obstruct the composting process to which it is introduced, or
 - It is biodegradable, which means that it is made of materials that can undergo different types of decomposition (physical, chemical, thermal or biological), ultimately decomposing into carbon dioxide, biomass and water.

Proposed changes. As part of the effort to improve the environmental sustainability of a broad range of products¹⁰, proposed Regulation on Packaging and Packaging Waste specifies sustainability requirements the packaging needs to meet, in order to be put into circulation in the single market.

Presence and concentration of substances of concern. While the maximum concentrations of heavy metals have remained the same, it is envisaged that possible exemptions (e.g. for recycled materials or products in closed loops, or for certain types of packaging) would be determined by delegated acts.

Recyclability of all packaging will become mandatory. Instead of the current vague definition of recyclability, the proposal introduces the criteria that the packaging would have to meet in order to be regarded as recyclable. These are new *design for recycling* and *recyclability at scale* criteria; based on them, recyclability performance grades would also be introduced¹¹. A transitory period for the application of announced criteria is envisaged, because, once they are put in place, non-complying packaging would not be allowed to be put into circulation in the EU market anymore. Design for recycling criteria would apply as of 2030, while recyclability at scale (meaning that packaging is in large amounts collected, sorted and recycled) would apply as of 2035. However, in order to promote innovation in the production of packaging, it is envisaged that innovative packaging would be exempted from above-described obligations for a period of 5 years after being placed at the market.

Mandatory *recyclable content for plastic packaging*. All plastic packaging, as well as plastic parts of packaging, will have to contain recycled content. The intention is to substitute virgin materials with recycled materials, and, specifically, to increase the uptake of recycled plastics. Following minimal contents are specified, which are defined per unit of packaging:

- For contact sensitive packaging made from PET, minimal recycled content would be set at 30% as of 2030, and would increase to 50% as of 2040;

¹⁰ Proposed Regulation on ecodesign requirements for sustainable products (European Commission, 2022c), envisages that almost all types of products will be required to satisfy specific environmental requirements, in order to be placed on the EU market. However, there would be a few notable exceptions that the proposal does not relate to, including food and beverage products.

Applicable sustainability requirements would depend on the type of products, but may include the following aspects: durability of a product, reliability, reusability, upgradability, repairability, possibility of maintenance and refurbishment, presence of substances of concern, energy use or energy efficiency, recycled content, recyclability, possibility of recovery of materials, carbon and environmental footprint, and generation of waste.

Sustainability requirements for packaging are included in the Proposal for Regulation on Packaging and Packaging Waste.

¹¹ Annex II of the Proposal for Regulation on Packaging and Packaging Waste.

- For contact sensitive packaging from other plastic materials (except single-use plastic beverage bottles) minimal recycled content would be: 10% as of 2030 and 50% as of 2040;
- For single use plastic beverage bottles: 30% as of 2030 and 65% as of 2040;
- For other packaging: 35% as of 2030 and 65% as of 2040.

For both recyclability criteria and recyclable content exemptions apply for certain types of medical devices, while recyclable content requirements do not apply to compostable plastic packaging.

Compostability requirements are proposed to be imposed on filter coffee pods, sticky labels on fruits and vegetables, and very lightweight plastic carrier bags. Member States may decide to impose this requirement on lightweight plastic carrier bags as well.

Packaging minimisation requirement. Current requirement that the weight and volume of packaging shall be minimal, while providing for packaging function, is supplemented by specific clarifications. Namely, packaging would have to meet the specified performance criteria, and also its technical documentation would have to contain explanation of the assessment methodology for minimum packaging volume and weight, to be eligible to be put into circulation within the EU market. Also, it would not be allowed to place on market packaging with double walls or false bottoms, aimed only to increase the perceived size of the product; and empty spaces will have to be minimised¹².

Re-usability. As in the case of recyclability, specific requirements are imposed on packaging to be regarded as re-usable. In essence, the packaging should be designed and conceived to be re-used or refilled a number of times. For that purpose, it is required to be able to sustain many rotations of emptying and re-use or refilling, without being damaged; and also to meet safety and hygiene requirements. It is also important that, once re-usable packaging cannot be used anymore and becomes waste, it must satisfy recyclability criteria. In addition, introduction of systems for the re-use of packaging is envisaged by the Proposal, which will be described in more detail below.

4.3 Material markings

Packaging may contain markings that indicate the nature of the packaging material. The aim of these markings is to facilitate separate collection, reuse and recovery of packaging waste. The markings can be put on the packaging itself or on the label.

The identification system for packaging materials is established at the EU level, and regulated by the (Commission Decision 97/129/EC). However, the use of markings is voluntary, which means that producers are free to decide whether they would use them or not; if they choose to use them, they must follow the prescribed identification system.

