
European assessment of compostable packaging

Report for TIPA Corp Ltd.

European assessment of compostable packaging for TIPA
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Executive summary

TIPA commissioned Ricardo to conduct a review of the current opportunities and barriers for the use of compostable packaging across the EU through a range of desk-based research and structured interviews. The research conducted a high-level review of existing policies and strategies and a targeted review of the Extended Producer Responsibility (EPR) legislation to understand how compostables are treated in different countries. A range of stakeholders across the compostables value chain from policy makers to organic treatment facility operators were interviewed to gain insight into the existing and possible future market for compostables.

It is well understood that flexible packaging has many positive attributes in terms of its functionality - it is light weight and it keeps products fresh, crisp, and protected thus reducing spoilage. However, the perceived value of flexible packaging has long been diminished by the fact that the collection and treatment infrastructure is not available. The current rate of recycling household flexible plastics across the EU is only 14%¹. In the UK WRAP have quoted a figure as low as 4% of household plastic film is recycled². The end-of-life issues are compounded by the fact that, in many instances, flexible packaging is contaminated by food and organic waste making it costly, impractical or even not authorised by EU regulations³ to recycle. At the same time, plastic films are contaminating food waste collections and treatment. Plastic has a role to play in packaging products, but it must be able to be recycled and kept from leaking into the environment. To move towards a sustainable future, we need a circular economy where materials are fit for purpose and can be effectively recycled or re-used or recycled to the biosphere for soil nourishment; this means ensuring packaging materials can be reused, recycled or composted.

At a global level, most countries and major plastic users are in the process of re-thinking conventional plastic packaging. Reducing plastic waste in the environment and improving recycling rates for packaging plastics are objectives of the European Commission and aligned to a number of priority policy areas, namely: Circular Economy Action Plan (CEAP), specific measures on the use of 'single-use plastics' (SUPs), Bioeconomy Strategy and the Fertilising Products Regulations. Reducing conventional plastic waste will also contribute towards the UN Sustainable Development Goal on Sustainable Consumption and Production (SDG 12), specifically target 12.5 on substantially reducing waste generation through prevention, reduction, recycling and reuse. It also contributes to achieving SDG 14, Life on Water, through target 14.1 on preventing and reducing marine pollution of all kinds.

The strong policies detailed above all recognise the usefulness of compostable packaging materials for their role in assisting the return to the biosphere of biodegradable wastes. This report provides an overview of these policies and highlights how compostable packaging materials can play a role in achieving some of the most important and challenging EU policies and targets. Overall, the review found that whilst the overarching policies are in place, they are not uniformly implemented in member state countries and therefore, the uptake of compostable packaging materials has so far been limited and piecemeal.

Following a review of different EPR schemes across Europe, it was found that the EPR systems provide a mechanism to support the uptake of compostable packaging. However, existing EPR schemes could do much more to support the achievement of the EUs goals and ambitions around plastic waste and increased recycling. However, our study found that there are only a few examples where compostable packaging materials have been incorporated into the fee structure of EPR packaging compliance schemes. There are two main features of an EPR scheme which have been successfully implemented are to support the uptake of compostables are:

¹ Plastics Recyclers (2020) What is next for increasing flexible packaging recycling [online] Available at: <https://www.plasticsrecyclers.eu/post/what-is-next-for-increasing-flexible-packaging-recycling> [Accessed 16 October 2020]

² Letsrecycle.com (2020) WRAP defends record on flexible plastic recycling [Online] Available at:

<https://www.letsrecycle.com/news/latest-news/wrap-defends-record-flexible-plastic-recycling/>

³ <https://www.efsa.europa.eu/en/topics/topic/plastics-and-plastic-recycling> - https://ec.europa.eu/food/sites/food/files/safety/docs/cs_fcm_legis_recycling-processes_applications.pdf

- the direct 'flow-through' of money to organisations which process the material at end-of-life
- a modulated fee for materials which have a better eco-design or recyclability

Using these two examples there is an opportunity for more to be done to support alternatives to conventional plastic in EPR systems for packaging across Europe. There is clear evidence that where a country has a supportive EPR system in place there is an increased uptake of compostables and vice versa, an increased uptake of compostable packaging supports greater contributions into EPR systems (e.g. Italy).

The stakeholder engagement exercise provided an opportunity to seek alternative views on the use of compostables and how compostables can, and do, support achievement of the EUs circular economy policies. The following highlights the key insights from the stakeholder interviews:

- 82% of respondents felt that the use of compostable materials would help to reduce plastic contamination in organic waste streams.
- There is a real opportunity to increase the adoption of all appropriate applications for compostable materials where mechanical recycling is not possible. This was found to be especially important when the recycling is not possible due to contamination with food waste. If compostable packaging is used then the packaging and food waste can be collected and treated together.
- 100% of respondents agreed that the most likely/easiest application for compostable plastic material would be for bags - carrier bags or liners for food waste collection vessels (caddy liners). This is especially relevant as food waste collections come into force across the EU post 2023.
- 72% of respondents stated that compostable packaging would help increase the amount of food waste captured and decrease plastic contamination.
- Stakeholders across all countries agreed that there is a need for clear mandatory labelling of compostable materials (which are EN13432 certified) to ensure that citizens can easily distinguish between compostable and non-compostable materials.

Overall, stakeholders acknowledged the benefits of integrating compostable packaging materials into the current waste management systems. However, many expressed that misinformation about compostable materials has been one of the main barriers limiting the uptake of compostable packaging in Europe.

Across the different policies which have been reviewed in this report, there is evidence of a gap between EU and national (member state) level ambitions on plastic collection and recycling, bio-waste collection targets, and the standards to prevent soil contamination from plastics. Through discussions with stakeholders and review of policies, it is clear that compostables have a role to play in bridging this gap.

Compostable packaging can provide the role of the golden thread across key EU policy commitments detailed within this study to help:

- Increase biowaste recycling
- Increase plastic recycling and reducing pollution
- Increase quality of biofertilizer

The research has highlighted the clear positive impact that compostable packaging can make in supporting the achievement of the EUs environmental targets. Indeed, much has been done in recognition of the value compostable packaging can play evidenced through the EUs Green Deal and Circular Economy Action Plan. Although there are some examples of supporting policies that facilitate the adoption of compostable packaging it is also evident that these are not widespread. Although there are strong examples of the benefits and value compostable packaging can provide in certain countries, like Italy, other countries are reluctant to support the introduction of compostable packaging. This study highlights the differing approaches to compostables across the EU. The study finds that with political will and leadership the benefits of compostables could be realised.

Following our review of the evidence from across Europe, our key recommendations for increasing the uptake of compostable packaging are:

Main policy recommendations required to support compostable packaging

1. Mandate the use of easily implemented compostables which have proven to be successful such as food waste caddy liners, fresh produce bags, tea bags, coffee pods, sticky labels on fruit and vegetables, sandwich boxes and prepared food trays. Likewise mandate that traditional plastics shall not be used in these same applications to avoid cross contamination.
2. Adopt consistent policies to support the use of compostables and penalise other packaging that is non-recyclable for example through higher compliance fees through EPR schemes.
3. Implement stronger standards for compost with a near zero tolerance for plastic contamination in both inputs and outputs.
4. Develop clear and consistent labelling guidance to educate consumers and producers.
5. Develop clear and consistent terminology to avoid unhelpful and potentially harmful terms that confuse and disrupt the market.

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Definitions

Plastic⁴ - means a material consisting of a polymer as defined in point 5 of Article 3 of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which can function as a main structural component of final products, with the exception of natural polymers that have not been chemically modified;

Microplastics⁵ - Microplastics are very small (typically smaller than 5mm) solid particles composed of mixtures of polymers (the primary components of plastics) and functional additives. They may also contain residual impurities from when they were manufactured. They can be unintentionally formed through the wear and tear of larger pieces of plastic, including synthetic textiles

Bio-based Plastic⁶ – Bio-based plastics are those with building blocks that are derived partly or wholly from plant-based feedstocks. These are often also known as bioplastics.

Biodegradable Plastic⁷ - means a plastic capable of undergoing physical, biological decomposition, such that it ultimately decomposes into carbon dioxide (CO₂), biomass and water, and is, in accordance with European standards for packaging, recoverable through composting and anaerobic digestion

Compostable Plastic⁸ - Compostable materials are materials that break down at composting conditions. Industrial composting conditions require natural fermentation temperatures of (55-60°C) combined with a high relative humidity and the presence of oxygen, Plastic that biodegrades in industrial composting and is compliant with the harmonised European standard, EN 13432 or EN 14995:

- EN 13432:2000 Packaging⁹:
 - This European Standard specifies requirements and procedures to determine the compostability and anaerobic treatability of packaging and packaging materials by addressing four characteristics: 1) biodegradability; 2) disintegration during biological treatment; 3) effect on the biological treatment process; 4) effect on the quality of the resulting compost. In case of a packaging formed by different components, some of which are compostable and some other not, the packaging itself cannot be classified compostable. The EN 13432 applies when compostable plastics are used for packaging.
- EN 14995:2006 Plastics¹⁰:
 - This European Standard specifies requirements and procedures to determine the compostability or anaerobic treatability of plastic materials by addressing four characteristics: I) biodegradability, II) disintegration during biological treatment, III) effect on the biological treatment process and IV) effect on the quality of the resulting compost. EN 14995 applies to plastics when used in non-packaging applications.

