A circular multilayer plastic approach for value retention of end-of life multilayers films

D7.7: Interim report on legislative and pre-normative actions

WP7: Pre-normative studies, dissemination, communication and exploitation

Project Information

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Abbreviations

In this document the following abbreviations and acronyms are used, and in this list, they are indicated with its meaning:

UNE Spanish Association for Standardization

CEN European Committee for Standardization

CENELEC (CLC) European Committee for Standardization in the Electrical field

CWA CEN or CENELEC Workshop Agreement

EAD European Assessment Document

ECHA European Chemicals Agency

EFSA European Food Safety Authority

EN European Standard

ETSI European Telecommunications Standards Institute

ETAG European Technical Approval Guideline

ESO European Standardisation Organisation

EOTA European Organisation for Technical Assessment

hEN Harmonised European Standard

ISO International Organization for Standardization; International Standard

IEC International Electrotechnical Commission

NMC National Mirror Committee

NSB National Standardization Body

PPWD Packaging and Packaging Waste Directive

SC Subcommittee

TC Technical Committee

TR Technical Report

TS Technical Specification

PPWD Packaging and Packaging Waste Directive

PR Producer responsibility

REACH Registration, Evaluation, Authorisation and Restriction of Chemicals

WG Working Group

WI Work Item

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Executive summary

This deliverable (D7.7), prepared within the WP7: "Pre-normative studies, dissemination, communication, and exploitation", offers a panoramic description of the legislative context as well as the standardization landscape for multilayer plastic films.

The first section **(PART A)** of this deliverable addresses the EU directives and National plans in particular in France, Spain, the Netherlands and Finland, having impacts on multilayer films circularity, from their design to their end-of-life management and recycling. This includes offer and demand, business models, regulation through tax, EU & National drivers, etc...

The report covers legislative texts which are not legally binding (i.e. Communications and Recommendations), as well as those that are (i.e. Directives and Regulations).

A second section **(PART B)** collects information on the standardization landscape and needs for updated or new standards to achieve circularity of multilayer films, supported by the CIMPA partners involved in technical standardisation committees. As a result, this deliverable includes a list of standards and technical bodies, with recommendations on actions about them.

CIMPA project is focused on multilayer films from food and agricultural applications, thus, the legislation on the packaging and agriculture plastic sector are analyzed in this document. However, being the packaging sector the largest plastic end-use market, and due to the growing generation of packaging waste, more policy, legislation, and standardization initiatives are found for the packaging than agriculture sector.

This document will be reviewed and updated including the developments of legislative actions and standards. A final report on legislative and pre-normative actions, with recommendations for legislative revisions and updated or new standards will be produced by M35.

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Introduction

The growing generation of waste, and more specifically plastics, has led to rethink the production and consumption models, as well as the end-of-life management of products. This, together with EU and national targets, political and private sector commitment to increase collection, recycling rates and recycled content in products among others, have created a dynamic legislative environment inside and outside Europe.

In recent years, specific targets and policy statements towards a circular economy for plastics have been included in EU strategies, plans and initiatives. “Boosting the EU market for recycled plastics to 10Mt by 2025” (Circular Plastic Alliance), “all plastic packaging on the EU market should be recyclable by 2030” (Circular Economy Action Plan), “55% of plastic packaging waste should be recycled by 2030” (PPWD) or “ensuring no net emissions of greenhouse gases by 2050” (Green Deal) are some of them.

Furthermore, with the aim of boosting demand for recycled plastic, the European Strategy for plastics requests the “development of quality standards for sorted plastics waste and recycled plastics in cooperation with the European Standardisation Committee and the industry”. Thus, to implement these commitments, not only the revision of legislation is needed but also the development of quality standards.

In addition, there are more and more companies, brand owners incorporating sustainability in their agendas (PepsiCo, for instance, recently vowed to cut virgin plastic from its chips bags by 2030) and making “recyclable” or “recycled content” claims on product labelling. This, together with increasing pressures from consumers to move towards more sustainable products, has accelerated the revisions of existing legislation and standards.

This report offers a panoramic description of the legislative context in Europe and at national level in some specific CIMPA partner countries. This review includes EU directives, regulations, and strategies as well as national plans and legislation having impacts on multilayer plastic films circularity, especially in the food packaging and agriculture sector. Not only the legislation in force is described, but also the legislation that are currently under review or under preparation, which may have implications for the CIMPA research and outputs.

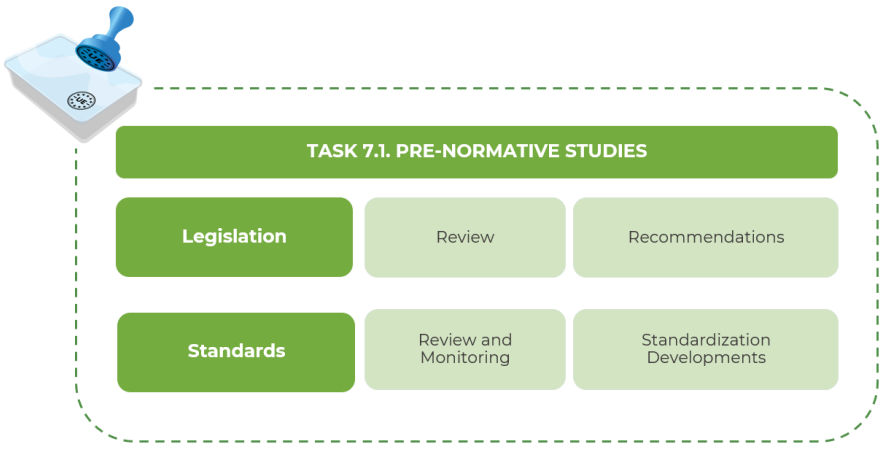

Figure 1. Steps for the legislative and standards review

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Besides the fact that CIMPA only deals with food and agricultural foils, other pieces of legislation that can have an indirect impact on the project are analyzed as well (for example: rules on other kind of packaging items, i.e. pharmaceutical packaging, can be relevant if it changes the waste stream).

Moreover, a list of existing standards related to packaging and agriculture plastics and plastics recycling is included. This is accompanied by a description of the needs for update or develop new standards to achieve the circularity in multilayer films.

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PART A. LEGISLATIVE REVIEW

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Legislative context at European level

European Green Deal

The European Green Deal provides a roadmap and an ambitious package of measures "to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use."

The European Commission adopted a set of proposals to make the EU's climate, energy, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

European Green Deal priorities include reducing air, water and soil pollution, moving towards a circular economy and improving waste management, among others.

Circular Economy Action Plan

The new Circular Economy Action Plan (CEAP) was adopted in March 2020 as a policy initiative foreseen by the Green Deal. It provides "a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens and civil society organisations."

The new action plan announces initiatives along the entire life cycle of products. It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that waste is prevented, and the resources used are kept in the EU economy for as long as possible.

A Sustainable Product Policy Framework

In order to make products fit for a climate-neutral, resource-efficient and circular economy, reduce waste and ensure that the performance of front-runners in sustainability progressively becomes the norm, the Commission will propose a **sustainable product policy legislative initiative.**

As part of this legislative initiative, and, where appropriate, through complementary legislative proposals, the Commission will consider establishing sustainability principles and other appropriate ways to regulate the following aspects:

- improving product durability, reusability, upgradability and reparability, addressing the presence of hazardous chemicals in products, and increasing their energy and resource efficiency;
- increasing recycled content in products, while ensuring their performance and safety;
- enabling remanufacturing and high-quality recycling;
- reducing carbon and environmental footprints;

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- mobilising the potential of digitalisation of product information, including solutions such as digital passports, tagging and watermarks;
- rewarding products based on their different sustainability performance, including by linking high performance levels to incentives.

Key Product Value Chains – Packaging & Plastics

Two of the seven Key Product Value Chains identified in the CEAP are Packaging and Plastics.

Packaging

The main action regarding packaging is the revision of the **Directive 94/62/EC27 on packaging and packaging waste,** to ensure that all packaging on the EU market is reusable or recyclable in an economically viable way by 2030. With this review, the Commission will reinforce the mandatory essential requirements for packaging to be allowed on the EU market and consider other measures, with a focus on:

- reducing (over)packaging and packaging waste, including by setting targets and other waste prevention measures
- driving design for **re-use and recyclability of packaging**, including considering restrictions on the use of some packaging materials for certain applications, in particular where alternative reusable products or systems are possible, or consumer goods can be handled safely without packaging.
- considering reducing the complexity of packaging materials, including the number of materials and polymers used.

The Commission will also establish rules for the safe recycling into food contact materials of plastic materials other than PET

Plastics

The **EU Strategy for Plastics in the Circular Economy** has set in motion a comprehensive set of initiatives responding to a challenge of serious public concern. However, as consumption of plastics is expected to double in the coming 20 years, the Commission will take further targeted measures to address the sustainability challenges posed by this ubiquitous material and will continue to promote a concerted approach to tackle plastics pollution at global level.

To increase uptake of recycled plastics and contribute to the more sustainable use of plastics, the Commission will propose mandatory requirements for recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles, also taking into account the activities of the **Circular Plastics Alliance**.