The identification system for the packaging that contains plastics is as follows:

- Polyethylene terephthalate: abbreviation PET, numerical mark 1,
- High-density polyethylene: abbreviation HDPE, numerical mark 2,
- Polyvinyl chloride: abbreviation PVC, numerical mark 3,
- Low-density polyethylene: abbreviation LDPE, numerical mark 4,
- Polypropylene: abbreviation PP, numerical mark 5,
- Polystyrene: abbreviation PS, numerical mark 6,
- Composites are marked with "C" and abbreviations of materials are separated by "/". Numerical marks used for composites which contain plastics are the following:
 - Plastic/aluminium: 90,

¹² Empty space – defined as space between the total volume of grouped, transport or e-commerce packaging, and sales packaging contained in it (including any filling material, such as bubble wraps, foam, or other) – will not be allowed to exceed 40% of the entire volume of packaging.

- Plastic/tinplate: 91,
- Plastic/miscellaneous metals: 92,
- Paper and fibreboard/plastic: 81,
- Paper and fibreboard /plastic/aluminium: 84,
- Paper and fibreboard /plastic/aluminium/tinplate: 85,
- Glass/plastic: 95.

Proposed changes. The proposal for the establishment of a harmonised labelling system and mandatory labelling for certain types of packaging has been put forward¹³.

Namely, it would be obligatory to put labels containing information on the material content of packaging, in order to facilitate the sorting of waste by consumers¹⁴. For the same purpose, as of 2028 containers and other receptacles for the separate collection of packaging waste will also be labelled with material marking. In addition, the label will indicate the reusability of the packaging, and also contain a digital data carrier (e.g. QR code) to provide more information on its re-use. The Proposal indicates that plastic packaging may bear labels containing information on recycled content, but this is not obligatory; if used, though, harmonised labelling must be applied.

In addition to labelling requirements established by the Regulation, Member States would be allowed to require additional labelling for the identification of the EPR or deposit-return systems.

4.4 EPR for packaging

Member States are required to ensure the functioning of systems for the return and/or collection of used packaging or packaging waste, and also that the collected packaging is reused or recycled. Such systems must apply to imported packaging as well.

EPR schemes for packaging have been established in many EU Member States. With the 2018 amendments to the PPW Directive, EPR schemes for packaging have become obligatory for all EU Member States, and the deadline for this is the end of 2024.

EPR schemes for packaging must follow harmonised requirements on EPR schemes, that are prescribed by the WFD and elaborated in point **Error! Reference source not found.** In addition to this, they must also follow specific requirements prescribed by the PPW Directive, that relate to public awareness activities. Namely, it is stipulated that Member States must ensure that consumers are well informed about the available return, collection and recovery systems, about the ways how they can contribute to the reuse and recovery of packaging, what is the meaning of markings on packaging, and about the goals and measures related to the management of packaging waste. The reasoning is that properly informed and knowledgeable consumers are necessary for the successful functioning of the EPR schemes for packaging.

Proposed changes. New provisions contained in the Proposal of Regulation on Packaging and Packaging Waste aim to facilitate the application of EPR obligations in the EU. It specifies that the producer has extended producer responsibility for packaging within the territory of the Member States where it is established and where it puts packaging into circulation for the first time, and that appointed representative must be named in each of the other Member States where he further puts packaging into circulation. Member States

¹³ Changes in labelling requirements partly stem from the broader effort to establish information requirements on products, as envisaged in the Proposal for a Regulation on ecodesign requirements (European Commission, 2022c). One of the measures to increase the sustainability of products is the introduction of digital product passports, containing all information on sustainability aspects of a product.

¹⁴ For that reason, mandatory labelling is not required for transport packaging.

are required to prepare registries of liable producers, which shall be linked, to facilitate registration in different Member States.

While it is acknowledged that EPR obligations can be met either individually or collectively (through an EPR organisation), it is left to Member States to decide whether they would make participation in EPR organisations mandatory. In either case, requirement is imposed that the producer, i.e. EPR organisation, must be authorised, in line with the nationally established procedure. To be granted authorisation, in addition to meeting provisions set out by the WFD, they would now be required to make sure that they have arrangements in place (at least preliminary arrangements) with entities conducting waste management (public utility companies, distributors etc.), that necessary sorting and recycling capacity is available, and also must provide financial guarantees to cover the costs in the case of non-compliance with EPR obligations.

Another new and important element to be introduced is the mandatory modulation of EPR fees, with the aim to incentivize recyclability of packaging. For that purpose, it is envisaged that the amount of financial contributions paid by liable producers, would depend upon the level of recyclability of packaging and the recyclable content of the plastic part of packaging.

4.5 Re-use and recycling of packaging

4.5.1 Promoting the re-use of packaging and recycling of packaging waste

The 2018 amendments to the PPW Directive impose requirements on Member States to do more in order to promote the re-use of packaging and the utilisation of recycled packaging.

The PPW Directive contains a proposal of measures that could be put in place. For instance, in order to increase the share of reusable packaging, Member States may rely on deposit-return schemes, refer to economic incentives (such as subsidies), set quantitative or qualitative targets, or specify a minimum percentage of reusable packaging that must be placed on market each year. And in order to support the utilisation of materials from recycled packaging waste, Member States are required to work on the improvement of market conditions, and to review legislative obstacles in that regard.