⁴ Directive 2019/904 on the reduction of the impact of certain plastic products on the environment (2019) Official Journal L155, p. 8

⁵ European Chemicals Agency (ECHA). 2020. Microplastics [online] available at <https://echa.europa.eu/hot-topics/microplastics> [accessed 18 August 2020]

⁶ WRAP (2020) Considerations for compostable plastic packaging.

⁷ Directive 2019/904 on the reduction of the impact of certain plastic products on the environment (2019) Official Journal L155, p. 9

⁸ WRAP (2018) Understanding plastic packaging and the language we use to describe it.

⁹ European Committee for Standardization (CEN). 2020. CEN/TC 261 – Packaging [online] available at https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:13285,6242&cs=16419E079DF816FA31BA049B6F9169CF8 [accessed 18 August 2020]

¹⁰ European Committee for Standardization (CEN). 2020. CEN/TC 249 – Plastics [online] available at https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT,FSP_ORG_ID:21783,6230&cs=12459CCC96FCD875A348D49110FF2D1BF

Industrial Composting¹¹ - A blanket term which includes all forms of centralised aerobic organic waste treatment that is characterised by high levels of control and results in various forms of soil improver and/or biogas

Home Composting¹² - Home compliant material biodegrades in home compost in under 12 months. Longer timescales are permitted under other specifications where the producer complies with the ISO 14021 requirements for self-assessment and clear labelling. The main private certification body; TÜV Austria runs the well-respected OK Compost Home certification scheme¹³.

Bio-waste¹⁴ — means biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants. This report will focus on bio-waste generated from households.

Recycling¹⁵ - means any recovery operation by which waste materials are effectively reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;

Separate collection¹⁶ - means the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment;

Extended producer responsibility scheme¹⁷ - means a set of measures taken by Member States to ensure that producers of products bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product's life cycle.

WRAP have acknowledged that there is confusion regarding the language used for plastic packaging materials, however, “understanding the terms that we use to describe plastics is essential to ensure that the right materials are used in the right applications, and so that all plastics are recycled in the right way and pollution of the environment is prevented.”

Source: WRAP (2018) Understanding plastic packaging and the language we use to describe it.

¹¹ WRAP (2020) Considerations for compostable plastic packaging.

¹² WRAP (2020) Considerations for compostable plastic packaging.

¹³ Bio-based and Biodegradable Industries Association (BBIA). 2020. The truth about bioplastics [online] available at <https://bbia.org.uk/faq/>

¹⁴ Directive 2008/98/EC on waste and repealing certain Directives (2008) Official Journal L312, p.9

¹⁵ Directive 2008/98/EC on waste and repealing certain Directives (2008) Official Journal L312, p.10

¹⁶ Directive 2008/98/EC on waste and repealing certain Directives (2008) Official Journal L312, p.10

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008L0098-20180705&from=EN>

1 Introduction

This is the final report “European assessment of compostable packaging” for TIPA.

1.1 Introduction

Since nearly a quarter¹⁸ of all flexible plastic packaging material is used for food packaging, there is a strong argument that finding an alternative material may help to resolve the low recycling rate of household consumer packaging currently taking place across Europe.

Whilst reduction and prevention are the highest priorities under the Waste Hierarchy, some packaging is unavoidable. In order to reduce avoidable plastic packaging waste and increase the possibility of recycling the packaging, we can foresee some applications where substitution of plastic packaging by compostables is possible, especially where compostables can also play a role in more efficient management of biowaste. We should underline that the organic recycling of packaging is considered a legal equivalent under the Packaging and Packaging Waste Directive to mechanical recycling.

However, uptake of compostable packaging is poor, this is attributed to the limited policy frameworks in place across the EU and around the world to support the development of this market. This contrasts starkly with the comprehensive regulatory support in place for other technologies or solutions that support EU objectives like biofuels or renewable energy. Whilst there has recently been significant investment across the EU to treat organic waste, the collection infrastructure for organic waste is still very limited in comparison to waste disposal solutions.

1.2 Aims and objectives

The aim of this project is to research European use and processing of compostable packaging, documenting examples of the legislative and policy frameworks that currently exist. The research also engaged with key stakeholders to seek their perspectives on the further adoption of compostable packaging. The aim was to understand the benefits compostables can provide and what the opportunities are for a greater uptake of compostables. The study was also to understand what the current barriers are that restricts the further use of compostables and where these limits are justified in order to avoid inappropriate use of compostables.

The objectives for each section of the study are outlined below:

Policy review – to understand the policy landscape across Europe which impact on the uptake and use of compostable packaging. This will also identify any gaps in policy which present an opportunity to further increase the uptake of compostable packaging materials. In order to inform our research, desk-based studies and semi-structured stakeholder interviews were conducted.

1. **Extended Producer Responsibility scheme review** – to understand what type of EPR, regulation, infrastructure and business models will help to leverage the opportunities provided by compostable packaging.
2. **Case study identification** – to highlight best practice examples. These examples are reviewed to provide information for decision-makers on:
 - a. current regulations which enable the growth of the compostable packaging market;
 - b. EPR systems which require producers to pay material fees for compostable packaging materials and distribute the fees to those organisations responsible for dealing with the waste (e.g. organic recycles);
 - c. Infrastructure and technologies used in the disposal of compostable packaging materials.
3. **Summary of stakeholder interviews** - to seek their perspectives on the further adoption of compostable packaging

¹⁸ Plastics Recyclers Europe (2020) Flexible films market in Europe – State of play

2 Policy Review

This section of the report reviews the policy frameworks in place within the EU. Currently, there is a gap between EU and national level ambitions on plastic collection and recycling, bio-waste collection targets, and the standards to prevent soil contamination from plastics. Compostable packaging can play a role in bridging this gap when driven by the right policy mechanisms.

As the EU aims to be climate neutral in 2050 according to the Green Deal for Europe¹⁹, there have been emerging policies which support innovative industries, biodiversity and sustainable agriculture. As part of this report, a number of European directives and policies have been reviewed to understand how compostables can play a role in achieving the EU objectives for sustainable consumption and production. There are gaps between plastic recycling targets, requirement for bio-waste collection and the challenges of compost quality and contamination of soils. Some of these gaps could be filled by an increased uptake of compostable packaging materials.

2.1 EU Circular Economy Action Plan



The European Commission adopted the new Circular Economy Action Plan²⁰ (CEAP) which was proposed as part of the European Green Deal. CEAP aims to decouple economic growth from resource use, presenting a set of initiatives to establish a sustainable framework for products, services and business models. CEAP aims to reduce waste being generated to a minimum by encouraging the use of the waste hierarchy – reduce, re-use, recycle, recover and disposal. The introduction of the new CEAP encourages society and business to move away from the linear model of “take-make-consume-throw away” towards a more wholistic circular model where “waste” is treated as a valuable resource to be re-introduced to production processes as much as possible.

Notably, CEAP lays out plans to ensure that all packaging on the EU market is reusable or recyclable by 2030, by driving design for re-use and recyclability, and reducing the complexity of materials and polymers used. Building on the EU Plastics Strategy²¹, the Commission will propose

mandatory requirements for recycled content, restrict contamination from microplastics and develop a policy framework on the use of biodegradable plastics.

In relation to waste the key targets and obligations which form the Circular Economy Action Plan are outlined in Table 1.

| Waste Reduction Targets | Separate Collection Obligations |
|---|---------------------------------|
| 65% of municipal waste to be recycled by 2035 | Bio-waste by the end of 2023 |
| 70% of packaging waste to be recycled by 2030 | |

Table 1 - Circular Economy Action Plan Targets & Obligations

Bio-waste is the largest single component of municipal waste in the EU with about 60 % of bio-waste being food waste²². Currently, the amount of food waste captured within the EU27+ (including UK and Norway) is 9,520,091 tonnes per year, which is estimated to be just 16% of the theoretical potential,

¹⁹ European Commission. 2020. A European Green Deal. [online] Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en#policy-areas [Accessed 13/08/2020]

²⁰ European Commission 2020. EU Circular Economy Action Plan [online] available at: <https://ec.europa.eu/environment/circular-economy/> [Accessed 13/08/2020]

²¹ European Commission, 2018. A European Strategy for Plastics in a Circular Economy [online] Available at: <https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy.pdf> [Accessed 16/10/20]

²² EEA (2020). Bio-waste in Europe — turning challenges into opportunities

approximately 59,938,718 tonnes²³. This provides a large-scale opportunity for investment into the collection and treatment infrastructure needed for biowaste and for the development of compostable packaging materials to be used to help capture biowaste across Europe and ensure that the EU's target to recycle 65% of municipal waste by 2035 is achieved.