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European Strategy for Plastics

In January 2018, the European Commission's (EC) Communication on a European Strategy for Plastics in a Circular Economy was published, presenting guiding measures for action at the EU level.

The document presents a vision for a new circular economy for plastics, laying out a workplan and measures to turn this vision into a reality. Several of the policies envisaged in the workplan are today part of the EU legislative framework or are in the process of becoming law.

Improving the economics and quality of plastics recycling

The measures to implement the Strategy call for the manufacturing of durable plastic products, enabling for reuse and high-quality recycling, with the overall aim of **ensuring all plastic packaging placed on the market are either reusable or recyclable by 2030**. Within this vision, changes in production and design would enable higher plastics recycling rates for all key applications to a point where, by 2030, more than half of plastics waste generated in Europe is recycled.

To enable the achievement of these targets, the strategy advocates for increased sorting and recycling capacity. With that, the Strategy highlights the need to improve the economics and quality of plastics recycling, through design for recyclability, by boosting the demand for recyclates, as well as by enhancing and harmonizing separate collection and sorting.

The European Strategy for plastics requests the "development of quality standards for sorted plastics waste and recycled plastics in cooperation with the European Standardisation Committee".

Declaration of the Circular Plastics Alliance

In the context of the European Strategy for Plastics (2018), the European Commission launched the Circular Plastics Alliance to help plastics value **chains boost the EU market for recycled plastics to 10 million tonnes by 2025** (under Annex III related to voluntary pledges by industry).

The alliance covers the full plastics value chains and includes 293 organisations representing industry, academia and public authorities. New stakeholders can join the alliance by signing its declaration.

CPA covers five sectors, each of them addressed by a CPA Working Group (WG): Automotive, **Packaging, Agriculture,** Building & Construction and Electronic and Electrical.

Regarding the future Standardization Request on "Plastics recycling and recycled plastics", the WGs have been

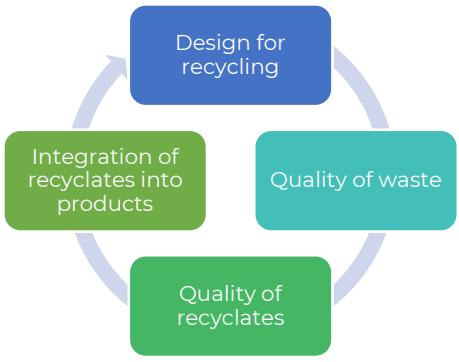

Figure 2. Standardization Request Areas

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tasked to identify standards to be potentially revised or developed under four main areas (as shown in Figure 2).

Implications for the project

Although the above-mentioned strategies, plans and initiatives do not bear direct legal implications, they will trigger the analysis and revision of the existing legislation, even considering a change of the legal format from Directive to a Regulation. In this report, the current and envisaged upcoming reviews relevant for CIMPA project are highlighted.

Directive 2008/98/EC on Waste (Waste Framework Directive - WFD)

EU waste policy aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. The **Waste Framework Directive** is the EU's legal framework for treating and managing waste in the EU.

It introduces an order of preference for managing and disposing of waste called the "waste hierarchy". The Directive explains when waste ceases to be waste and becomes a secondary raw material, and how to distinguish between waste and by-products. It also introduces the "polluter pays principle" and the "extended producer responsibility".

Figure 3. Waste hierarchy

Extended producer responsibility (Art. 8)

In order to strengthen the re-use and the prevention, recycling and other recovery of waste, Member States may take legislative or non- legislative measures to ensure that *the producer of the product* has extended producer responsibility. Article 8a of Directive lays out the general minimum requirements for implementing extended producer responsibility (EPR) schemes.

Preparing for re-use and recycling (Art. 11)

In order to comply with the objectives of this Directive, and move to a European circular economy with a high level of resource efficiency, Member States shall take the necessary measures designed to achieve the following targets:

- by 2025, the preparing for re-use/recycling of municipal waste shall be increased to a minimum of 55 % by weight;

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- by 2030, the preparing for re-use/recycling of municipal waste shall be increased to a minimum of 60 % by weight;
- by 2035, the preparing for re-use/recycling of municipal waste shall be increased to a minimum of 65 % by weight.

Certain categories of waste require specific approaches. Therefore, as well as the overarching legal framework, the EU has many laws to address different types of waste.

Among the specific policies, **Packaging and Packaging Waste Directive** will be studied as relevant rules for this project.

Directive 94/62/EC on Packaging and Packaging Waste Directive (PPWD)

The PPWD covers from packaging design to packaging waste management. It aims to:

- harmonise national measures on packaging and the management of packaging waste
- provide a high level of environmental protection
- ensure the good functioning of the internal market

The latest amendment to the Directive (2018) contains updated measures to prevent the production of packaging waste, and promote the reuse, recycling and other forms of recovering of packaging waste, instead of its final disposal

Among other rules, by end of 2024, EU countries should ensure that **extended producer responsibility schemes** are established for all packaging. The Directive also sets the following specific **targets for recycling**.

	Current targets (%)	By 2025 (%)	By 2030 (%)
All packaging	55	65	70
Plastic	25	50	55

Table 1. Targets for recycling established on Article 6

Member States shall take measures to promote **high quality recycling of packaging waste** and to meet the necessary quality standards for the relevant recycling sectors.

Regarding the labelling, the packaging material(s) used must be indicated for identification and classification purposes and the packaging shall bear the appropriate marking on the packaging itself or on the label.

The directive also requires packaging to comply with **'essential requirements'** which include the minimisation of packaging volume and weight, and the design of packaging to permit its reuse or recovery.

Moreover, it promotes the preparation of European standards relating to criteria and methodologies for life-cycle analysis of packaging, for a minimum content of recycled material in packaging, criteria for recycling methods and for the marking of packaging, among others.

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Implications for the project

Multilayer plastic films are used in agriculture for crops (0.6Mt/year) and as packaging for the protection of food (2Mt/year). Moreover, around 20% of the worldwide film production for food applications are multilayer films. Thus, multilayer films represent a significant share of packaging placed on the European market as well as the generated waste. With the CIMPA multilayer recycling value chain, the volume of waste being disposed of in landfills or incinerated will be reduced, contributing towards the achievement of the above-mentioned targets for recycling.

The legal obligation of meeting these recovery and recycling targets can be extended to producers/ importers of packaging through the setting of EPR schemes. By designing the next generations of recyclable multilayers, film manufactures using CIMPA technology will benefit when eco-modulation of EPR is established, taking into account their recyclability.

Review of the PPWD

With the objective of improving packaging design to promote reuse and recycling, increase recycled content in packaging, tackle excessive packaging and reduce packaging waste, the European Commission is currently assessing options to review the PPWD. This review started in June 2020 and an open consultation together with different stakeholders' workshops have taken place since then. The Commission Adoption is expected by the end of 2022. **This information will be updated in D7.8 by M35.*

One of the key measures assessed under this revision is the recyclability of packaging, so only recyclable packaging can be granted market access by 2030. This means that multilayers could become a phased-out product in Europe if recycling solutions are not developed by then.

REACH Regulation

The objective of the REACH Regulation (Registration, Evaluation, Authorisation and Restriction of Chemicals) is to harbour a safe use of chemicals in Europe, while at the same time ensure the competitiveness of the European chemicals industry and safeguard human health and the environment. REACH applies to all chemical substances.

To comply with the measures lined out in the Regulation, companies must identify and manage risks entailed in the use of substances they manufacture, demonstrating to the European Chemicals Agency (ECHA) their safety but also appropriately informing consumers on the same.

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Commission Regulation (EU) 2022/1616 on recycled plastic materials and articles intended to come into contact with foods will enter into force on 10 October 2022.

This Regulation will set clear rules to ensure that recycled plastic can be safely used in food packaging in the EU. It will contribute to increasing the overall sustainability of the food system and achieving the objectives of the Circular Economy Action Plan, by increasing the recycled content in food packaging and other food contact materials.

This Regulation lays down rules for:

(a) the placing on the market of plastic materials and articles intended to come into contact with food, containing plastic originating from waste or manufactured therefrom;
(b) the development and operation of recycling technologies, processes and installations, to produce recycled plastic for use in those plastic materials and articles;
(c) the use in contact with food of recycled plastic materials and articles and of plastic materials and articles which are intended to be recycled.

These provisions specify the requirements for recycled plastic materials and articles and the conditions for authorizing related recycling processes. It also lays down the procedures for assessing novel recycling technologies.

The new Regulation will establish a public register of recycling processes, recyclers, and recycling installations under its scope, providing an increased level of transparency.

Implications for the project

For CIMPA, this regulation is key as it requires the decontamination of plastics by means of a suitable recycling technology (including for first time the use of chemical recycling technologies in its scope) and it also sets rules on novel technologies. Thus, the decontamination technology developed by CIMPA partners should be in line with these regulatory developments.

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Legislative context in Spain

Background

Political and territorial organization of Spain is arranged on the basis of four levels: the central Government, the autonomous communities their provinces and the municipalities that conform them.

The information collected corresponds to the central Government.

Law 22/2011, of July 28, of waste and contaminated soil and its amendments.