4.5.2 Recycling targets for packaging waste

Recycling targets for packaging waste that Member States need to achieve have been prescribed by the EU. Targets are set out both for total packaging and for specific materials:

- By the end of 2025, at least 65% by weight of all packaging waste must be recycled. The recycling target for plastic packaging is set at 50%.
- By the end of 2030 the recycling target for total packaging is 70%, and for plastic packaging 55%.

The PPW Directive also announces that the EC would examine the feasibility of the introduction of reuse targets for packaging waste, and decide on this by the end of 2024.

4.5.3 Calculation rules for the achievement of recycling targets

For the purpose of calculating the achievement of targets, all packaging that has been placed on the market in a given year is considered as packaging waste. Rules are set out by the PPW Directive (Article 8) and the (Commission Decision 2005/270/EC), and have become stricter with the 2018 amendments to the PPW Directive. Namely, for the calculation of the 2025 target only packaging waste that enters the recycling process should be taken into account.

Since packaging made of certain material happens to be collected together with non-packaging waste made of the same material, it should be underscored that only packaging waste is taken into account for the calculation of recycling targets (Commission Decision

2005/270/EC). This would mean that any plastic waste that does not satisfy the definition of packaging (e.g. toys, sports equipment, plastic tools, kitchen utensils etc.) must be subtracted.

Calculation rules that apply to plastic packaging waste are provided below (Commission Decision 2005/270/EC):

- In general case, calculation point is a point at which plastics separated by polymers enter the operations of pelletisation, extrusion or moulding, and a point at which plastic flakes are obtained, which do not require any further reprocessing.
- Certain derogations may apply, as in the case of municipal waste. Namely, under specific circumstances, it may be possible to count the packaging waste at the end of the sorting operation; however, in these cases any material rejected by the recycling facility, or removed during the treatment in the recycling facility, must be deducted.
- With respect to composite packaging and other packaging made of different materials, rules have also become stricter. Previously, only the dominant material by weight was calculated for the attainment of recycling targets; by 2025 at the latest, all materials will have to be calculated separately. Only for materials that constitute a negligible portion of the total mass (at most 5%) this requirement is not obligatory.
- As regards biodegradable packaging, quantity that can be taken into account for the calculation of recycling targets is the recycled content of the aerobic or anaerobic treatment (compost, digestate or other), that can be used as recycled product, material or substance.
- Reusable packaging can also be counted for the attainment of recycling targets. The PPW Directive (Article 5) specifies that, in this case, adjusted recycling targets are applied, which represent prescribed targets from which the share of the reused packaging is subtracted. To be precise, what is subtracted is the share of reused packaging placed on the market for the first time¹⁵, in the total packaging placed on the market, over the preceding three years. The maximum share that can be subtracted in this way is 5 percent.
- Shipments of packaging waste sent to the recycling can also be counted, under the following conditions: i) when the packaging waste is generated in one Member States and recycled in another, it can be counted only in one country, and that is the country in which it was collected; ii) shipments to third countries can be counted only if the exporter can prove that the exported packaging waste is treated under the conditions that are in line with the EU environmental regulations (in line with the requirements specified in the Waste Shipment Regulation).

Proposed changes related to the re-use and recycling of packaging. Proposal of Regulation on Packaging and Packaging Waste envisages many new measures to ensure the recyclability and reusability of packaging. Unlike the current legislation, where only specific measures set at the EU level include targets and calculation methodology, promotion of recyclable and reusable packaging in the future would entail a number of obligatory measures applicable throughout the EU.

Proposed *sustainability criteria* have already been discussed in point 4.2. As a reminder, recyclability of packaging would become mandatory, and plastic packaging would have to contain minimal recycled content.

Mandatory deposit-return system is envisaged to be put in place by 2029 for single-use plastic bottles and metal beverage containers, with the capacity of up to 3 litres¹⁶. Minimum

¹⁵ Reusable packaging that is sent back for reuse is not calculated as being placed on the market in the given year, nor it is considered as packaging waste. Reusable packaging becomes packaging waste only when it is discarded.

¹⁶ However, exemptions may apply in the case of certain alcoholic or milk products.

requirements are set for the operation of such system (in Annex X of the proposal), including the following: there must be a single operator of the system, established as an independent and non-profit entity; at least 1% of annual turnover (deposit excluded) is spent on public awareness campaigns; minimum deposit level is put in place; etc. Member States are allowed to set additional requirements, and also to include glass bottles into the system (or to set up a separate system). They are also encouraged to consider establishing deposit-return systems for beverage cartons and reusable packaging; however these are not mandatory from the viewpoint of the EU.

Establishment of the system for the re-use of packaging is also envisaged. Namely, economic operators who place re-usable packaging on the market must establish the system for the re-use. Other operators who use such packaging will also be obliged to set up their own or participate in an existing system for the re-use. When it comes to Member States, they are encouraged to support the establishment of such systems, by establishing a deposit-return system, using economic incentives, or by other means.

Concept of refill is introduced. In this case, economic operators who offer refill services will have to provide relevant information to consumers (about the accepted types of containers, and about the hygiene standards) and also that the refill system complies with sanitary and other requirements.