Relevance:

The requirement to provide separate collections of bio-waste provides a mechanism and infrastructure to capture and process compostable material. The requirement that all plastic packaging placed on the market is either reusable or recyclable creates an opportunity for compostable packaging given that it can be readily recycled/composted. Moreover, in order to avoid the contamination of biowaste and thence composts/digestates with plastic fragments, EU policy should mandate the obligation the use compostable materials for collection, as per the Italian model where two thirds of all EU food waste is currently collected.

2.2 EU Bioeconomy Strategy

The bioeconomy covers all sectors and systems that rely on biological resources, their functions and principles. The EU Bioeconomy Strategy²⁴ aims to reduce the dependence on natural resources and to promote sustainable production of products and energy through a three-tier approach to:

- Strengthen and scale-up the bio-based sector – including the promotion and development of standards, labels and market uptake of bio-based products (e.g. the EU Ecolabel)
- Rapidly spread bio-economies across the whole of Europe towards the 2030 agenda, the Sustainable Development Goals (SDGs), and the Paris Agreement
- Understand the ecological limitations of the bioeconomy – including an EU-wide monitoring system to track progress towards a sustainable and circular bioeconomy

The EU have stated that they will develop a Bioeconomy Action Plan to support the growing bio-based sector and to ensure that it considers all environmental impacts and benefits. In order to meet the mandatory requirement within the new EU Waste Framework Directive that “by 31 December 2023 and subject to Article 10(2) and (3), bio-waste is either separated and recycled at source, or is collected separately and is not mixed with other types of waste”²⁵ the Bioeconomy Action Plan will need to promote the increase of bio-waste collections. According to Zero Waste Europe data²⁶ garden waste collections from households are well established across the EU, however, food waste collections are significantly lacking.



Relevance:

A strong bioeconomy sector will help create the infrastructure to collect, manage and treat biowaste using compostable materials as a vehicle to ensure clean collections, and therefore remove an existing barrier to the widespread deployment of compostable materials. The carbon cycle of biowaste can be closed – from soil back to soil using compostable materials, made partly or largely from renewable carbon – developing a circular bioeconomy.

²³ Zero Waste Europe (2020) Bio-waste generation in the EU: Current capture levels and future potential

²⁴ European Commission. 2019. Updated Bioeconomy Strategy 2018 [online] available at: https://ec.europa.eu/knowledge4policy/publication/updated-bioeconomy-strategy-2018_en

²⁵ European Commission (2018) A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment

²⁶ Zero Waste Europe (2020) Bio-waste generation in the EU: Current capture levels and future potential

2.3 EU Single-use Plastic Directive

| | | | |
|--|----|--|---------|
| 12.6.2019 | EN | Official Journal of the European Union | L 155/1 |
| DIRECTIVE (EU) 2019/904 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL | | | |
| of 5 June 2019 | | | |
| on the reduction of the impact of certain plastic products on the environment | | | |

The Single-use Plastics Directive (SUP)²⁷ aims to tackle the ten most littered single-use plastic products (Table 2²⁸), as well as lost and abandoned fishing gear which contributes to marine debris. Under the SUP Directive there will be bans on certain items (those which have designed-in single use properties which reduce re-use options), increased producer obligations, awareness raising measures, labelling and, consumption and collection targets.

| Top 10 items of marine litter in the European region | |
|--|-----------------------------|
| Drink bottles | Cups & Lids |
| Food Containers | Sanitary applicators |
| Cigarette Butts | Cutlery, straws & Stirrers |
| Bags | Cotton buds |
| Crisp packets/ Sweet wrappers | Balloons and balloon sticks |

Table 2 - Top 10 items of marine litter in the European region

Several industry and NGO led voluntary initiatives have been developed following the focus on plastic materials and waste at both the policy level and within consumer society. One of the most prominent of these is the Global Commitment of the by the Ellen MacArthur Foundation ([Appendix 4](#)) which incorporates targets to ensure that all plastic packaging is reusable, recyclable, or compostable.

It is important to highlight that the SUP Directive also covers single-use plastic items made of bio-based as well as biodegradable and compostable single-use plastics²⁹. Whilst European Bioplastics³⁰ raised the importance of compostable plastic alternatives to certain single-use products (e.g. bags and cutlery) during recent consultations on the development of guidelines for the SUP Directive, compostable materials are not currently exempt from the SUP Directive, and therefore this could limit the uptake of compostable materials as an alternative to plastics in uses where food waste is relevant, across Europe.

Relevance:

As much of the plastic pollution and littering within marine and terrestrial environments is due to flexible packaging, compostable packaging alternatives could provide an effective solution to SUPs.

²⁷ Directive (EU 2019/904) on the reduction of the impact of certain plastic products on the environment (2019). Official Journal L155

²⁸ JRC Technical Report (2017) Top Marine Beach Litter Items in Europe – A review and synthesis based on beach litter data [Online] Available at: https://mcc.jrc.ec.europa.eu/documents/Marine_Litter/MarineLitterTOPitems_final_24.1.2017.pdf

²⁹ Zero Waste Europe (2019) Unfolding the Single-Use Plastics Directive. Policy briefing

³⁰ European Bioplastics. 2020. Guidance on single-use plastics directive: European Commission to stick to its timeline [online] available at: <https://www.european-bioplastics.org/guidance-on-single-use-plastics-directive-european-commission-to-stick-to-its-timeline/>

2.4 EU Fertilising Products Regulation (EU FPR)



According to Zero Waste Europe's report "Bio-waste generation in the EU" almost half of European soil has low organic matter content due to land use changes, modern agricultural practices and climate change³¹. This limits the soil's ability to retain water, nutrients and to store carbon. In line with the EU's circular economy model, the Commission wants to encourage the large-scale production of fertilisers from organic or secondary raw materials, turning waste into nutrients for crops. Collection of bio-waste materials to generate compost could become a stable source of organic matter for the agricultural sector.

Under the EU Fertilising Products Regulation³² (EU FPR), the requirements for fertilisers produced from phosphate minerals and from organic or secondary raw materials in the EU have been harmonised³³. The regulation has set limits for the level of contaminants allowed within fertilisers, such as cadmium. Other contaminants such as glass, metal and plastic have been limited to no more than 3g/kg dry matter of macroscopic impurities above 2 mm in compost and digestate³⁴. It covers a range of product types including fertilisers, soil improvers, and plant bio-stimulants. This has allowed new possibilities for their production and marketing on a large scale. Many of the regulations will begin to apply across Europe from July 2022.

From July 2026, the level of plastic contaminants (above 2mm) allowed in compost and digestate must be no more than 2.5 g/kg dry matter. This level will be reassessed in July 2029. However, whilst these limits have been set down in legislation, they do not take into consideration micro- and nano-plastic particles³⁵.

Those fertilisers produced within the EU which are made from organic or secondary raw materials can apply the "CE mark" if they fulfil certain requirements, such as the specific contaminant levels and consisting only of defined component materials. Those who fulfil the CE marking requirements will be able to benefit from free circulation within the EU's internal market. Producers of fertiliser which do not bear the CE mark, are still able to be placed on their national markets. Similarly, producers of waste-derived composts and digestates within the EU's internal market may choose to supply them as CE marked products or for use on land under waste regulatory controls.

According to the EEA's 'Bio-waste in Europe - turning challenges into opportunities' report, 24 European countries have or are currently developing national standards for compost quality. Out of these, 12 countries have developed compost quality management and assurance schemes, creating access to

³¹ Zero Waste Europe (2020) Bio-waste generation in the EU: Current capture levels and future potential

³² Regulation (EU) 2019/1009 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1059/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (2019). Official Journal L170

³³ Organics Recycling Group. 2019. New EU rules on fertilisers [online] available at: <http://www.organics-recycling.org.uk/page.php?article=3546&name=New%20EU%20rules%20on%20fertilisers>

³⁴ Regulation (EU) 2019/1009 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1059/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (2019). Official Journal L170

³⁵ Stubenrauch, J., and Ekardt, F., (2020) Plastic Pollution in Soils: Governance Approaches to Foster Soil Health and Closed Nutrient Cycles

higher added value markets such as potting compost³⁶. Examples for compost standards at European and national levels have been expanded in [Appendix 3](#).