The purpose of this Law is to regulate the management of waste, promoting measures that prevent its generation and mitigate the adverse impacts on human health and the environment associated with its generation and management, improving efficiency in the use of resources. Another purpose of this Law is to regulate the legal regime of contaminated soils.

This law transposes Directive 2008/98/EC of the European Parliament and of the Council, of November 19, 2008, on waste.

This law also incorporates the three main principles of the waste management policy:

1. Protection of human health and the environment: The competent authorities will adopt the necessary measures to ensure that waste management is carried out without endangering human health or damaging the environment. In particular:
   a) It will not generate a risk for the water, the air, the soil, the fauna nor the flora;
   b) It will not cause discomfort due to noise or odours;
   c) It will not affect landscapes or legally protected places of special interest.

2. Waste management hierarchy
   a) Prevention
   b) Preparing for re-use
   c) Recycling
   d) Other valuation methods, as energy recovery

3. Self-sufficiency and proximity: All institutions involved in waste management will take the appropriate measures to establish an integrated network of waste disposal facilities and facilities for the recovery of mixed household waste, even when the collection also includes similar waste from other producers, considering the best available techniques.

4. Access to information and participation in matters of waste: Public administrations shall guarantee the rights of access to information and participation in matters of waste.

5. Costs of waste management: In accordance with the polluter-pays' principle, the costs related to waste management will have to borne by the initial waste producer, the current holder or the previous waste holder.

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With reference to plastic waste:

- Article 21 calls for the separate collection of waste for preparation for reuse, recycling, and recovery of waste.
- A separate collection of at least paper, metal, plastic, and glass waste was established.
- Article 22 established as a goal that before 2020, that the amount of domestic and commercial waste destined for preparation for reuse and recycling for fractions of paper, metals, glass, plastic, bio-waste or other recyclable fractions should reach, altogether, at least 50% by weight.
- The second additional provision requests that public administrations adopt the necessary measures to promote the most sustainable systems for the prevention, reduction, and management of waste from single-use commercial bags made of non-biodegradable plastic and its alternatives.

Regarding packaging waste:

- Article 31 delegates to the Council of Ministers the regulation of the Extended Responsibility of the Producer that includes the system of deposit, return and return of containers.

The Draft Law on Waste and Contaminated Soils, which will repeal this Law, is currently undergoing parliamentary proceedings.

Law 11/1997, of April 24, on Packaging and Packaging Waste and its amendments.

This Law aims to prevent and reduce the impact on the environment of packaging and the management of packaging waste throughout its life cycle.

To achieve the above objectives, measures are established for the prevention of the production of packaging waste, the reuse of packaging, recycling, and other recovery methods for packaging waste, in order to avoid or reduce its elimination.

Through this legislation, the principles of action are established, which are:

- Prevention: the General Administration of the State and the Autonomous Communities are responsible for, within their respective spheres of competence, adopting the appropriate measures, especially related to the design and manufacturing process of the containers, with the aim of minimizing and preventing the production of packaging waste.
- Promoting the reuse and recycling: public administrations are authorized to establish those measures of an economic, financial, or fiscal nature that are necessary, in order to increase the reuse and recycling of packaging.

Waste management is clearly stated as an activity delegated to local entities, the general administration of the State is only authorized to promulgate basic legislation for the protection of the environment.

This legislation establishes the minimum concepts for the financing of waste management through the extended producer responsibility' (EPR).

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Lastly, the law makes no difference between packaging based on the material with which they are made.

The approval of the Draft Royal Decree on waste and contaminated soils that will repeal this Law is currently in process.

Royal Decree 293/2018, of May 18, on reducing the consumption of plastic bags.

This Royal Decree transposes Directive (EU) 2015/720 of the European Parliament and of the Council, of April 29, 2015, which modifies Directive 94/62/EC regarding reduction in consumption of lightweight plastic bags.

The purpose of this royal decree is to adopt measures to reduce the consumption of plastic bags, to prevent and reduce the adverse impacts that the waste generated by plastic bags causes in the environment, with special attention to the damage caused to the aquatic ecosystems.

Through this Royal Decree, since January 1, 2021, the delivery of light and very light plastic bags to the consumer at the points of sale of goods or products was prohibited, except if they are made of compostable plastic. Merchants will also be able to opt for other packaging formats to replace plastic bags.

Royal Decree 847/2011, of June 17, which establishes the list of substances allowed for the manufacture of polymeric materials intended to get in contact with food.

In terms of Food Contact Plastics, the regulation at European level is complied with:

- Regulation (EU) 10/2011 of the Commission, of January 14, 2011, on plastic materials and objects intended to get in contact with food;

- Regulation (CE) 282/2008 of the Commission of March 27, 2008, on recycled plastic materials and objects to get in contact with food and by which Regulation (CE) 2023/2006 is modified;

- Regulation (CE) 2023/2006 of the Commission of December 22, 2006, on good manufacturing practices for materials and objects intended to get in contact with food, among others.

At the national level, this Royal Decree aims to approve:

a) The list of monomers, additives, and other starting substances, authorized for the manufacture of polymeric materials and objects intended to get in contact with food products.
b) Maximum allowed migrations obtained in migration tests and determine the test conditions.
c) Identity conditions and purity of coloring substances.

This royal decree is applicable to the following materials and objects that, as finished products, are intended to get in contact with food products, and are made for the following purposes:

a) Adhesives.
b) Natural and synthetic elastomers and rubbers.
c) Ion exchange resins.

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d) Silicones.
e) Varnishes and coatings.
f) Plastic materials, as polymerization production supports not included in Annex I of Regulation (EU) No. 10/2011, of the Commission, of January 14, 2011, on plastic materials and objects intended to get in contact with food.
g) Waxes.

It is also important to clarify that this royal decree will not apply to:

- Plastic materials and objects, regulated by Regulation (EU) No. 10/2011, of the Commission, of January 14, 2011, on plastic materials and objects intended to get contact with food, except for production supports of polymerization foreseen in section f) of point 1 above.
- Regenerated cellulose films, regulated by Royal Decree 1413/1994, of June 25, 1994, which approves the Technical-Sanitary standards on regenerated cellulose film materials and objects for food use.

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Legislative context in France

Loi AGEC : Anti-Gaspillage pour une Economie Circulaire (Sept. 2021)

Translation: Anti-waste law for a circular economy

The law contains about fifty measures providing for:

- new obligations with the creation of new Polluter pays sectors to include new product families in the circular economy and the requirement of transparency on the environmental and health impacts of products, on waste management.
- new prohibitions to control irreversible ecological ambitions, particularly on the use of single-use plastics and to combat wastage of both food and non-food unsold products.
- new tools to better control and sanction offences against the environment to support companies in their eco-design initiatives and assist citizens in new consumption practices (repairability index, information on endocrine disruptors, simplifying the sorting process, development of deposit-systems).

The law already provides a fast-track ban on single-use plastic for a first series of uses and products which predominantly end up in the environment and in the ocean, in accordance with the European SUP Directive.

Loi transition énergétique pour la croissance verte (August 2015)

Translation: Energy transition for green growth act

François Hollande: "A great ambition underlies France's Energy Transition for Green Growth Act: to make France – following on from the Paris Climate Summit – an exemplary nation in terms of reducing its greenhouse gas emissions, diversifying its energy model and increasing the deployment of renewable energy sources"

Global goals:

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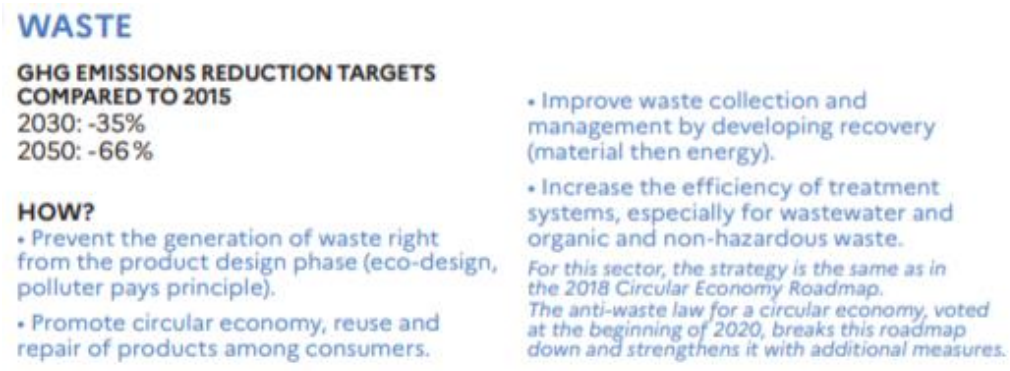
Circular Economy goals:

- Progressively dissociate economic growth from the consumption of raw materials.
- Reduce household waste and similar products by 10% by 2020.
- Recycle 55% of non-hazardous waste by 2020 and 65% by 2025.
- Recover 70% of construction and civil engineering waste by 2020.
- Halve the amount of waste disposed of in landfill sites by 2025.

Stratégie nationale Bas-Carbone (SNBC -2015 – Revised in 2019)

Translation: National low carbon strategy

Implemented via the law of 17 August 2015 relating to energy transition for green growth, the National Low-Carbon Strategy (SNBC) serves as France's policymaking road map in terms of climate change mitigation. It is one of the two prongs of French climate policy, along with the National Adaptation to Climate Change Plan.