Targets. A number of new re-use targets are proposed. Apart from current recycling targets for all packaging waste and per different types of packaging materials, new re-use targets are set for specific types of packaging. The objective is to promote the application of re-usable alternatives instead of single-use packaging.

- Recycling targets for all packaging and plastic packaging would remain the same as in the current PPW Directive (by the end of 2025 65% by weight of all packaging waste, and 50% by weight of plastic packaging waste; targets to be achieved by the end of 2030 are set at 70% and 55%, respectively).
- Waste prevention targets: per capita packaging waste generated would have to decrease compared to 2018, by 5% until 2030, by 10% until 2035, and by 15% until 2040.
- A number of targets is envisaged for different types of packaging. Those that are relevant for the plastic packaging for food and beverages are set as follows:
 - Beverages filled at the point of sale for take away: from 2030 20% of these beverages would have to be available in re-usable packaging within the system for reuse or by enabling refill; from 2040 this share would increase to 80%.
 - Take-away ready-prepared food intended for immediate consumption: from 2030 10% of these products would have to be available in re-usable packaging within the system for re-use or by enabling refill; from 2040 the share would have to be 40%.
 - Alcoholic beverages other than wine: from 2030 10% will have to be available in re-usable packaging within the system for re-use or by enabling refill; from 2040 25% would apply.
 - Wine: from 2030 5% will have to be available in re-usable packaging within the system for re-use or by enabling refill; from 2040 the required percentage would be 15%.
 - Non-alcoholic beverages: from 2030 10% will have to be available in re-usable packaging within the system for re-use or by enabling refill; the percentage would increase to 25% from 2040.¹⁷

Also, Member States that achieve over 90% of separate collection of such packaging for 2 consecutive years, may be exempted from the obligation to establish the mandatory deposit-return system.

¹⁷ Other packaging for which reusable targets are set include different types of grouped, transport and e-commerce packaging.

Also, certain exemptions are envisaged. Those that may apply to food and beverage packaging entail producers who place less than 1 tonne of packaging on the market during a calendar year, and those HORECA operators whose sales area is less than 100 m².

Methodology for the calculation of targets. It is announced that the methodology to calculate the attainment of all the targets would be developed by the European Commission. When it comes to recycling targets for all packaging and packaging by material, according to the description provided in the proposal of new regulation, would not entail substantial changes to the current one.

4.6 Addendum: additional provisions envisaged by the proposal for new regulation on packaging

Green public procurement would be used as another tool to promote sustainable packaging. It is announced that the European Commission would prepare green procurement criteria for packaging and packaged products, which would be obligatory for any public contract on the territory of the EU¹⁸.

Ban on the use of certain types of packaging. It is envisaged to ban certain types of packaging as of 2030. The list of such products is provided in Annex V of the Proposal of Regulation on Packaging and Packaging Waste. Such types of plastic packaging that are used for food and beverages include:

- Single use packaging for less than 1,5 kg fresh fruit and vegetables, e.g. nets, bags, trays or containers¹⁹.
- Single use packaging for foods and beverages filled and consumed within the premises of hotels and restaurants (i.e. in HORECA sector), e.g. disposable plates and cups, trays, foil, bags, or boxes.
- Single use packaging in the HORECA sector, containing individual portions or servings (such as sugar, seasoning, coffee creamer, sauces etc.), e.g. sachets, boxes, or tubes.²⁰

¹⁸ Introduction of obligatory green procurement criteria are also based on the Proposal for a Regulation on ecodesign requirements for sustainable products (European Commission, 2022c).

¹⁹ Exemption may apply in cases when it is necessary to avoid physical shock, microbiological hazards or water or turgidity loss.

²⁰ Other single-use packaging that is envisaged to be banned from 2030, includes single use hotel miniature packaging (shampoo bottles, sachets around miniature soaps and such), and single-use plastic grouped packaging in retail stores that is not necessary to facilitate handling and distribution (e.g. foil around the grouped bottles to encourage the purchase of more than one product).

5 Specifics related to certain types of plastic packaging and plastic waste

5.1 Plastic carrier bags

Following the steps of some Member States, the EU has introduced measures to decrease the consumption of plastic carrier bags, in order to mitigate the damage to the environment caused by the plastic bags litter. These measures have been brought in with the so-called Plastic Bags Directive (Directive 2015/720), which was actually an amendment to the PPW Directive.

Before describing the measures, it would be worthwhile explaining the terminology. *Plastic carrier bag* is defined by the PPW Directive as a carrier bag made of plastic, with or without handles, which is provided to a consumer at the point of sale. If the thickness of the wall is below 50 microns, such a bag is referred to as a *lightweight carrier bag*; and if the thickness of the wall is below 15 microns, these are *very lightweight carrier bags*.