However, whilst the Fertiliser Directive lays down limits to the contaminant outputs, there are no limits to the inputs of contaminants to organic fertiliser production. This results in the biowaste treatment system having to manage the technical and financial burden of incoming contaminants, above all plastics. There is an opportunity under the next revision of the Fertiliser Directive to create input contaminant levels to reduce the burden placed on biowaste treatment.

Relevance:

Increasing the use of compostable plastics for collection of bio-waste, especially food waste, can help to reduce the amount of plastic contamination found in fertiliser materials and to reduce the levels of hazardous substances from traditional virgin plastics contaminating fertiliser products. Compostable packaging materials will play a vital role in meeting the increasingly strict fertiliser quality regulations.

2.5 EU Waste Framework Directive



The “polluter pays principle” outlined in the Waste Framework Directive envisages that the cost of waste management is paid for by the producer placing the product on to the market. The Directive sets binding targets for reuse, recycling and recovery of waste which each member state needed to achieve via appropriate waste management plans. These plans include Extended Producer Responsibility (EPR) schemes. EPR schemes provide an incentive for producers to consider environmental implications from the design phase to the end-of-life of their products. Most producers across Europe join a Producer Responsibility Organisation (PROs) to help achieve their individual obligations under the legislation. Each member state’s EPR scheme varies slightly to ensure that it is the most appropriate for the national context. A report published by the European Commission in April 2020 concluded that there is no single EPR model which performs best or is the most cost-effective.

Amendments to the Waste Framework Directive in 2018³⁷ require EPR schemes to modulate fees being paid by producers to reflect the true costs of waste collection and treatment at end-of-life. In addition, the amendments require the use of economic instruments to implement the waste hierarchy, to take measures to prevent waste generation and to ensure the separate collection of bio-waste.

The most commonly differentiated plastic packaging materials are PET/HDPE, expanded polystyrene, and plastics bags³⁸. In cases where there is a specific fee for PET/HDPE, the PET/HDPE fee is lower than for other plastics in Belgium, Spain and Slovenia, higher in Cyprus, and currently the same in Lithuania and Romania. These are outlined in more detail in the EPR Review section. This may reflect the sorting and recycling infrastructure available in each country to process each type of plastic. PET is the most commonly recycled plastic packaging material in the EU.

The Circular Economy Action Plan also makes key amendments to the Waste Framework Directive which state that by 2023, “bio-waste shall either be separated and recycled at source or collected

³⁶ European Environment Agency (2020) Bio-waste in Europe — turning challenges into opportunities

³⁷ Directive (EU) 2018/851 of the European Parliament, amending Directive 2008/98/EC on waste

³⁸ IEEP (2017) EPR in the EU Plastics Strategy and the Circular Economy: A focus on plastic packaging

separately”³⁹. Compostable packaging provides a vehicle and several opportunities to help meet the Directive’s aim to reduce the amount of organic waste sent to landfill and promote this type of feedstock into waste-derived products and energy.

In addition, as from 2027, “Member States may count municipal bio-waste entering aerobic or anaerobic treatment as recycled only if, in accordance with Article 22, it has been separately collected or separated at source”⁴⁰. The mandatory requirement to ensure that bio-waste is collected separately by 2023 and will only be able to be included in Member States’ recycling figures from 2027 when collected and treated separately will help to meet the Directive’s overall aim to reduce the amount of waste sent to landfill and promote this type of feedstock into waste-derived products and energy.

Relevance:

The implementation of modulated fees by EPR systems in Europe will encourage producers to choose packaging materials which have an effective waste management system in place, and therefore, boosting the markets for recycled content. Differentiating fees between plastic polymer types ensure that compostable plastic materials can be seen as a viable alternative to conventional plastic materials.

2.6 UN Sustainable Development Goals



The United Nations Sustainable Development Goals⁴¹ are a global initiative to address the challenges faced across the world. As part of this report, there is clear acknowledgement of goal 12: Responsible Consumption and Production; Goal 14: Life Below Water and Goal 15: Life on Land. These three goals focus on reducing plastic contamination and creating a more circular environment, avoiding plastics within our oceans and reduce biodiversity loss and pollution. These highlight the need for compostables as a key factor in promoting healthier and circular environments.

Relevance:

Compostable plastic packaging materials promotes circularity of product waste becoming a valuable resource for another process. A clear example of this can be seen in the use of compostable bags for capturing food waste in separate collections, where the compost material produced is redistributed into the agricultural production of new food produce.

Across the different policies which have been reviewed in this section, it is evident that a number of the key policy objectives could be assisted with an increase in the use of compostable packaging materials, especially for collections of bio-waste and reducing plastic contamination in soils. The next section will review how compostable packaging materials could be integrated into current extended producer

³⁹ European Commission (2018) A sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment

⁴⁰ Directive (EU) 2018/851 amending Directive 2008/98/EC on waste (2018). Official Journal L150, p.23/32

⁴¹ United Nations 2020. United Nations Sustainable Development Goals [online] Available at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> Accessed: 13/08/2020

responsibility (EPR) schemes and the organic waste management infrastructure in place across a growing number of European countries.

3 EPR Review

The review of policies highlights a clear opportunity for compostable packaging materials to be used effectively within the organic waste stream in order to achieve the numerous targets set out in European legislation.

This can be addressed through integrating compostable packaging materials into the well-established Extended Producer Responsibility (EPR) packaging systems in place across the European Union.

This section reviews the EPR systems, in Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Poland, Portugal, Slovenia, Spain and the UK and aims to explore how compostable packaging materials can be integrated into each Member State's EPR and waste management system.

The amendments to the EU's Waste Framework Directive require EPR systems to modulate fees being paid by producers to reflect the true costs of packaging waste collection and treatment at end-of-life. In addition, the amendments require the use of economic instruments to implement the waste hierarchy, to take measures to prevent waste generation and to ensure the separate collection of bio-waste. This section will also look at plans for implementing modulated fees and bio-waste collections.

3.1 Introduction to EPR systems

Across Europe under the packaging regulations which have been implemented in each country, there are two predominant types of EPR system – 'Monopoly' or 'Competitive'. A report published by the European Commission in April 2020⁴² concluded that there is no single EPR model which performs best or is the most cost-effective.

- Under a 'Monopoly' system there is only one national Producer Responsibility Organisation (PRO) which all obligated companies are required to register with and declare the tonnages of packaging material placed on to the market. The monopoly PRO is also responsible for ensuring a coordinated approach to collections and waste management across the system to help the country meet their waste management and recycling targets. They also tend to run national communication campaigns to increase awareness and understanding of recycling amongst the population.
- Under a 'Competitive' system, companies which are obligated under the packaging regulations can choose from several PROs to help assist in them in meeting the legal requirements of packaging compliance. The number of competitive PROs also varies with some countries only having a two or three to choose from, whereas others have 10 to 15 possible choices.

Under the EPR systems, obligated packaging producers are required to declare the tonnage of packaging material placed on to the market per material type. The main packaging material categories are declared in all European countries – glass, metal, paper, plastic. There is further categorisation of these main material types in most countries, for example splitting the metal material category into steel or aluminium, and paper into paper and cardboard/corrugated board.

The biggest variation comes when looking at the categorisation of plastic materials. There tends to be a level of separation between plastic polymer types (e.g. PET, PP, PVC, HDPE, LDPE), with some countries also looking at the rigidity/flexibility of the plastic. Currently, most countries do not have a specific category for biodegradable or compostable plastics which means that companies placing these materials on to the market would need to declare them as 'other plastic'. This clearly results in a misrepresentation of compostable materials and highlights where EPR systems need to be updated to better represent and account for compostables.

The result of the lack of recognition of compostable packaging is that fees contributed by compostable packaging producers have absolutely no benefit to the systems into which these are placed and are spent on plastic recycling, into which compostables are not placed. This is inherently unfair and

⁴² Eunomia (2020) Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility Schemes

mistakenly distributes funds from organic recycling to collection and recycling of plastics. Therefore, whilst compostable packaging producers should be obliged to pay modulated EPR fees, their expenditure should be destined towards benefiting the organic recycling of those materials, not plastics.

3.2 Current EPR material fees

A number of EPR organisations provide the fees charged for different packaging materials online. The examples provided in [Appendix 6](#) show the variation of material categorisation between each country and the differences in cost charged to packaging producers for the different materials placed on to the market.

The material fees collected by EPR organisations are used to help local authorities and waste contractors to organise the collection of waste materials, provide guidance to household end-users for the correct sorting of materials, facilitate the treatment and processing of the waste materials, allow waste management companies to invest in new technologies, and to gather evidence of recycling taking place to help meet national targets.