Feuille de route économie circulaire (FREC)

Translation: Roadmap for the circular economy

Objectives

- Reduce natural resource use related to French consumption: 30% reduction in resource consumption in relation to GDP between 2010 and 2030.
- Reduce 50% of non-hazardous waste landfilled by 2025, compared to 2010.
- Aim towards 100% of plastics recycled by 2025.
- Reduce greenhouse gas emissions: avoid the emission of 8 million additional tonnes of CO2 each year thanks to plastic recycling.
- Create up to 300,000 additional jobs, including in new professions

Implications for the project

Out of the 50 measures proposed in this roadmap, the most relevant ones for CIMPA project are the following:

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- N°1: Use more secondary raw materials in products
- N°4: Enable the EPR schemes to secure the investments of the industrial recycling sectors and producers of recycled products to close the circular economy loop
- N°18: Extend the scope of the EPR "packaging" scheme to professional packaging
- N°19: Simplify the sorting process for citizens

Plan Climat (2017)

Translation: Climate plan

The objectives are:

- Making the implementation of the Paris agreement irreversible
- Improving the daily lives of french citizens
- Ending fossil fuels use and moving towards carbon neutrality
- Making France the number one country in the green economy by making the Paris agreement an opportunity for an opportunity for attractiveness, innovation and employment
- Mobilizing the potential of ecosystems and agriculture to fight climate change
- Strengthening international mobilization on climate diplomacy

Stratégie d'accélération « Recyclabilité, recyclage, et réincorporation des matériaux recyclés » (April 2019)

Translation: National Strategy: "recyclability, recycling and reincorporation of recycled material"

The "recyclability, recycling and reincorporation of recycled materials" acceleration strategy is one of the key markets selected as part of the Productive Pact 2025, announced by the President in April 2019.

This strategy aims to improve the performance of the recycling raw materials markets by identifying the obstacles and action levers that can be done along the recycling value chain. It focuses on:

- Recyclability of products put on the market
- Collection and sorting of end-of-life products
- Production of raw materials for recycling
- Reincorporation of recycled raw materials into new products

The aim is to strengthen the French recycling industry in order to meet a number of ecological, economic and technological challenges necessary for the transition to a competitive and environmentally friendly circular economy, by:

- developing a French supply of recycled materials
- increasing their reincorporation into products as a substitute for virgin raw materials

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Décret 3R (April 2021)

Translation: 3R Decree

3R Decree for Reduction, Reuse and Recycling is the decree implementing the Anti-Waste and Circular Economy (law AGEC). This decree is non-binding and does not set any bans. It sets targets for the period 2021-2025, aiming to end the marketing of single-use plastic packaging by 2040.

The objectives about recycling are:

- Brand owners shall ensure that they choose packaging that has an operational recycling scheme by the 1st of January 2025, does not disturb the sorting or recycling of general packaging waste, and does not contain any substances or indissociable elements that could limit the use of the recycled material (Articles 2 & 3).
- To help achieve the recycling target set out in Article L. 541-10-17 of the Environmental Code, which is to aim for 100% by 1 January 2025. Brand owners shall foster the incorporation of recycled material in plastic packaging, to support the development of recycling schemes and increase their output (Article 3).

Implications for the project

This will concern multilayers films packaging because today they disturb recycling and there is no operational recycling scheme for other films than mono PE films.

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Legislative context in Finland

Summary

In Finland, currently (2019) around 42 % of plastic packaging is recycled. Finland has well established deposit-return-system for plastic bottles – deposit bottles' return rate was 92 % in 2020. Overall, however, Finland is still behind the upcoming recycling targets. Finland has several activities to reach the required 50 % recycling rate (by 2025) of plastic packaging as well as address single-use plastics as regulated in the Single Use Plastics Directive. Most of those policy measures and activities are listed in **Finland's national strategy for plastics**, which was launched in 2018. The implementation started immediately and has been followed up closely. The strategy is under update for continuation and efficiency improvements. Recent bigger regulatory and policy related activities have been gathered in different **Green Deals** for plastics for example in single-use packaging, and construction and demolition sectors. **Different taxation schemes and financial incentives** are investigated to improve recycling efforts, competitiveness of alternative products and reduce the amount of waste generated. **Programmes with dedicated funding** are also used as a policy measure to support plastics circularity, for example by supporting projects, Research and Innovation, and value chain collaboration. Finally, **Producer responsibility (PR) schemes** in different sectors like plastic packaging and agricultural plastics are implemented and extended.

Plastic packaging is addressed by reducing and phasing out single-use plastics, improving collection and separation, increasing efficiency of recycling, and supporting recyclate-markets. **Agricultural plastics** are partially subject to PR schemes, and targeted activities are aiming towards increasing the recycling of agricultural plastics. Also, funding is dedicated to RDI of alternative - bio-based and biodegradable - agricultural plastics. **Construction sites' plastic packaging** is aimed to have higher recycling rates, which is supported by Green Deals and national plan, where measures to reduce use of plastics, increase the recycling rate of plastic waste as well as use of recycled plastics in construction are introduced.

The **new Directive on waste**, Jätelaki 646/2011[1], came to force in 19.7.2021 to implement set EU targets to **increase collection and recycling**. It became compulsory to have separate plastic collection in all buildings that have at least 5 apartments. PR schemes were extended so that producers participate in the costs, covering at least 80 % of the costs, of collecting and recycling plastic waste from properties together with the municipalities. Also, as e-commerce is an important and ever-growing sector, the international websites are also obligated to take responsibility of their waste. In addition to the property-based requirements for collection, the producers are also responsible for the organisation of regional collection points. The national

[1] Jätelaki 646/2011. Available at: https://www.finlex.fi/fi/laki/ajantasa/2011/20110646

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Government's landfill legislation, Valtioneuvoston asetus kaatopaikoista 331/2013[2], is going under review to be updated to match the new EU regulations to decrease amount of recyclable materials ending up in landfill and also improve monitoring of landfilled waste. Finland's Ministry of Environment reviewed in 2020 the national End-of-Waste (EoW) regulation possibilities to improve plastics' mechanical and chemical recycling to end products. A working group has been formed to monitor the EU EoW process and to prepare the national regulation to further support the development of circular economy markets.

Finland's strategy for plastics: Plastics Roadmap for Finland: Reduce, refuse, recycle and replace

The European Commission published in January 2018 EU's strategy for plastic. Finland drafted its own roadmap for plastic strategy prior to this to prepare for the actions and requirements that come with the EU's strategy for plastics and Directive on single-use plastics. The aim of the strategy is in short term to reach more efficient and better recycling of plastics, more efficient collection of plastic waste, improve recovery and recycling of plastic waste as well as increase the demand for recycled plastic and its use.

The 'Plastics Roadmap for Finland: Reduce, refuse, recycle and replace' was drafted by the Ministry of Environment with a working group comprising of representatives from ministries, research institutes and universities, civil society organisations, and business and industry in the field. The working group was supported by a secretariat of experts, also ideas were collected from citizens. The roadmap was put into action immediately as the implementation began in 2019. The progress is actively monitored by the Ministry of Environment. The roadmap identified range measures to diversely address the plastics challenge. Finland's competences, which are strengthened by this strategy, lie in recycling technologies and safe novel alternative materials. Finland has for example a long track-record and a strong background in bio-based materials.

Below is a summary of thematically grouped plastic waste related policy measures that relate to the CIMPA target material stream. All of the action points have dedicated responsible actors, different ministries of Finland are always also involved. The progress is monitored actively.

1. Reduce littering and avoid unnecessary consumption

    - Set of nation-wide campaigns: raising general public and consumers' awareness to choose sustainable alternatives to single-use plastics and reduce littering.
    - Green Deal agreements to reduce use of single-use packaging and overpackaging, as well as littering: an operating model is designed where there is a fee connected to choosing single-use packaging, e.g. for business which offer takeaway services. For example, the use of Finnish tap water is promoted by encouraging cities, hotels and restaurants to visibly offer tap water.