What is targeted with the Plastic Bags Directive are specifically lightweight plastic carrier bags. Namely, this Directive stipulates requirements on Member States to:

i) Take measures in order to achieve prescribed targets related to the consumption of lightweight carrier bags (target set to be achieved by the end of 2025 is that the annual consumption is up to 40 lightweight plastic carrier bags per person, or its weight equivalent);

and/or

ii) Take measures to ensure that by the end of 2018 lightweight plastic carrier bags are not provided free of charge at the sales points anymore;

In both cases very lightweight carrier bags may be excluded.

It is left to Member States to decide which measures they would rely on. The Directive only sets out the proposal of measures, such as the introduction of national reduction targets, use of economic instruments (e.g. charges), or restricting their placing on the market.

Proposed changes by the *Proposal of Regulation on Packaging and Packaging Waste*. The proposal imposes a requirement on the sustained reduction in the consumption of lightweight plastic carrier bags – which means that annual per capita consumption, to be achieved by the end of 2025, may be at most 40 bags. Member States are allowed to exclude very lightweight carrier bags from this calculation. Also, they are allowed to use different instruments to attain this goal, such as national targets, economic instruments, or even restriction of placing on the market if required.

5.2 Single-use plastic products

The Single-use Plastics Directive (EU 2019/904) has been enacted with the aim to address the growing problem of beach and marine littering. Namely, explanatory notes to the draft directive report that plastics constitute around 80% of total littering at EU beaches, out of which 50% were single-use plastic products covered by this Directive. The Directive builds on the Plastic Bags Directive, in terms of taking action to reduce the generation of single-use plastic waste.

It is important noting that the SUP Directive presents a *lex specialis* in relation to the WFD and other legislation, which means that, in the event of possible conflict, the SUP Directive has prevalence.

5.2.1 Product and marking requirements

Single-use plastic products refer to products that are partly or entirely made of plastics, and which are typically intended to be used once²¹. The SUP Directive imposes certain requirements for some of these products, intended to improve their collectability, reusability and recyclability.

Product requirements are specified for the following types of beverage containers:

- Beverage containers with a capacity of up to 3 litres will need to have plastic caps and lids attached to the product, at latest by 3 July 2024²²;
- In addition to the previous design requirement, content requirements are imposed on PET beverage bottles. Namely, it will be compulsory for them to contain recycled plastics – from 2025 they will have to contain at least 25% recycled plastics (calculated as an average of all PET bottles placed on the market in that MS), and from 2030 the minimum content would increase to 30%.²³

Rationale for the introduction of these product requirements is that plastic caps and lids have been among the most frequent beach litter, so collecting them jointly with plastic beverage containers would hopefully decrease the volume of littering.

Marking requirements are imposed on certain plastic products, so that they need to contain labels, informing consumers about the plastic content and the negative impact of littering on the environment, as well as about the appropriate waste management options. In relation to food and beverage plastic packaging, compulsory marking requirements have so far been established only for beverage cups, and this requirement is applied as of 3 July 2021.

Proposal of Regulation on Packaging and Packaging Waste envisages recyclable content criteria for all plastic packaging (refer to point 4.2 for more detail). If adopted, content requirements for PET bottles would cease to be regulated by the SUP Directive, as well as the obligation to put labels informing about the plastic content of the beverage container.

5.2.2 Reductions and bans

The SUP Directive explicitly forbids the use of certain single-used plastic products, for which appropriate alternatives are available. Products that do not have proper alternatives are not banned, however their consumption must be reduced. In the following paragraphs focus is put on bans and reductions that apply to food and beverage plastic products.

Placing on the market is banned as of 3 July 2021 for the following food and beverage plastic products:

- products made of oxo-degradable plastics²⁴,
- forks, knives, spoons and other cutlery made of plastics,
- plastic plates,
- plastic straws, plastic stirrers for beverage,

²¹ However, it is specified that the SUP Directive does not cover microplastics.

²² Exemptions from this obligation include metal and glass beverage containers (even if the caps and lids are made of plastics), and beverage containers used for medical purposes.

²³ Containers for medical purposes are exempted from this obligation.

²⁴ Rationale for the ban of oxo-degradable plastics is because they contribute to the microplastics pollution, and negatively affect the recycling of the conventional plastic. This is due to their properties, as they contain additives, that lead to the oxidation and fragmentation or chemical decomposition of the product.

- food and beverage containers and cups made of expanded polystyrene.

Consumption reduction applies to single-use plastic products for which there is no suitable alternative. Among them, the following types of food and beverage plastic packaging are included:

- beverage cups (including covers and lids), and
- food containers (e.g. boxes), containing food which is prepared for immediate consumption, without further preparation, and where the food is typically consumed from the container.

The SUP Directive does not specify targets for the reduction. However, it imposes an obligation on Member States to employ different measures to substantially reduce the consumption of these plastic products by 2026. Some of the measures that countries can apply are setting national reduction targets, making sure that re-usable alternatives are offered to consumers at sales points, prohibiting the free-of-charge offer of these products at sales points, etc.