3.3 Modulated fees

As mentioned under the Waste Framework Directive section, EU member states will be required to implement a modulated fee system to reflect the true costs of waste collection and treatment at end-of-life. Therefore, each packaging material and sub-material type will have a different fee per tonne placed on the market. Most countries already have different fees in place for the material types, but not all have the different fees in place for the sub-categories of material – specifically plastic polymer types, which we anticipate being implemented in the near future. Another aspect of modulated fees includes the promotion of certain packaging traits (e.g. recycled content) with a lower material fee rate. Whilst those materials which are seen as disruptive to the waste management system have a penalty fee applied to them. This “bonus-malus” fee system for packaging materials has been in place in France since 2011.


Table 3 provides information per country about the different EPR systems in place, and if a modulated fee system is currently in place.



| Country | EPR System | Modulated Fees |
|-------------|-------------|---|
| Austria | Competitive | No – No implementation date planned* |
| Belgium | Monopoly | Yes – Plastics |
| Finland | Monopoly | No |
| France | Competitive | Yes – Plastics |
| Germany | Competitive | No – Under review; implementation date unknown* |
| Ireland | Monopoly | No - Plastics in 2021 and all materials by 2023* |
| Italy | Monopoly | Yes – Plastics |
| Netherlands | Monopoly | Yes – Plastics |
| Poland | Competitive | No – Under review; implementation date unknown* |
| Portugal | Competitive | Yes* |
| Slovenia | Competitive | No |
| Spain | Monopoly | No – Under review; implementation date unknown* |
| UK | Competitive | No – Under review; Government consultation taking place |

Table 3 - Implementation of modulated fees within EPR systems

*Insight gained from email correspondence with EPR compliance scheme

Key:

 Modulated fees system in place currently

-  Modulated fees system not in place currently, but implementation is under review
-  Modulated fees system not in place currently, and no information on implementation provided

On the whole the EPR systems are not being used to their full potential. There are few examples where the incorporation of compostable packaging materials into the compliance fee structure has been viewed positively as indicated in Table 3. There are two main elements which have been successfully implemented:

- the direct flow through of money to those which process the material at end-of-life
- a modulated fee for materials which have a better eco-design or recyclability

3.4 Declaring compostable packaging




In order to successfully integrate compostable packaging materials into EPR schemes, they need to be recognised as a packaging material type and producers need to pay compliance fees to manage the end-of-life treatment processes. Across Europe there is an acknowledgement of the reluctance to collect and process compostable packaging materials via the current set up of EPR systems. This is a significant barrier for the increased use and uptake of compostables. This in turn reduces the investment on organising collections capable of appropriately capturing and treating the waste as there is no fee being collected that can be returned back to fund processing infrastructure. This results in a large proportion of compostable packaging materials placed on to the market ending up in landfill or going to incineration for energy from waste.

Table 4 below provides information about whether compostable packaging is currently required to be declared separately by EPR organisations:

| Country | Compostable Packaging Declared |
|-------------|---|
| Austria | Yes – Biodegradable materials declared |
| Belgium | No – Compostable packaging not currently declared |
| Finland | Yes – Biodegradable materials declared |
| France | No – Compostable packaging not currently declared |
| Germany | No – Compostable packaging not currently declared |
| Ireland | No – Compostable packaging not currently declared |
| Italy | Yes – Compostable packaging declared |
| Netherlands | No – Compostable packaging no longer declared, but was previously |
| Poland | No – Compostable packaging not currently declared |
| Portugal | No – Compostable packaging not currently declared |
| Slovenia | No – Compostable packaging not currently declared |
| Spain | No – Compostable packaging not currently declared |
| UK | No – Compostable packaging not currently declared |

Table 4 - Data declaration required for compostable packaging materials

Key:

-  Compostable/Biodegradable packaging declared under EPR system currently
-  Compostable/Biodegradable packaging no longer declared under EPR system
-  Compostable/Biodegradable packaging not declared under EPR system currently

As can be seen in the Table 4, the Netherlands is the only country included in the research which has stopped declaring compostable packaging separately. From 2013 to 2018 the EPR organisation Afvalfonds Verpakkingen set a lower tariff rate for compostable plastic that is certified according to the EN 13432 standard – confirming that the compostable plastic packaging can be processed in industrial composting facilities. From 2019 onwards, this lower tariff rate was removed, so that compostable plastic packaging is charged at the same tariff rate as conventional plastic materials. This decision was based on an understanding that in recent years, the process demand of composting plants has accelerated sharply, and the compostable plastic material does not break down quickly enough and remains in the compost. Alongside this, if the compostable plastic is mixed with other plastic waste, it

can affect the quality of the plastic recycle produced. They are therefore, encouraging household consumers to dispose of compostable plastic packaging with their residual waste and not in the bio-waste collections. However, results from a study carried out by Wageningen University and commissioned by the Netherlands Government showed that most new compostable packaging materials will completely breakdown in compost within 22 days treatment cycle and would not adversely affect the quality of the compost produced⁴³.

Whilst the Netherlands has taken a step back from including compostable packaging materials in their EPR system, Italy has taken a decisive step towards acknowledging and embracing this material type. In May 2020, the Italian Minister of the Environment announced a new EPR scheme dedicated to compostable materials⁴⁴. The new Italian scheme for compostable materials is explored further as part of the case study section 5.1 of this report and we note that it came into force on 14 November 2020⁴⁵.

There is an opportunity for more to be done to support alternatives to conventional plastic in EPR systems for packaging across Europe. Where compostable packaging materials have been given the opportunity to establish themselves as part of the wider packaging market, integration into EPR systems can be beneficial (e.g. Italy).

In addition to financial incentives via modulated fees and the inclusion of compostable material in EPR systems, producers most readily react to legislative pressures to ensure compliance. A number of countries across Europe have introduced specific targets to encourage the use and integration of compostable packaging materials into their national packaging policies (details provided in Appendix 5). Having legislative targets in place means that not only can policy makers hold producers to account but financial investors, supply chain actors and household consumers can also ensure that packaging producers play their role in achieving the national targets.

Overall, the emerging narrative of this review outlines that with all the commitments and ambitions mentioned there is currently a gap with flexible packaging, especially for those which are likely to have high levels of food contamination. This creates an opportunity for compostable flexible packaging to help member states meet their recycling plastic targets, as well as effectively managing the collection of bio-waste in a manner that will significantly reduce conventional plastic contamination in soils⁴⁶.

4 Summary of stakeholder interviews

We engaged with key stakeholders across the EU to seek their perspectives on the further adoption of compostable packaging.

A range of stakeholder groups were identified for interview as part of this research project, they included policy makers, organic recyclers, EPR schemes, compostable material trade associations, organic recyclers trade associations, and industry experts in five key countries – France, Germany, Italy, Spain and the United Kingdom.

All stakeholders were sent a specific questionnaire to capture their perspective on issues affecting their area of work within the compostable packaging industry. Interviews were conducted via video conference. Of the 38 stakeholders contacted, 17 (44%) provided a response to the questionnaire.

⁴³ Wageningen University (2020) The fate of (compostable) plastic products in a full scale industrial organic waste treatment facility

⁴⁴ La Repubblica (2020) Varato il consorzio bioplastiche, Costa: "L'usa e getta non è un toccasana" [online] available at: https://www.repubblica.it/dossier/ambiente/green/2020/05/14/news/varato_il_consorzio_bioplastiche_costa_l_usa_e_getta_non_e_un_toccasana_-256596695/

⁴⁵ Gazzetta Ufficiale (2020) Approvazione dello statuto del Consorzio nazionale per il riciclo organico degli imballaggi in plastica biodegradabile e compostabili (Biorepack) (GU Serie Generale n.284 del 14-11-2020)

⁴⁶ IEEP (2018) Plastic Pollution in soil [online] Available at: <https://ieep.eu/uploads/articles/attachments/3a12ecc3-7d09-4e41-b67c-b8350b5ae619/Plastic%20pollution%20in%20soil.pdf?v=63695425214>

All stakeholders were asked the same five key questions (outlined below) to be able to draw comparisons from across the sector and perspective from the different countries. A full copy of the questionnaire for all stakeholders can be found in [Appendix 7](#).

Key Questions

1. *In what type of applications do you think compostable packaging can help meet EU targets on waste and recycling?*
 2. *Does flexible plastic packaging pose a challenge within the recycling process?*
 3. *How do you think that compostable packaging can help to reduce plastic contamination in organic waste collections?*
 4. *How can compostable packaging help increase the amount of food waste being captured?*
 5. *Can compostable packaging materials be successfully integrated into the bio-waste collection and management system that will be mandatory from 2023?*
-

The following sections summarise the findings.

4.1 Applications for compostable packaging

100% of respondents agreed that the most likely/easiest application for compostable plastic material would be as bags for food waste collection vessels (caddy liners or carrier bags). In Germany, this was viewed as the only viable option currently for the material to be integrated into the waste management system. A French compostable material trade association said that it was important to “promote all logical applications for compostable materials when mechanical recycling is not possible, especially when it’s due to food contamination”. This sentiment was reflected by respondents in France, Spain, Italy & the UK.