[2] Valtioneuvoston asetus kaatopaikoista 331/2013. Available at https://www.finlex.fi/fi/laki/alkup/2013/20130331

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2. Study the possibility to introduce a tax on plastics
    - Investigations on alternative ways to implement plastic taxes: assessment on impact on especially reduction of single-use plastic product use.
    - Evaluation of the relationship between taxation and producer responsibility systems (incl. their expansion); investigation of needs and opportunities to expand deposit-refund systems.
    - Evaluation of financial incentives to improving conditions for recycling of plastics and use of recycled plastics by adjusting the relative prices of plastic raw materials and recycled plastics.
3. Increase significantly the recovery of plastic waste
    - Amendment of requirements for separate waste collection and significantly increase recovery of plastic packaging by expanding property-specific and regional collection systems, as well as organising neighbourhood collection points. Waste sorting is supported by pricing incentives. RDI to investigate alternative ways to implement separate collection of different types of plastic waste.
    - Product categories investigated where certain share of recycled plastics could be required.
4. Improve the identification of plastics in buildings and sorting of plastic waste at construction sites
    - Guidelines prepared for construction sector to reduce plastic packaging. A Green Deal agreement on reduction of plastic packaging in real estate and construction sector was concluded.
    - Plan established to reduce plastics and increase the recycling rate of plastic waste as well as use of recycled plastics in construction. Plan experimented and implemented first through public procurement project, where the circularity plans are applied in design, construction, repair and demolitions.
5. Promote the recycling and replacement of plastics in agriculture and horticulture.
    - Agricultural plastic packaging is subject to producer responsibility in Finland. Reception terminals are established by producers where plastic waste can be delivered without a fee. The PR scheme is however limited and e.g. feed packaging, mulches, or gauzes are not included. Steering instruments are investigated to increase recycling of agricultural plastics. Regional cooperation is increased by also including actors outside the scope of the PR scheme. Recycling is boosted by educating raw material producers.
    - Development of environment payment scheme of the Rural Development to support replacement of fossil-based plastics with bio-based alternatives. Investments and funding for development of novel bio-based and fully biodegradable mulch materials.
6. Introduce diverse recycling solutions for recovered plastics

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Potential of chemical recycling and the framework conditions are examined, projects are launched to strengthen cooperation between companies and RDI. Based on these, 1-2 full-scale plastic processing plants and a chemical recycling unit are set up as separate projects or as part of the existing chemical industry.

7. Invest in a big way in alternative solutions and set up a New Plastics knowledge network

    - National programme is launched with allocated funding to develop new value networks for developing solutions, materials and technologies for plastic alternatives.
    - New Plastics Finland knowledge network is established. The network supports political decision-making and has an active role to promote innovative solutions.

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Legislative context in the Netherlands

Overview of Dutch policy instruments and initiatives

The limitations regarding recycling of multilayer packaging touch upon the field of different ministries. The boundaries set by legislation and regulation are of importance in the consideration to transition towards circular multilayer packaging. This section describes the available policy instruments and ongoing initiatives in the Netherlands which are relevant for the transition. A distinction is made between the mandatory and voluntary policy instruments.

MANDATORY POLICY INSTRUMENTS

This type of instruments are binding for the packaging industry. Some of the regulative measures are constituted in agreement with the industry.

Wet milieubeheer

Translation: Law on environmental control

The 'wet milieubeheer' is a legislative measure that describes the legal means to protect the environment. This includes the general regulations, way of enforcement, environmental programs, financial instrument, etc. which set, inter alia, conditions and demands to comply with by the multilayer packing.

Besluit Beheer Verpakking and VANG

Translation: Decision on the control of packaging and VANG (Van Afval naar Grondstof, i.e. from waste to raw material)

Manufacturers and importers are held responsible for the prevention, collection and recycling of all packaging. The responsibility, together with the essential packaging compliances for the spoil of food, are established in the 'Besluit Beheer Verpakkingen'. The legislation continuously tightens up packaging demands regarding recyclability. This is also the case for the VANG (Van Afval naar Grondstof, i.e. from waste to raw material) program, in which municipalities actively try to reduce the residual waste. Due to the program, prices for residual waste management increase to create an incentive of increasing the recyclability of packaging.

Raamovereenkomst Verpakkingen

Translation: Framework agreement Packaging

The 'Raamovereenkomst Verpakkingen' covers the way the manufacturers have to take responsibility for their manufactured packaging. This includes execution and monitoring of the set compliances by the 'Besluit Beheer Verpakking'. Furthermore, the waste management structure and responsibility of each stakeholder are defined in the compulsory agreement. For example, 'afvalfonds verpakking' [*waste fund packaging*] is founded to implement the manufacturers' responsibility. Furthermore, knowledge institutions have been established to

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support increasing the recyclability of packaging. The agreement sets the system boundaries for the process of collecting and recycling packaging waste.

Also, the financial flows are defined for the waste management structure. This includes agreements regarding the system of differentiated charges related to the recyclability of packaging. For instance, specific (DKR) categories are defined for packaging sorting. Manufacturers of good recyclable packaging have to pay less to the 'afvalfonds verpakking'. Lastly, the general objectives are defined in the agreement related to reuse of material, deposit systems and litter of packaging.

VOLUNTARY POLICY INSTRUMENTS

This type of instruments is not binding for the packaging industry. Some of the presented policy instruments are not even policy instruments. However, those initiatives are a result of the constituted policy and therefore included. A distinction is made between policy focused on packaging, the transition towards a circular economy in general and Dutch green deals.

Brancheplan Duurzaam Verpakken

Translation: Industry plan Sustainable Packaging

The 'Brancheplan Duurzaam verpakken' describes the way the pharmaceutical sector is planning to reduce wasting medicinal products and their packaging.

Brancheplannen Kennisinstituut Duurzaam verpakken

Translation: Knowledge institute for sustainable packaging

The 'kennisinstituut duurzaam verpakken'(KIDV) created, as part of the waste management structure, a sector-specific program for sustainable packaging. Objectives and measures are defined to reduce the environmental impact of packaging. Multilayer packaging is not acknowledged as recyclable by the KIDV since, in practice, it is currently not recycled in the Netherlands. Therefore, this type of packaging is not part of the sector programs. However, these are continuously updated and, thus, the sector programs might have affiliation with multilayer packaging in the future.

Center for Research in Sustainable Packaging (CRISP) and Community of Practice for laminates

The CRISP is a collaboration of different research institutions to increase the recyclability of packaging such as multilayer packaging. Three main research topics have been set: environmental and economic considerations related to packaging, the recycling structures and systems and laminates. The community of practice is founded to share innovative solutions related to those laminates among manufacturers.

Rijksbrede programma Nederland Circulair and Grondstoffenakkoord.

Translation: Governmental program Dutch Circular and Raw material agreement

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The program established by the Dutch government for the transition towards a circular economy is described in the 'Rijksbrede programma Nederland Circulair'. In the program, the prioritised value chains that should transition, due to their high environmental burden, are defined. Plastics is one of those and as a result, strategic objectives have been set. Therefore, the program has consequences for the multilayer packaging. In the 'grondstoffenakkoord' different stakeholders have agreed to comply with the program.

Transitieagenda Kunststoffen en Consumptiegoederen

Translation: Transition agenda Plastics and consumption goods

The 'transitieagenda' (TA) [*transition agenda*] is constituted by the government, market and NGOs to define how to execute the 'rijksbrede programma Nederland Circulair'. The TA for plastics and consumer goods has set objectives for this specific market, which touch upon multilayer packaging. Furthermore, it proposes financial instruments to boost innovation for the market. The TA also focuses to increase the manufacturers' responsibility, for example by increasing differentiated charges based on the environmental performance.

Uitvoeringsprogramma CE

Translation: Implementation program circular economy

To implement the TA for plastics and consumer goods, the 'uitvoeringsprogramma CE' has been established. This includes different projects as defined in the TA. The following projects are most relevant for the multilayer packaging:

- *Plastic Pact Nederland* Plastic Pact NL.
  A deal to reduce the environmental impact and litter of plastic packaging. The ambition stated in the agreement has been worked out in four specific objectives for 2025. Within the deal, the stakeholders agreed to research the application of additives in plastics and multilayer packaging. Furthermore, the scientific evidence of legislative restrictions related to the application of recycled plastics in new packaging is re-evaluated.
- *Actieplan Chemische Recycling*
  A plan to increase chemical recycling and gain more insight into the effect of the technology. It's a potential method to recycle multilayer packaging.
- *Actieplan meer en betere sortering en mechanische recycling*
  A plan to improve sorting of waste and quality of mechanical recycling technologies.
- *Toepassing kunststof recyclaat in nieuwe producten en verpakkingen*
  A project to create standards for the application of recycled materials. Packaging materials are not yet part of the scope of the project.
- *Nationaal Testcentrum Circulaire Plastics* NTCP | Nationaal Testcentrum Circulaire Plastics A test center to do applied research on sorting and recycling technologies.

Uitvoeringsprogramma CE; Dwarsdoorsnijdende thema's

Translation: Implementation program circular economy; Cross sectional topics

Besides the implementation programs constituted from the TA's, different topics touch upon all prioritized value chains. In this program, those topics are addressed, which include

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manufacturer responsibility, legislation and regulation, circular procurement, circular design and education and communication. Each of these topics worked on within the program can be of importance for multilayer packing manufacturers. For example, the organisation CIRCO that helps entrepreneurs and designers to create business through circular design.

P>Act Challenge

The 'P>Act challenge' is a regional initiative to support circular innovative solutions. To increase the circularity of multilayer packaging, these types of regional initiatives could help to identify powerful solutions.

"Over de datum?"

The Over the datum initiative aims to increase the awareness about the due date of products and, so, reduce food waste. These initiatives can impact the labelling of packaging.

"Groene certificaten"

The Green certification is an initiative created to stimulate the use of renewable resources. By certification, the environmental performance of the supply chain can be communicated more easily.

"Betrouwbaar bewijs voor toepassen van kunststof recyclaat"

This initiative clarifies the quality and characteristics of recycled materials by certification.

DUTCH STRATEGY AND PRIORITIES IN PRACTICE

Afvalfonds Verpakkingen (Packaging Waste Fund)

The before mentioned Afvalfonds Verpakking has been made responsible for the prevention, collection and recycling of packaging waste. On its website, it confirms the legal framework as follows.