5.2.3 Measures at the level of Member States

Member States have the obligation to establish *EPR schemes for certain single-use plastic products*, at latest by 31 December 2024. Food and beverage plastic products for which this obligation applies are:

- food containers (e.g. boxes), containing food which is prepared for immediate consumption, without further preparation, and where the food is typically consumed from the container,
- packet and wrappers containing food, from which the food is consumed without further preparation,
- beverage containers with a capacity of up to 3 litres, including their caps and lids,
- beverage cups, including their covers and lids, and
- lightweight plastic carrier bags.

General requirements on these EPR schemes are prescribed by the WFD (refer to point **Error! Reference source not found.** for more details). The SUP Directive imposes additional requirements on producers of these products, as they are also liable to cover the following costs: i) costs of the waste collection of products discarded in the public collection system, ii) costs of the clean-up of litter, and iii) related transport and treatment costs.

An obligation is imposed on Member States to put in place *separate collection of plastic beverage containers* of up to 3 litres²⁵. Targets for the separate collection are also prescribed, so that until 2025 at least 77% of these containers are separately collected, and by 2029 this percentage should be at least 90%. It is left to Member States which measures they would put forward in order to meet prescribed obligations; some of the measures indicated by the SUP Directive include the establishment of deposit-refund schemes, or national targets for the separate collection.

Finally, the SUP Directive imposes a requirement related to *awareness-raising measures*. In that regard, for certain single-use plastic products, Member States must make sure that consumers are properly informed about the available re-usable alternatives, about the waste management options, and about the negative impact of littering and inappropriate disposal on the environment and on the sewage network. Food and beverage plastic products for which awareness-raising obligation applies are the ones that are subject to EPR responsibilities described above.

²⁵ Beverage containers for medical use are exempted from this obligation.

5.3 Bioplastics

There is currently no EU legislation regulating bioplastics. However, the framework has been developed with the EC's communication on *EU policy framework on biobased, biodegradable and compostable plastics* (COM(2022) 682) from November 2022.

5.3.1 References in existing legislation

Different types of bioplastics are referred to in existing Directives.

The WFD does not specifically address bioplastics. However, it prescribes that packaging waste that has similar biodegradability and compostability properties as bio-waste may be separately collected together with bio-waste.

The PPW Directive makes a distinction between biodegradable packaging waste and packaging waste that is compostable. Requirements on biodegradable packaging stipulate that it must be able to undergo physical, chemical, thermal or biological decomposition, resulting in biomass, carbon-dioxide and water. Requirements of compostable packaging specify that it must be sufficiently biodegradable, so that it does not hinder the composting process into which it is introduced. The PPW Directive also makes provision for the incorporation of recycled content of biodegradable packaging for the purpose of calculating the achievement of packaging recycling targets.

Proposal of Regulation on Packaging and Packaging Waste puts emphasis on compostable packaging, acknowledging that its use may have demonstrated environmental benefits. Compostability requirements are imposed on filter coffee pods, sticky labels on fruits and vegetables, and very lightweight plastic carrier bags; Member States may decide to impose this requirement on lightweight plastic carrier bags as well. When it comes to other types of packaging, including biodegradable plastics, they are all proposed to go to material recycling streams.

The SUP Directive makes no distinction between ordinary plastics and bioplastics, and its provisions apply to all types of plastics.

5.3.2 EU policy framework for biobased, biodegradable and compostable plastics

The established policy framework serves to provide a better understanding of issues related to the use of bioplastics and possible solutions, and to provide guidance to EU policy and legislation in that regard. The challenge is related to the need to promote alternatives to materials based on fossil fuels, while, at the same time, it turns out that these alternatives can also exhibit sustainability issues. Main points set by the EC's communication (COM(2022) 682), with emphasis on the application of bioplastics in packaging, are presented in the following paragraphs.

Distinction among biobased, biodegradable and compostable plastics. First and foremost, the policy framework points to the need to differentiate between different types of plastic with different properties, that are commonly used under the umbrella terms *bioplastics*. For that purpose, distinctions between biobased, biodegradable and compostable plastics are explained²⁶. Further on, different policy approaches, either

²⁶ Biobased plastic is explained to refer to plastic that is fully or partially made of biobased feedstock, such as wood, food crops (e.g. cereal or oil crops) and organic by-products (e.g. used cooking oil or bagasse left after the processing of sugar cane).

Biodegradable plastics is specified to refer to the plastics that is designed to decompose into carbon dioxide and water, and other residues (microbial biomass, mineral salts, and possibly methane); however, an important precondition for biodegradability are adequate conditions in the environment.

Compostable plastics is a type of biodegradable plastics that is designed to biodegrade in the controlled environment, such as industrial composting facilities.

required or preferred ones, are in more detail provided for each of different types of bioplastics.

Biobased plastics.

- **Feedstock sustainability** for the production of biobased plastics must be ensured. For that purpose:
 - It is suggested to prefer the use of organic waste and by-products as feedstock.
 - In cases when primary biomass is used, it is required to meet the EU sustainability criteria for bioenergy, contained in the Renewable Energy Directive (EU 2018/2001)²⁷.
- When producing plastic products with biobased content, **long-lived products** should be preferred over single-use and other short-lived products.
- Use of **voluntary standards developed by CEN/TC411** is recommended, as, so far, there exist no mandatory nor agreed rules on the biobased content, labelling, certification scheme etc.
- It is suggested **not to use claims that might mislead consumers** about the true properties of biobased products. For instance, instead of using terms “bioplastics” or “biobased plastics”, it is suggested to specify the exact share of biobased content in the plastic product.