Several examples were given for where compostable materials would be suitable alternatives to flexible packaging; these included - fresh fruit and vegetable packaging, tea bags, coffee, pods, sweet/snack wrappers.

4.2 Challenges of flexible plastic packaging recycling

100% of respondents agreed that conventional flexible plastic packaging poses a challenge within the recycling system. Respondents provided a number of reasons why flexible packaging was problematic, these are:

Hard to recycle

Flexible packaging is lightweight and small in size making it difficult for the current technology to pick the material out for recycling treatment. A high proportion of flexible packaging is used to package food and will become heavily contaminated with food. As a result of the flexible nature of the plastic the food waste gets trapped within the folds of the packaging rendering it unfit for recycling in most cases. One of the key flexible packaging formats highlighted as an issue in Germany was plastic carrier bags.

12% of stakeholders also noted that more often than not, flexible packaging is not mono-material and usually multi-layered which means it cannot be effectively separated for recycling. A primary example of this provided by an Italian industry expert are chocolate bar wrappers.

Lack of collection infrastructure

There is a lack of consistent collection infrastructure in place. A German organic material trade association stated that in order “to increase recycling rates of flexible plastics, it needs to be economically viable. Just changing the legislation to make its collection mandatory is unlikely to have a significant impact on recycling rates”.

An industry expert in Germany found that through their own research, there was no indications that soft plastics or thin plastic food wrappings were more difficult to treat than hard plastics. Any type of plastic is regarded as an impurity by organic recyclers in Germany.

4.3 Reducing plastic contamination in food waste

A pan-European compostable material trade association outlined that “composting facilities feel insecure about accepting [compostable plastics] in their waste stream. They fear that bio-waste can easily be contaminated by conventional plastic and enter the compost output”. These concerns are echoed by composting site operators in the UK due to their experiences with non-compostable packaging and non-packaging items in food and garden waste bins. Paradoxically the lack of commitment by composters to accept compostable packaging is due to plastic contamination they are burdened with, evidencing the need for certain products to be wholly compostable to avoid plastic contamination.

Currently, in Germany there is around 1-2% of plastic contamination in compost material and the average cost of dealing with this contamination is 100-200€ per tonne according to an organic recyclers trade association. An industry expert in Germany has however, cited higher plastic contamination figures in certain cities, for example in Frankfurt the volume of contamination may be as high as 30% and in the City of Oldenburg in Lower Saxony the contamination is around 33%. The German trade association confirmed that they had seen a sharp increase in cost for dealing with plastic contamination due to the increase in single-use non compostable plastics during the Covid-19 pandemic.

The majority of respondents (82%) felt that the use of compostable materials would help to reduce plastic contamination in organic waste streams. This can be seen very clearly from a joint study⁴⁷ conducted by the Italian Composting and Biogas Association (CIC) and COREPLA (EPR scheme) on composting facilities which found that there was three times more compostable packaging within the organic waste since their last study. At the same time the study did not see an increase of conventional plastic materials in the organic waste received by composting facilities. A Spanish policy maker also suggested that having clear food waste bags (rather than coloured) helped to reduce non-organic waste contaminating the food waste stream as consumers were more concerned about the contents of the bag as it made it easier to see if they had made a mistake.

4.4 Increasing food waste being captured

It was positively expressed by **72% of respondents that compostable packaging would help increase the amount of food waste capture and decrease plastic contamination**. A respondent from an Italian EPR scheme summarised this very succinctly – “without compostable bags it’s impossible to get citizen buy in [for separate organic waste collections]”.

The UK’s organic recyclers trade association also highlighted that compostable caddy liners would reduce the ‘drag’ effect which occurs at organic waste treatment facilities. Currently a proportion of food waste is removed at treatment facilities when non-compostable packaging is removed prior to the organic waste undergoing the composting stages.

An industry expert from Germany shared an example from 2016 where Munich’s city council distributed free compostable bio-waste bags to 7,200 households in the district of Neuhausen. A comprehensive communication and information initiative formed part of the project which resulted in a 100% increase in the amount (by weight) of bio-waste collected in the project area from 12 kg per inhabitant per year to around 24 kg during the trial. The city’s communal waste management company AWM (Abfallwirtschaftsbetrieb München) concluded that the trial increased the volume of organic waste being collected due to the compostable caddy liners instilled a discipline and knowledge in the households. The cleanliness and comfort that compostable caddy liners offered consumers was identified to be the key element in ensuring citizens’ readiness to efficiently separate bio-waste.

4.4.1 Infrastructure capacity

In our interviews with stakeholders we have often found a common misperception regarding the amount of compostable materials that require now, or will require, infrastructure to treat them. On the premise that compostable packaging has a role in food waste collection and treatment, we must also assume

⁴⁷ Italian Composting and Biogas Association (CIC), CONAI & COREPLA (2017) Monitoring activities on plastics and compostable bioplastics in organic recycling plants

that compostable packaging does not have a role to play in, for example, liquid containers. Our own report in 2019 highlighted for the UK market a potential penetration of compostable materials of 138,000 tons. This compares to a potential amount of food waste of circa 4 million tons and garden waste already treated of circa 6 million tons. Similarly, in Italy, where the market is already mature, compostable materials currently amount to 110,000 tons compared to 6 million tons of food waste and 1 million tons of garden waste. In both cases, compostable packaging presents a potential for treatment of 1.5% of the capacity of organic waste treatment systems.

We need this quantitative evaluation to be understood to avoid the perception that compostable plastics will substitute plastics *per se* in the same volumes. This simply will not happen. Therefore, the existing treatment infrastructure available in many EU nations is totally sufficient to manage any expansion of the use of compostable materials.

Conversely, the collection systems to ensure both the separate collection of food and garden waste and their delivery to treatment facilities is lacking in most EU nations, as the BIC/ZWE report illustrates. Therefore, the focus on infrastructure should be upon collection rather than treatment.

Infrastructure capacity is increasing every year for organic waste collections in Italy. However, there is regional disparity between the north and south of Italy. Southern Italy & Sicily have fewer facilities which are able to process organic waste. The Italian EPR scheme stated that it was “important to build local level capacity for this type of waste stream as it’s not very suitable to transport for long distances and also in warmer climates”.

The compostable material trade association in the UK felt that “infrastructure in the UK is not the main issue”. The AD facilities are running at approximately 80% total capacity. Therefore, it would be relatively easy to bolt on extra capacity to existing facilities. “The main issue is that the collection system is missing across all local authorities”.

The Spanish compostable material trade association shared this sentiment, stating that there was significant infrastructure in place already. The next step to increase capacity was to make sure that they adapted the processes in place to enable them to receive and process EN13432 compostable materials.

In contrast, the development of infrastructure to treat compostable materials is not a top priority for the EPR scheme in France because this material is seen as such a small tonnage in comparison to other packaging materials. Until national bio-waste collection systems are in place from 2023 onwards (the most likely option would be to add food waste into the garden waste collection systems which are already in place across the whole of France), developing treatment systems for compostable materials is not seen as worthwhile in the short term.

4.5 Integration of compostable packaging into waste management systems

4.5.1 Current organic waste management systems

It is estimated that approximately 18 million tonnes of bio-waste per year is generated⁴⁸ and approximately 20,000 tonnes of compostable packaging material is placed on to the French market. Currently in France, there is no national bio-waste collection system in place, approximately 30% of the population have some sort of municipal collection – predominantly in western areas of France, such as Brittany.

In comparison, Italy has the 2nd largest collection of biowaste (food and garden) in Europe - approximately 7 million tonnes per year. It also produces approximately 110,000 tonnes of compostable packaging per year.

It is important to clarify how much biowaste is collected because through this prism we can understand why treatment systems are resistant to change, i.e. to accepting compostable materials.

⁴⁸ Veolia (2019) Valoriser les déchets alimentaires et développer les circuits courts

In Germany biowaste is often collected with garden waste. Indeed, Germany collects very little food waste⁴⁹ with an interception rate for food waste of just 27% of the potential and overall biowaste of just 11% of potential.

The UK has mandatory food waste collections across Scotland, Wales and Northern Ireland yet in England, where 80% of the population live, only 400,000 tons of food waste was separately collected for treatment in 2019. This represents circa 13% of the potential.

Italy has separate food waste collections across two thirds of the country and intercepts 47% of the potential, currently some 6 million tons. Per capita, this represents circa 100 kilos, compared to circa 20 kilos in Germany and 15 kilos in England.

It is clear from these data that the overall volumes of wet, highly biodegradable food waste entering treatment in Italy creates more suitable conditions for the both the use of compostable packaging in the collection systems, and the ideal conditions for treating them once they enter composting plants.