Dutch and EU Packaging Waste legislation

In the Netherlands, producers and importers of packaged products are legally responsible for the prevention, collection and recycling of packaging waste. This extended producer responsibility follows from Dutch national legislation implementing the European directive on packaging and packaging waste (the Packing (Management) Decree 2014 (Besluit beheer verpakkingen 2014), which implements European Directive 94/62/EC). This extended producer responsibility applies to companies that are the first to make packed products available to another in the Netherlands and/or who remove the packaging on import.

Waste Management Contribution Agreement

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The Waste Management Contribution Agreement (ABBO) is binding on all producers and importers of packaged products in the Netherlands. Producers and importers responsible for more than 50,000 kg of packaging in any given calendar year must register with Afvalfonds Verpakkingen, declare their packaging weight and pay the fees accordingly. By doing so, producers and importers meet the majority of obligations they have under the Packaging Decree, including the recycling targets. Since January 1st of 2018, this also applies to foreign entrepreneurs who are the first to make packaged products available to consumers in the Netherlands.

Further information can be found in the packaging waste Policy that is further explained below.

National agreement

On 27 June 2012 the Ministry of Infrastructure and Water Management (at that time the Ministry of Infrastructure and the Environment), the Association of Netherlands Municipalities (VNG) and the Packaging Industry signed the Packaging Agreement (Raamovereenkomst verpakkingen) 2013-2022 which states, amongst other things, that companies must recycle more packaging material and make the entire packaging chain sustainable. The collective implementation of the extended producer responsibility is guaranteed via Afvalfonds Verpakkingen. In order to cover the associated costs, Afvalfonds Verpakkingen levies a mandatory packaging waste management contribution on the bases of the Waste Management Contribution Agreement for Packaging (Afvalbeheersbijdrageovereenkomst Verpakkingen/ABBO) which has been declared universally binding by the Minister of Infrastructure and Water Management.

According to the Packaging Agreement and the Packaging Decree, the national recycling targets for packaging materials should be reached. Each year Afvalfonds Verpakkingen reports the recycling results.

Policy Afvalfonds Verpakkingen

Packaging Waste Fund Policy.

In the Netherlands, producers (brands) pay € 700 excluding VAT per tonne of plastics (2022 tariff) for single or multilayer flexibles.

The Plastic Fee Modulation Scheme exists for rigid plastic packaging and does not apply for single or multilayer flexibles, even if these are properly recyclable. This Plastic Fee Modulation Scheme is only intended to reward companies that use rigid plastic packaging that has good recyclability with a positive market value after sorting, leading to lower net costs for Afvalfonds Verpakkingen ('Packaging Waste Fund'). For rigid plastic packaging that is sorted and recycled without impediments and with a positive market value, a lower fee applies (€ 440 instead of € 700). The fees are re-established annually and the relative discount compared to the regular plastic fee will be maintained for a multiannual basis.

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Material	Fee 2022 (€/kg) ex. VAT	Fee 2021 (€/kg) ex. VAT	Fee 2020 (€/kg) ex. VAT	Fee 2019 (€/kg) ex. VAT	Fee 2016/2017/2018 (€/kg) ex. VAT
Plastics, regular fee	0.700	0.670	0.600	0.640	0.640
Plastics, reduced fee	0.440	0.410	0.340	0.380	-
Biodegradable plastics	0.700	0.670	0.600	0.640	0.020
Beverage cartons	0.64	0.470	0.380	0.380	0.180

To determine if a plastic packaging has good recyclability or not, Afvalfonds Verpakkingen uses the recycle check for rigid plastic packaging, which has been developed by Netherlands Institute for Sustainable Packaging (Kennisinstiuut Duurzaam Verpakken, KIDV).

Recycle Check for Flexible Plastic Packaging

Although flexible packaging does not have the differentiated tariff, the KIDV has also developed a **Recycle Check for Flexible Plastic Packaging**. An English version packaging can be downloaded here.

On the next page, the Decision Tree Recycle Check Flexible Plastic Packaging as currently used in The Netherlands is showed[3].

[3] Please note that de KIDV Roadmap is from August 2020 and does not include a CurvCode sorting solution yet.

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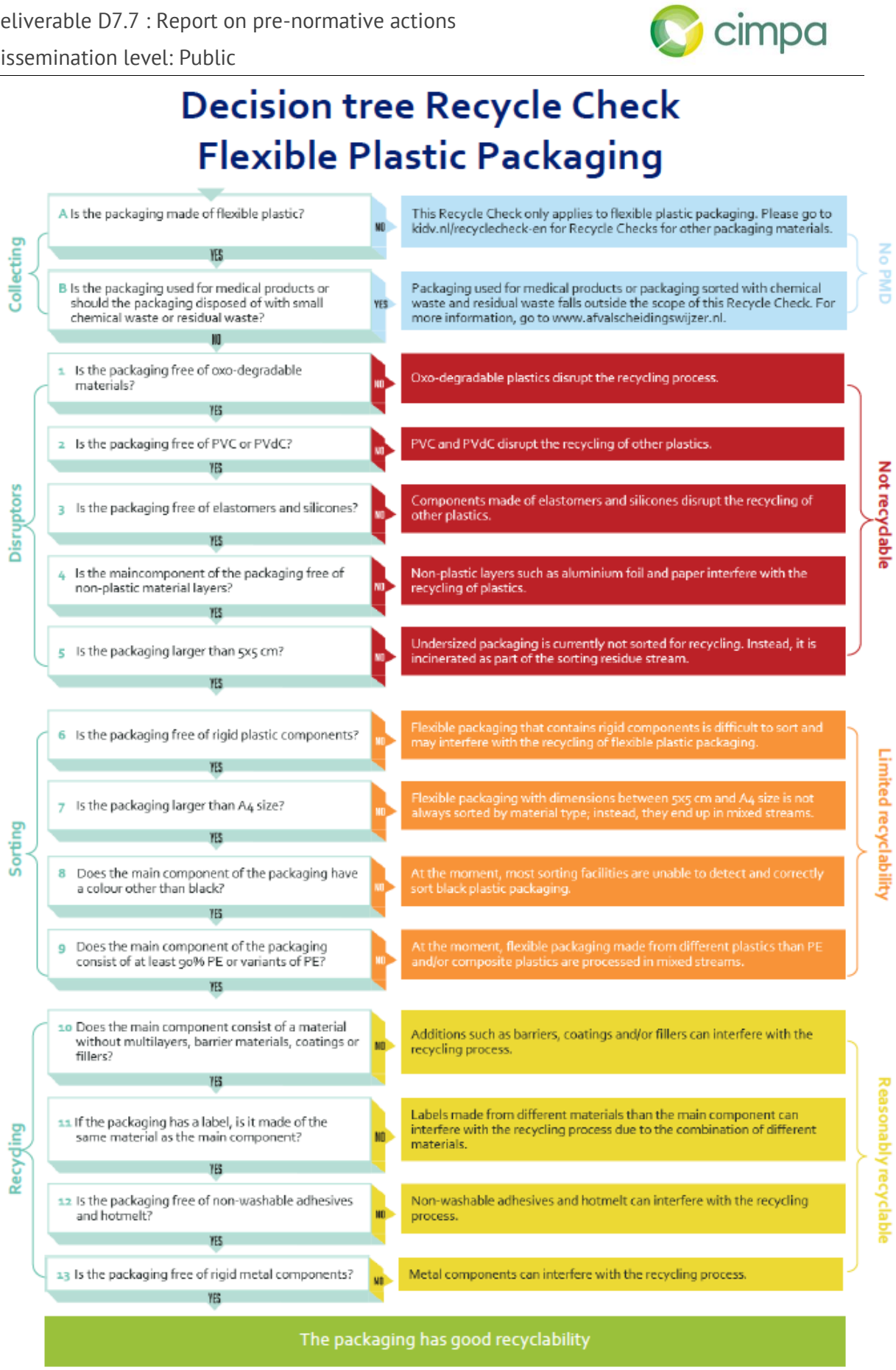

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Roadmap 'Multilayer flexible packaging in a circular economy'

Also an English version of the KIDV **Roadmap 'Multilayer flexible packaging in a circular economy'** is available here. The following text is the introduction from this Roadmap document, which sums up the key issues.

"Currently, multilayer flexible packaging is portrayed as the example of a linear economy solution: in the Netherlands it is either send to a waste-to-energy plant or it is recycled into products which don't require a mono-material. Society addresses stakeholders like brands and retail to move multilayer packaging towards more circular solutions: all packaging should be recycled and, as a next step, new packaging should be produced from materials with recycled content.

There are multiple guidelines for circular design of recyclable flexible packaging available, such as the guidelines from CEFLEX and RecyClass. Other guidelines are in progress, such as the Ellen MacArthur Foundation barrier project. Those examples are based on current best practice technologies. However, when brands design their packaging according to these guidelines, it does not automatically mean that their packaging will get recycled after usage. There is a gap between these best practice technologies and everyday reality in the process of collection, sorting, and recycling of flexible packaging in the various European countries.