When it comes to legislation, a new directive has been proposed to empower consumers for the green transition (European Commission, 2022b), which would, once adopted, guide this area.

- Requirement is imposed that the **biobased content is measured precisely**. For that purpose, it is stated that radiocarbon-based methods should be preferred.

Biodegradable plastics.

- **Term biodegradation** will not refer to material properties only, but will also have to include environmental conditions and risks (referred to as *system properties*).
- **Use of biodegradable plastics in the open environment should be limited to:**
 - Biodegradable materials that have proven full biodegradability within a specific timeframe, and
 - Only those applications where re-use, full collection and recycling options are not viable.

One of such examples is the use of mulch films in agriculture.

In addition, it is specified that the use of biodegradable plastics should not be regarded as substitution for conventional plastics (relating to the improper waste management and littering caused by conventional plastics).

- Appropriate **labelling** would be required, in order not to mislead the consumers. For that purpose, it is suggested that labels should contain information on the environment for which the biodegradation is intended, and the required timeframe for biodegradation. Also, biodegradable properties should not be labelled on products covered by the SUP Directive and other plastic products that often end up in litter.
- Emphasis is put on the application of consistent and science-based **testing and certification** standards, but also on the need to observe processes under real conditions.
- **Additives** added to biodegradable and compostable plastics will have to be biodegradable themselves safely, and their use should be disclosed.

Industrially compostable plastics.

- Use of industrially limited plastics should also be limited, to applications where environmental benefits are higher than if alternatives are used, provided that the quality of compost is not compromised. In these cases, a collection and treatment system must

²⁷ It is also specified that new rules are expected to be enacted once proposed new renewable energy directive is adopted (EC communication COM(2021)).

be set up. Examples of such applications are compostable plastic bags for the separate collection of biowaste, fruit and vegetable stickers, tea bags and coffee filter pods, and very lightweight plastic carrier bags.

- When it comes to labelling, to avoid confusion, only certified industrially compostable plastics would be allowed to be labelled as compostable. Also, such packaging should contain pictograms depicting the proper disposal.
- Revision of existing standard is announced (specifically EN 13432:2000) (including clarification of biodegradability and compostability features, taking into account current conditions in industrial composting plants, and referring to the whole product, including additives).
- Home composting is not addressed at the EU level, but is left to Member States to allow it under specific conditions.

5.3.3 Proposal of provisions related to unfair commercial practices

In March 2022 European Commission proposed a new directive (European Commission, 2022b), that would amend the Unfair Commercial Practices Directive (2005/29/EC) and Consumer Rights Directive (2011/83/EU). The proposed directive aims to enable consumers to make a sustainable purchasing decision.

Proposal relevant for bioplastics refers to the ban on misleading environmental claims related to products. In this case, it is envisaged that generic environmental claims that are not supported by demonstrated environmental performance would be banned. Examples of such claims refer to generic uses of terms “biodegradable”, “biobased”, “eco-friendly”, “green” and so on. More precisely, amendments to Directive 2005/29/EC would be introduced, specifying types of unfair commercial practices that are not allowed. This would, *inter alia*, refer to:

- Use of sustainability labelling that is not based on a recognized certification system or is not established by authorities.
- Making generic environmental claims, without being able to demonstrate recognised excellent environmental performance.
- Making environmental claims on the whole product, in cases when that claim is demonstrated only for a certain aspect of the product.

6 Requirements on plastic in contact with food

Requirements on materials that come in contact with food are imposed by Regulation 1935/2004. More precisely, obligations refer to materials and articles that are in contact with food, but also to those that are intended to or can reasonably be expected to be brought into contact with food.

General requirement is that such materials and articles must follow **good manufacturing practices**, to ensure that, if constituents are transferred to food, they do not pose threat to human health, or change the composition of food, or deteriorate organoleptic characteristics of food. Good manufacturing practices, further regulated by Commission Regulation 2023/2006, basically mean that quality assurance and quality control systems must be put in place, to ensure that materials coming into contact with food are produced in conformity with relevant rules and appropriate quality standards. This entails the use of adequate equipment, organisation of premises, adequacy of staff, use of materials that meet pre-established specifications, monitoring the implementation of good manufacturing practices and taking corrective actions as needed, and maintaining appropriate documentation. For recycled plastic, supplementary rules apply, which entail the application of additional procedures and use of additional documentation.

Apart from general provisions related to good manufacturing practices, for certain materials and articles, including plastics, specific measures may be envisaged. Those that are relevant for plastic product in contact with food entail the following:

- Requirements related to the **traceability** of materials. These are envisaged to be established by appropriate labelling or by documentation, with the aim to facilitate control and informing consumers, and also to allow for the attribution of responsibility and recall of a product if required.
- For products that are not yet in contact with food, appropriate **labelling** is required, to point that product is intended for food contact²⁸. This also includes information on the business entity responsible for placing the product on the market (either producer, seller, or processor).