Industry experts and organic waste recyclers have stated that a mix of food and garden waste is better for a composting process. A UK packaging EPR scheme stated that once organic waste collections are established on a national scale, “it is then easier to process compostable packaging alongside the food and garden waste”.

4.5.2 Future potential for successful integration of compostable packaging into organic waste management systems

Most respondents believed that the integration of flexible packaging formats for compostable materials would be more successful in the short to medium term to meet the EU's 2023 implementation target for bio-waste collection.

54% of respondents stated that there needs to be supporting legislation to encourage the uptake of compostable packaging to meet 2023 targets. Legislative changes were stressed by UK and French EPR schemes and Spanish policy makers as being the main mechanism for there to be an uptake in compostable packaging materials.

4.5.3 Challenges for the uptake of compostable packaging materials

There were three main challenges which respondents from the policy makers stakeholder group mentioned; the first was regarding the design of the vessel to capture organic waste (e.g. aerated or enclosed designs). It is accepted that in the warm summer months, kitchen waste can develop smells if it is collected only fortnightly, which may decrease resident's willingness to separate.

The second challenge was the frequency of collections. In the Frankfurt am Main area, domestic green waste (kitchen and garden waste and known locally as biotonne or bio waste) is collected either weekly or fortnightly depending on location. The waste management company for the area - Frankfurter Entsorgungs- und Service GmbH (FES) suggested that increasing the areas where they provide weekly collections could increase the volume of organic waste collected (addressing the suggestion that the relatively low separation rates are due to the infrequency of collection).

The third challenge was whether the organic waste collection vessels and the compostable bags used as liners should be provided free to citizens by local authorities and if so for how long. This decision would likely be informed by the levels of citizen engagement and buy-in.

The Spanish and French compostable material trade associations stated that one of the main barriers to the increase of compostable materials in their countries was the Single-Use Plastics Directive definition of compostable plastic being incorporated into 'plastic'. This means that “what is forbidden in plastic or is required to reduce this will be also for compostable”. Which is an important concern for the compostable plastic sector as it could limit the willingness of policy makers to encourage the use of compostable materials within their waste management systems. Several of the compostable material trade associations which were interviewed have been actively lobbying national governments and EU policy makers to make an exemption within the SUP Directive for compostable packaging materials. At

⁴⁹ Bio-based Industries Consortium (2020) Bio-waste generation in the EU: Current capture levels and future potential

the time of writing, Italy is passing into law the exemption of compostable packaging from the application of the SUP ban for products used in food waste collections and closed loop catering locations.

Another significant concern raised by the French compostable material trade association was that prominent French environmental NGOs are pushing for an overall reduction in the use and consumption of plastics and not to replace some of the more difficult to recycle materials with compostable alternatives. So, the adoption of compostable packaging is suffering from the stigma of conventional plastic packaging and therefore, they felt that the French government were against compostable packaging other than in their use as caddy liners for food-waste collections.

It was commented that clarity was needed as to how compostable packaging could support the EU targets as it was still relatively new and not well understood by the existing organic recyclers. As such, there is a level of suspicion about how compostable packaging can be integrated into the organic collection and treatment process. This view is highlighted by the following quote:

“Misinformation about compostable materials is biggest issue to the uptake of compostable packaging in Europe” – quote from a pan-European compostable material trade association.

4.6 Labelling requirements

Stakeholders across all countries agreed that there is a need for clear mandatory labelling of compostable materials which are EN13432 certified to ensure that citizens can easily distinguish between compostable and non-compostable materials. Particularly, this was emphasised by industry experts and policy makers who stated that there needed to be a standardisation of labelling and communications to citizens. Furthermore, stakeholders from all sectors stated that labelling rules should be developed at the European policy level.

Another key aspect which was raised during interviews with all respondents from Germany and the UK was that clear labelling for compostable materials would not be enough without increased consumer awareness and education. The UK's On-Pack Recycling Label organisation found that 84% of UK consumers use on-pack information to check recycling guidelines on conventional packaging materials⁵⁰. Showing that with clear and consistent labelling on compostable packaging, household consumers would follow labelling guidance, therefore, reducing mistakes and contamination.

A positive example of how consumer education campaigns can help to decrease plastic contamination in organic waste streams can be seen in Italy. As part of a study⁵¹ conducted by the Italian Composting and Biogas Association (CIC) their results showed that once household consumers were made aware of contamination from non-compostable materials in their bio-waste collections, the contamination level dropped from 9% to 2%. With time and awareness campaigns consumers will become much more familiar with the role composting packaging can play.

4.7 Funding options

Currently, compostable packaging material are collected alongside organic-waste collections in France, Germany and the UK. These collections are all financed by local municipalities via citizen taxes, not via the EPR schemes.

In the interview with a Spanish policy maker, a tax model was discussed where citizens are required to pay more (disposal tax) when they/the system is not performing well (in terms of contamination levels) and are able pay less if they have less contamination in their organic waste. They felt that financial incentives were needed to really gain traction with citizens.

Other than in Italy, no packaging EPR system distributes the fees collected for compostable materials to those processing the organic waste at end-of-life. This funding model is discussed in more detail in Section 8. The French packaging EPR scheme confirmed that they collect approximately €8 million per

⁵⁰ OPRL (2020) What Consumers Want – 7 key research insights on engaging consumers

⁵¹ Italian Composting and Biogas Association (CIC), CONAI & COREPLA (2017) Monitoring activities on plastics and compostable bioplastics in organic recycling plants

year for compostable packaging materials, but this doesn't get distributed to those doing the organic composting.

The UK's compostable material trade association stated that organic waste recyclers are willing to pay into the EPR system as long as the money which is collected is then directed to the facilities which process the material. Alongside this the UK's organic recyclers trade association is seeking higher payments per tonne for treating compostable materials (e.g. composters, dry-AD operators with a composting phase and other suitably equipped AD operators). If the price point for treating compostable packaging materials is too low, most organic waste recyclers would feel that their cost of dealing with the high levels of contamination (where they would expect to have to remove and pay for sending to material EfW or landfill) would not be covered. Again, the paradox is evident here: whilst compostable materials can be treated in composting and other suitability equipped AD operators, the resistance of some operators is due to plastic contamination. Yet the plastic industry pays nothing for this creating a barrier to entry to market for compostables at no costs to their industry. This market distortion is effectively a transfer of funds used to collect biowaste to incineration of contaminated biowaste and plastics.

4.7.1 Modulated Fees

From the stakeholder interviews conducted with EPR schemes, it is clear that a modulated fee system will be introduced in line with the EU Waste Framework Directive requirements. Modulated fees will be applied to plastic polymers and likely to differentiate between format types and eco-design features (e.g. % recycled content). In France, where modulated fees on materials have been in place since 2011, future changes to the fee system are likely to focus on eco-design aspects (National strategy on plastic under consultation in August 2020) rather than plastic polymer type – for example, reducing the amount of single-use and virgin plastic being placed on the market. In the UK, in comparison, the EPR system is undergoing a significant overhaul with many aspects still to be decided. A simplistic modulated fee system for different plastic polymers will be implemented, with evolution to include format types (flexible vs rigid) and eco-design principles. However, in both France and the UK which are at very different stages of implementing a modulated fee system, it is less clear how compostable packaging materials will be treated within the modulated fee system.

The French EPR scheme suggested that compostable packaging materials are unlikely to be categorised under the “malus” tariff. The tariff for compostable packaging would be based on the material recyclability and wouldn't be likely to have an eco-design modulation. Since compostable packaging material is expected to make up a small tonnage overall, it may end up having a similar high tariff to wood packaging. Packaging compliance fees in France for wood are the highest tariff rate in Europe due to it only making up a small tonnage of overall packaging placed on to the French market. The majority of wood packaging also goes to incineration, therefore has a higher fee since it performs badly on the waste hierarchy scale.

In Italy, the EPR scheme will implement a modulated fee structure to discourage certain applications for compostable material, for example, “it is unnecessary to create compostable plastic drink bottles when the waste management process is functioning for conventional plastic drinks bottles”.

5 Case Studies

From the stakeholder interviews and desk-based research, three case studies were identified that provide good examples of where compostable packaging solutions have been successfully integrated into waste management systems. The case studies are evidence that viable business models can be developed utilising compostable packaging.

5.1 Compostable packaging EPR in Italy

Two main pieces of legislation (outlined below) in Italy have played a pivotal role in the proliferation of compostable bags being used across the country:

- Law no. 296 (27/12/2006): Shopping bags since January 2011 have to be either biodegradable and compostable or reusable

- Law no. 28, (24/3/2012): non reusable shopping bags have to be certified biodegradable & compostable according to the norm EN13432 by accredited bodies.

Italy has had a successful impact on the collection of bio-waste and the decontamination of the organic stream and its products due to these two pieces of legislation. According to BIOREPACK approximately, 9 out of 10 items made from compostable materials in Italy are carrier bags, food waste caddy liners or fruit & vegetable bags.