Packaging specialists and decision makers in the packaging value chain need guidance to realise circular flexible packaging in three to five years from now. This document, the Roadmap Multilayer Flexible Packaging, describes the available technical routes towards recyclability of flexible packaging. It addresses the question: Which options are available to increase the recyclability of packaging using (metallised) multilayer flexible materials and move towards circularity by 2025?

This Roadmap describes the gap between the optimal situation as described in the CEFLEX Design for a Circular Economy guidelines (further referred to as 'CEFLEX guidelines') and actual practice in the Netherlands aligned as much as possible with developments in other major European markets like Germany. It points out the challenges and provides guidelines for an integrated roadmap with the steps needed to be taken in the flexible packaging value chain. To realise this ambition, the following is needed:

1. All (multilayer) packaging put on the market by brands and retail is designed according to the CEFLEX guidelines.
2. The recycling infrastructure ensures packaging (designed in accordance with these guidelines) is actually effective and efficient recycled in both the Netherlands and Europe.
3. The development of packaging design and infrastructure both cannot be realised at once. It is a step-by-step plan. Therefore, it is important that stakeholders such as brands, retail, and recyclers coordinate their efforts.

In the conclusions, KIDV mentions the lack of one clear policy for all EU-countries as one of several challenges. CIMPA can and should play an important role to realize this."

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CurvCode sorting technology
CurvCode technology makes it possible to sort different types of packaging on material, colour, type of layer and food or non-food.
In The Netherlands, a Coalition 2.0 Food2Food has recently been formed. All stakeholders (brands, producers, recyclers) are represented. For an industrial test planned in March/April 2022, Filigrade will also test different types of packaging and materials with CurvCode (digital watermark) sorting technology, including flexible plastic packaging.

Legislative developments to achieve a circular economy for plastics

A circular economy of plastics will help decouple economic growth from resource use, saving CO2 emissions and thus, contributing to achieve climate neutrality by 2050. As part of the European Green Deal and the new EU Circular Economy Action Plan, new and revised legislative proposals are being developed to achieve a modern, resource-efficient, clean, and competitive economy in Europe.

With the same purpose of achieving a circular economy, European countries such as Spain, France, Finland, and the Netherlands have also developed strategies and measures on waste prevention, packaging waste management and plastic circularity through the increased use of recycled materials.

Moreover, EU Member states have incorporated EU directives (such as the PPWD) into their national law in order to make their objectives, requirements and deadlines directly applicable. However, as shown above in the legislative review, the transposition of EU rules has been accompanied by different national measures such as the tax on virgin plastic, labelling requirements, recyclable packaging definition, etc. Such discrepancies lead to legal uncertainty for businesses, hampering investment in innovative solutions and business models for the circularity of plastics.

Thus, harmonisation of EU rules is needed to preserve a smooth functioning of the internal market as well as high level of circularity of packaging and plastic products placed across the EU. New EU harmonised packaging rules are expected to be published shortly by the European Commission. This will include sustainability requirements, criteria for the eco-modulation of fees under the extended producer responsibility schemes, labelling requirements, recyclability criteria, etc.

These upcoming legislative developments at EU and national level in Spain, France, Finland and the Netherlands will be analyzed and included in the final report on legislative actions, which will be delivered by M35. It will contain the implications for CIMPA project and recommendations to achieve multilayer films circularity.

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PART B. STANDARDIZATION

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Standardization and regulatory compliance

Introduction about standardization

Standards are voluntary technical documents that set out requirements for a specific item, material, component, system or service, or describe in detail a particular method, procedure or best practice. Standards are developed and defined through a process of sharing knowledge and building consensus among technical experts nominated by interested parties and other stakeholders - including businesses, consumers and environmental groups, among others. These experts are organized in Technical Committees (TCs), which are subdivided in Subcommittees (SCs) or Working Groups (WGs). These TCs are included in the structure of the Standardization Organizations (National, European and International). All the TCs work following the internal regulations of their organization, which are quite similar. When the work is carried in a TC at National or European level with the same scope as an International TC they are called mirror committees.

The standardization bodies operate at different levels:

- National (UNE, AFNOR, BSI, DIN, etc.)
- Regional (CEN, CENELEC, ETSI).
- International (ISO, IEC, ITU).

European Standardization Organizations (ESOs)

Three European Standardization Organizations (ESOs) are recognized by the European institutions as having the necessary ability and expertise to develop European Standards – identified by the code EN. These are:

• CEN – European Committee for Standardization

• CENELEC – European Committee for Electrotechnical Standardization

• ETSI – European Telecommunications Standards Institute

The members of CEN and CENELEC are the National Standardization Bodies and Committees in 33 European countries. Through Technical Committees and other groups of interested stakeholders, the ESOs facilitate the development of European Standards and other consensus-based publications.

For the countries involved in CIMPA project, the national standardization bodies are:

- Spain: UNE - Asociación Española de Normalización
- France: AFNOR, Association française de Normalisation
- The Netherlands: NEN -Royal Netherlands Standardization Institute
- Belgium: NBN -Bureau voor Normalisatie/Bureau de Normalisation
- Finland: SFS - Finnish Standards Association

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Types of documents

There are different kinds of documents used for standardization, being the standard the most widespread and important one. It can be defined as a *"document, established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context"*

Apart from standards, there are also other documents such as Technical Specifications (TS), Technical Reports (TR) and Workshop Agreements (CWA).

Depending on the organization under these documents are drafted and developed, they have a different code. For example, ISO or IEC is used for international standards and EN for European Standards.

In the table below, the characteristics of different standardization documents are presented.

Type	International code	European code	National code	Main characteristics
Standard	ISO IEC	EN	UNE, NF, BS, DIN, etc. When adopting: UNE-EN, NF-EN, UNE-ISO, NF-ISO, etc.	-Elaboration: 3 years •2 steps of member approval •European: compulsory national adoption •Revision: every 5 years
Technical Specification	ISO/TS IEC/TS	CEN/TS CLC/TS	When adopting: UNE-CEN/TS, NF-CEN/TS, UNE-ISO/TS, NF-ISO/TS, etc.	•Elaboration: 21 months •1 step of member approval or internal approval in TC •European: optional national adoption •Revision: at 3 years (upgrading to EN or deletion)
Technical Report	ISO/TR IEC/TR	CEN/TR CLC/TR	When adopting: UNE-CEN/TR, NF-CEN/TR, UNE-ISO/TR, NF-ISO/TR, etc.	•Elaboration: free timeframe •Internal approval in TC •European: optional national adoption •No revision required
Workshop Agreement	IWA	CWA	Variable	• Elaboration: free timeframe (usually few months) • Internal approval in the Workshop

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				• European: optional national adoption • Revision: at 3 years (upgrading to EN or deletion)

Table 2. Characteristics of different standardization documents

Importance of considering standardization within CIMPA

Standardization contributes to the sustainability of the CIMPA project and therefore a specific task is dedicated to standardization activities in WP7. To contribute to new standards development in the specific topics of the project, CIMPA partners have identified the most relevant existing standards regarding the design, manufacture, production and recycling of multilayer films. This is a key step to analyse the needs for update or development of new standards.

CIMPA aims at contributing to new standards developments in specific topics. The development of fast-track standards like CEN-CENELEC Workshop Agreements (CWA) is one of the most suitable options in the frame of a H2020 project, as they can be developed in some months, as showed in the table before. In addition, other options such as technical specifications (TS), contributions to current developments or proposals for modification of existing standards can be considered.

In addition, some of the CIMPA partners are involved in technical standardization committees:

Partner	Engagement	Role	Relevant activities
IPC	BNPP (integrated to IPC) that is a sectorial normalisation office part of the French normalisation system for the domain of plastics.	Member	BNPP operates under mandate from AFNOR (French Association for Standardization). Participation in ISO/TC 61 (Plastics and composites materials
AIMPLAS	UNE/CTN 53 / SC 4 (Packaging)	Member	Spanish standards about packaging in CEN/TC 194 (Utensils in contact with food), CEN/TC 261/SC 5/WG 25 (Rigid plastic packaging)
	UNE/CTN 323 (Circular Economy)	Member	Standardization in the field of Circular Economy for the development of

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			guidelines, framework, guides, support tools
EuRIC	CEN/TC 249 Plastics	Liaison Organisation	Relevant inputs to the work of CEN/TC 249 Plastics

Table 3. Participation of CIMPA partners in Standardization bodies.

Morevoer, European Standards are also developed to support the European Strategy for Plastics in a Circular Economy. On 2 August 2022, the European Commission notified to CEN and CENELEC the new Standardization Request on plastics recycling and recycled plastics, in support of the European Strategy for Plastics in a Circular Economy. The Standardization Request is the result of two years of cooperation of the CEN and CENELEC Technical Boards with the European Commission and the relevant stakeholders.

Methodology

This document presents the standardization activity found relevant for the CIMPA project. As a starting point, in order to structure the research, a list of key concepts has been prepared for the identification of standardization areas:

Keywords
1. Plastic recycling 2. Plastic packaging 3. Multilayer packaging 4. Recyclability 5. Environmental footprint 6. Life cycle analysis 7. Environmental impact 8. Eco-design 9. Polymer materials 10. Plastic test

Using the aforementioned keywords, significant number of standards have been identified. Through the standards, the relevant technical bodies (technical committees TC, subcommittees SC and working groups WG) were identified.