In order to be placed on the EU market, in addition to previously mentioned requirements, regulated by Commission Decisions 1935/2004 and 2023/2006, plastic materials intended to come in contact with food must also meet **content requirements**, established by Commission Regulation 10/2011. These requirements are applicable to products made entirely of plastics, but also to products with plastic parts, multilayer materials containing plastics, and plastic layers and coatings. They entail the following:

- Only **authorised substances** may be used in the manufacturing of these products. The list of authorised substances and procedures for authorisation is set by the European Commission. What is important is that authorised substances refer not only to monomers, but also to additives (excluding colourants), polymer production aids (excluding solvents) and macromolecules resulting from microbial fermentation.
- Substances must be of the **appropriate technical quality and purity**.
- Specific and overall **limits for the migration** of constituents into the food are established. Overall migration limit requires that transfer of constituents of plastic materials and articles to food shall not exceed 10 milligrams per dm² of food contact surface (in the case of food for infants and young children the limit is set at 60 milligrams per kg of food). For certain types of plastic substances, additional specific migration limits are applicable (provided in Annex I of the Commission Regulation 10/2011).
- For substances that are not authorised substances, general restrictions apply. This means that such substances may be present only as impurities, provided that specific

²⁸ However, such labelling is not required for products for which it is obvious that they come in contact with food.

migration limits do not exceed specified maximum (set out in Annex II of the Commission Regulation 10/2011).

- In the case of **multi-layer packaging**, plastic layers need to comply with all of the previously mentioned requirements. However, this does not need to apply to layers that are not in direct contact with food, and which are separated from food by a functional barrier.
- To prove conformity with all prescribed requirements, a **declaration of compliance** must be available for plastic materials and articles in contact with food (rules for assessing compliance are also prescribed by Commission Regulation 10/2011).

For **recycled plastics** additional rules apply, guided by Commission Regulation 2022/1616:

- Only plastics that come from **suitable recycling processes** are allowed to come into contact with food. As listed in Annex I of Commission Regulation 2022/1616, suitable recycling processes include:
 - *Post-consumer mechanical PET recycling*, containing up to 5% of materials and articles that were not in contact with food, subject to mechanical recycling. Decontamination must entail at least a minimum time to heat, and a vacuum or flowing gas, to remove incidental contamination to eliminate health concerns. The application of this technology, however, requires that each individual recycling process must be authorised.
 - *Recycling from product loops which are in a closed and controlled chain*, refers to those technologies where plastics is used, collected and processed within the recycling scheme (so that collection from consumers is excluded), which is chemically uncontaminated, coming from a single polymer or compatible polymers. In the case of this technology detailed technological requirements are provided for, but there is no need to authorise individual recycling processes.
- **Requirements for collection and pre-processing** are imposed on waste management operators, to ensure that appropriate plastic waste is used (e.g. only non-contaminated plastic waste that was in contact with food can be used, with organised separate collection, and each batch of collected plastic waste must be traceable up to the point of sorting).
- Additional, mostly procedural, requirements are specified, that apply to decontamination installations, post-processing of recycled plastic, use of recycled plastic, and operation of recycling schemes²⁹.

Commission Regulation 2022/1616 also contains requirements and procedures related to the development and authorisation of novel recycling technologies, authorisation of individual recycling processes, and reporting and monitoring provisions.

²⁹ Term *recycling scheme* refers to a such arrangement, where different economic entities cooperate related to the collection, recycling and use of plastics, so that contamination is prevented or limited, and recyclability is facilitated.

7 Conclusion

Current EU legislation that is relevant for the food and beverage plastic packaging establishes certain obligatory requirements (e.g. on authorised substances, migration levels, suitable recycling processes and such), but still leaves substantial space for Member States to formulate their own policies.

Of particular significance is the obligation to organise the separate collection of packaging from municipal waste, and also targets for the re-use and recycling of municipal waste and plastic packaging waste. Provisions that specify producer responsibilities for the management of packaging throughout its lifecycle, and in particular financial obligations in that regard, are essential for the establishment of separate collection and provide impetus for the recycling of food and beverage plastic packaging.

An important new development is announced changes to be introduced by the proposed regulation on packaging and packaging waste. They aim to align the policy setting at the EU level, and could be expected to substantially alter the current business models and behaviours of consumers.

Although specific requirements for different economic operators are yet to be precisely prescribed by secondary legislation, it is certain that virtually all companies involved in the production and supply chain of food and beverage products that are packed in plastic packaging would have to modify their business strategies and operating models.

Aspect that is of particular significance for the upPE-T project are the requirements on obligatory recycled content for plastic packaging – already as of 2030 the recycled content of PET packaging for food and PET bottles would have to be at least 30%. Significant increase in demand for such innovative technologies would arise, providing opportunities for the utilisation of solutions developed within the upPE-T project, and their further enhancements.

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