The standardization study covers European standards developed by the European Committee for Standardization (CEN) and the European Committe for electrotechnical Standardization (CENELEC). Moreover, the study covers also the International standards developed by the International Organization for Standardization (ISO) and the Spanish Association for Standarization (UNE).

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Technical bodies overview

Topic	Organism	Technical committee or subcommittee	CIMPA partners involved
Plastics	CEN	CEN/TC 249 Plastics	-
		CEN/TC 249/ WG 7 Thermoplastic films for use in agriculture	-
		CEN/TC 249/WG 11 Plastics recycling	IPC, EuRIC, AIMPLAS
		CEN/TC 249/WG 20 Analytical methods for contaminants in recycled plastics	-
		CEN/TC 249/WG 24 Coordination of environmental issues	AIMPLAS
	ISO	ISO/TC 61 Plastics	-
		ISO/TC 61/SC 6 Ageing, chemical and environmental resistance	-
		ISO/TC 61/SC 9 Thermoplastic materials	-
		ISO/TC 61/SC 11 Products	-
		ISO/TC 61/SC 11/WG 3 Plastics films and sheeting	-
		ISO/TC 61/SC 14 Environmental aspects	AIMPLAS
		ISO/TC 61/SC 14/WG 5 Mechanical and chemical recycling	AIMPLAS
	UNE	UNE/CTN 53 Plastics and Rubber	AIMPLAS
		UNE/CTN 53 / SC 4: Packaging	AIMPLAS
		UNE/CTN 53 / SC 6: Raw material specifications and test methods	AIMPLAS
		UNE/CTN 53 / SC 8: Plastics recycling,	AIMPLAS
Packaging	CEN	CEN/TC 261 Packaging	IPC, EuRIC
		CEN/TC 261/SC 4 Packaging and the environment	-
		CEN/TC 261/SC 4/WG 1 Terminology, symbols and criteria for life cycle assessment of packaging	-
		CEN/TC 261/SC 4/WG 3 Material recovery	-
		CEN/TC 261/SC 4/WG 4 Energy recovery	-
		CEN/TC 261/SC 4/WG 6 Prevention	-
		CEN/TC 261/SC 4/WG 7 Reuse	-
	ISO	ISO/TC 122 Packaging	-
		ISO/TC 122/SC 4 Packaging and the environment	-
Environment	ISO	ISO/TC 207 Environmental management	-
		ISO/TC 207/SC Environmental management systems	-
		ISO/TC 207/SC 3 Environmental labelling	-
		ISO/TC 207/SC 4 Environmental performance evaluation	-
		ISO/TC 207/SC 5 Life cycle assessment	-
	UNE	UNE/CTN 323: Economía circular	AIMPLAS
Food applications	CEN	CEN/TC 194 Utensils in contact with food	-
		CEN/TC 194/ WG 8 Overall migration	AIMPLAS

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Standards about plastics

- Very relevant: manage closely - follow and provide recommendations for update
- Relevant: follow and keep informed
- Not relevant: no interest / no action needed

Issuing body	Code	Title	Impact	Comments
CEN/TC 249/WG 11	EN 15343:2007	Plastics - Recycled Plastics - Plastics recycling traceability and assessment of conformity and recycled content	*Very relevant*	Very important to calculate the % of recycled material included in the new film. Follow-up and future updates, especially for physical recycling
	EN 15347:2007	Plastics – Recycled plastics – Characterisation of plastics wastes.	*Relevant*	Defining the mechanical recyclable and physical recyclable streams and input composition
	EN 15344:2021	Plastics – Recycled Plastics – Characterisation of polyethylene (PE) recyclates	*Very relevant*	This determines quality and re-usability, which is the core of CIMPA. However, it is now restricted to mechanical recycling. What about physical recycling?
	EN 15345:2007	Plastics – Recycled Plastics – Characterisation of polypropylene (PP) recyclates	*Very relevant*	This determines quality and re-usability, which is the core of CIMPA
	EN 15348:2014	Plastics - Recycled plastics - Characterisation of poly(ethylene terephthalate) (PET) recyclates	*Not relevant*	Focus of CIMPA is PO
	CEN/TS 16010:2013	Plastics - Recycled plastics - Sampling procedures for testing plastics waste and recyclates	*Relevant*	The waste is and the recyclate might be inhomogeneous so the method might determine the analysis result
	CEN/TS 16011:2013	Plastics - Recycled plastics - Sample preparation	*Relevant*	The recycled plastic could be inhomogeneous so the method might determine the analysis result

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ISO/TC 61/SC 14 Environmental aspects	ISO 15270:2008	Plastics — Guidelines for the recovery and recycling of plastics waste	*Very relevant*	CIMPA requirements and terminology connection
ISO /TC 308 Chain of custody	ISO 22095:2020	Chain of custody — General terminology and models	*Very relevant*	Calculation of the recycled content through the principles of segregation/controlled blending/ mass balance chain custody models

Standards about packaging

Issuing body	Code	Title	Impact	Comments
CEN/TC 261	EN 13427:2004	Packaging - Requirements for the use of European Standards in the field of packaging and packaging waste	*Very relevant*	Mandatory for suppliers of packaging
	EN 13428:2004	Packaging - Requirements specific to manufacturing and composition - Prevention by source reduction	*Not relevant*	CIMPA will focus on issues such as composition type and sorting, not source reduction.
	EN 13429:2004	Packaging – Reuse	*Not relevant*	CIMPA will focus on recyclability of complex structures, not the reuse.
	EN 13430:2004	Packaging - Requirements for packaging recoverable by material recycling	*Very relevant*	This determines the quality needed in a final package to be recyclable, which is one of the cores of CIMPA
	EN 13431:2004	Packaging - Requirements for packaging recoverable in the form of energy recovery, including specification of minimum inferior calorific value	*Not relevant*	CIMPA will focus on recyclability, not energy recovery.
CEN/TC 261/WG 1	EN 13193:2000	Packaging - Packaging and the environment - Terminology	*Very relevant*	Packaging is one of the main cores of the project

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	CR 12340:1996	Packaging - Recommendations for conducting life-cycle inventory analysis of packaging systems	*Very relevant*	Packaging is one of the main cores of the project and LCA will be performed
	CEN/TR 13910:2010	Packaging - Report on criteria and methodologies for life cycle analysis of packaging	*Very relevant*	Packaging is one of the main cores of the project and LCA will be performed
CEN/TC 261/WG 3	EN 13437:2003	Packaging and material recycling - Criteria for recycling methods - Description of recycling processes and flow chart	*Very relevant*	Standard as well as novel recycling methods will be performed in the project.
	EN 13440:2003	Packaging - Rate of recycling - Definition and method of calculation	*Relevant*	Each case study could be verified and benchmarked for validation of CIMPA technologies
	CEN/TR 13688:2008	Packaging - Material recycling - Report on requirements for substances and materials to prevent a sustained impediment to recycling	*Very relevant*	Specialized sorting and decontamination will be performed to obtain high quality recyclates.

Standards about agriculture

Issuing body	Code	Title	Impact	Comments
CEN/TC 249/WG 7	EN 13207:2018	Plastics - Thermoplastic silage films and tubes for use in agriculture	*Relevant*	CIMPA will develop formulations in compliance with European standards for agriculture films
	EN 13206:2017 +A1:2020	Plastics - Thermoplastic covering films for use in agriculture and horticulture	*Relevant*	Covering films for agriculture are studied in CIMPA
	EN 14932:2018	Plastics - Thermoplastic stretch films for wrapping silage bales	*Relevant*	Covering films for agriculture are studied in CIMPA

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	EN 13655:2018	Plastics - Thermoplastic mulch films recoverable after use, for use in agriculture and horticulture	*Relevant*	Much films for agriculture are relevant to the CIMPA project
	EN 17033:2018	Plastics - Biodegradable mulch films for use in agriculture and horticulture - Requirements and test methods	*Not relevant*	Biodegradable materials won't be developed within the project.
	CEN/TR 17219:2018	Plastics - Biodegradable thermoplastic mulch films for use in agriculture and horticulture - Guide for the quantification of alteration of films	*Not relevant*	Biodegradable materials won't be developed within the project.
	EN 17098-2:2018	Plastics - Barrier films for agricultural and horticultural soil disinfection by fumigation - Part 2: Method for film permeability determination using a static technique	*Not relevant*	n/a

Conclusions and recommendations

The present report concerning the standardization landscape has identified the standardization technical bodies and the main relevant standards for the CIMPA project, according to three main topics of interest: plastics, packaging, and agriculture. These standards have been evaluated according to their impact in CIMPA project (very relevant / relevant / not relevant) and how CIMPA partners can contribute to their development or improvement. Moreover, CIMPA partners, and especially those involved in technical standardization committees, will follow up closely the work on the Standardization Request by the European Commission, regarding plastics recycling and recycled plastics in support of the European Strategy for Plastics in a Circular Economy.

This report will be regularly updated, and a final version will be delivered by M35, including recommendations to update or revise European standardization deliverables as well as to create new deliverables to achieve the circularity of multilayer films.

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