Italy is set to lead the way in the compostable packaging market within Europe. In May 2020, a new EPR scheme was announced that is dedicated to compostable packaging material – BIOREPACK. This new scheme will sit alongside the six other dedicated material schemes (steel, aluminium, paper, wood, plastic and glass) as part of the [CONAI consortium](#). This consortium ensures that producers and users of packaging achieve the recycling and recovery targets set out by the EU and Italian Government and comply with the principles of EPR. CONAI has a total annual income of €800-900 million from producers and the obligated value chain of the packaging sector. BIOREPACK constitute approximately 2.5% in monetary terms whilst representing slightly less than 1% in volume of Italian packaging⁵².

Only packaging material that meets the EN 13432 standard is accepted under the new scheme. To comply with this standard, compostable plastics must disintegrate after 12 weeks and completely biodegrade after six months under industrial composting methods. Other bioplastic materials that are not compostable follow the same material flows as the conventional plastic counterpart through the dedicated plastic EPR scheme – [COREPLA](#).

COREPLA's fee system is split into household and industrial plastic packaging. Within household plastic packaging, the fees are split into three categories:

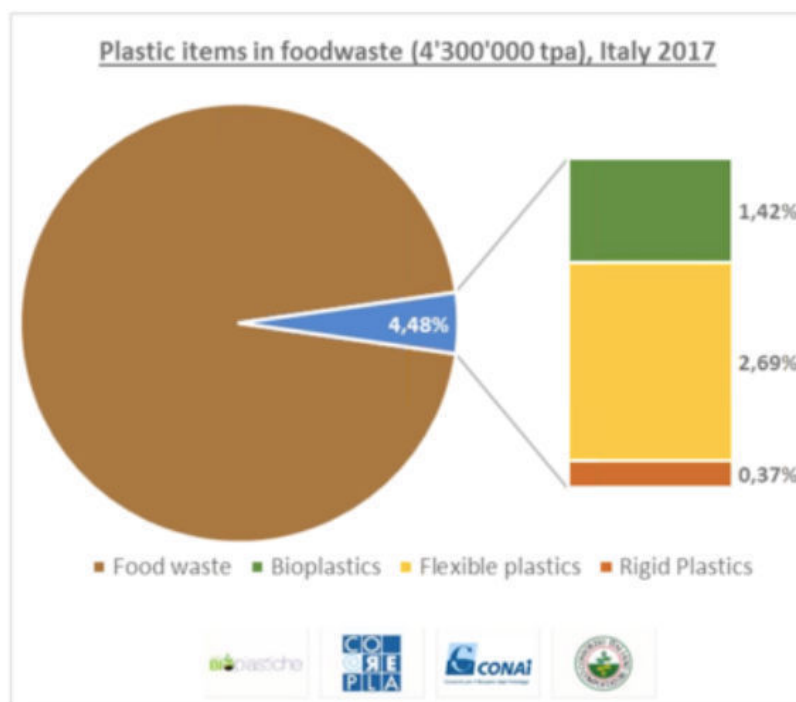
- Packaging from household with consolidate sorting and recycling value chain = 208 €/tonnes
- Other sortable and recyclable packaging from households = 436 €/tonnes
- Non-sortable/recyclable packaging = 546 €/tonnes
 - *Compostable plastic materials sit under this highest band of fees*

It is estimated that approximately €20 million per year is collected by CORPELA for compostable packaging materials. This amount will be paid directly into BIOREPACK, once they are fully operational. The money collected from producers that place compostable packaging onto the Italian market will be passed on to the organic recyclers (composting and anaerobic digestion facilities) that will treat the organic waste and compostable packaging.

BIOREPACK will implement a modulated fee structure to promote the use of compostable materials in applications which are seen as beneficial to the environment and to discourage certain applications – such as plastic drinks bottles which would cause unnecessary confusion for consumers and disrupt an already functioning waste management system for conventional plastic bottles. Further detail on the fee structure and a transition period with COREPLA will be made available later in the year.

A proportion of the money collected from producer fees will be used for communication and citizen awareness campaigns at national and local levels. The communication campaigns aim to educate the public about what can or cannot be disposed of within their organic waste collections with the goal of keeping the total level of plastic contamination below 5% - Figure 3 provides a breakdown of the plastic and compostable plastic found in food waste collections in Italy.

⁵² Resource (2020) What the UK can learn from Italy's compostable packaging EPR scheme [Online] Available at: <https://resource.co/article/what-uk-can-learn-italy-s-compostable-packaging-epr-scheme>



Example of consumer awareness campaigns

The CIC conducted education campaigns as part of the International Compost Awareness Week (ICAW) in May 2019. The campaign's goal was to raise awareness of the benefits of composting and its use in improving soil quality, reducing the use of pesticides and chemical fertilisers which in turn will improve water quality and protect the environment.

A wide range of events and activities were held throughout the week-long campaign, including tours of compost facilities, school gardening programs, compost workshops, lectures by a well-known gardening expert, and compost give-away days.

Figure 1 - provides a breakdown of the plastic and compostable plastic found in food waste collections in Italy

Whilst there will be no development of a specific logo for producers to use of their compostable packaging, BIOREPACK are hoping to increase the consistency of wording or colours used to help increase consumer awareness of the relevant compostable packaging standards. As part of a study⁵³ conducted by the Italian Composting and Biogas Association (CIC) their results showed that once household consumers were made aware of contamination from non-compostable materials in their bio-waste collections, the contamination level dropped from 9% to 2%.

The CIC conducted a study in 2016/2017⁵⁴ to verify the fate of plastics and compostable plastics in 15 composting and 12 AD facilities in Italy. The CIC's monitoring of the facilities found that of the almost 2 million tonnes of compost sampled, there was no remaining material from compostable packaging/bags. This highlights the materials efficiency to degrade under industrial composting environments. On the other hand, the contamination that remained from non-compostable packaging items created inefficiencies in the recycling process (dragging effect). The CIC estimates that the cost of separation and disposal of non-compostable materials within the organic waste stream costs the industry about €52 million per year.

In Italy nearly 7 million tonnes of food and green waste, amounting to 100 kg per person per year (of food waste) , is separately collected in Italy As can be seen from Figure 4, the coverage of separate food waste collections in the country is high, this will only grow with the introduction of mandatory collections in 2023. For example, in Milan 130,000 tonnes of food waste collected from residents (food waste recycling rates are up to 85%, with contamination levels down to around 4.5%).

⁵³ Consorzio Italiano Compostatori (2018) CIC Key Data 2018 [online] Available at: https://www.compost.it/wp-content/uploads/2019/08/CIC-Key-Data-2018-ENG_web-version_protetto.pdf

⁵⁴ Assobioplastiche, CIC, CONAI and Corepla (2017) Monitoring activities on plastics and compostable bioplastics in organic recycling plants [online] Available at: <https://www.compost.it/wp-content/uploads/2019/12/Bioplastics-Monitoring-oct-2017-ENG.pdf>



Figure 2 - Food waste capture in Italy, kg per capita (kg/ca), 2018⁵⁵

5.2 Food waste collections in Catalonia

Spain does not have a national landfill tax, Article 16 of the Spanish Waste Act⁵⁶ allows authorities from autonomous communities to apply economic incentives, promote waste prevention and incorporate separate collection. Catalonia Government were concerned at the amount of food waste being thrown to landfill, especially with many areas suffering from food poverty. Thus, separate collection of biowaste in Catalonia became compulsory in 1993⁵⁷ (30 years before the EU obligation). The service covers 95% of the population, with the remaining 5% being mostly small towns who have adopted home composting.

In an interview with the Waste Agency of Catalonia, they stated that one of the main applications in which compostable packaging can help meet EU targets on waste and recycling is through the compostable bags used in biowaste collection for at home separation. Latest figures state that approximately 7% of the food bought in Catalonia (262,000t) goes to landfill with 432,946t of organic waste being separately collected⁵⁸. In 2019, organic waste contributed to 11% of municipal waste totals.

In Catalonia, there are two types of facilities for biowaste treatment: AD with composting and composting. There are 4 facilities across Catalonia that use AD with composting. This is a homogenous input facility, with favourable input of food waste only. They have a smaller site size requirement and allow recovery of energy as biogas which contributes to fuel for vehicles. There is also better management for emissions and odours in the AD facility. However, there are high investment and management costs and the technology is highly sensitive which requires high inputs feasible on industrial scales. On the other hand, composting facilities, of which there are 20 across Catalonia, have much lower costs due to simple yet robust technology. This facility also allows for the input of green waste which helps create a mix suitable for quality A, organic compost.

⁵⁵ Zero Waste Europe (2020) Bio-waste generation in the UE: Current capture levels and future potential

⁵⁶ Boletín Oficial del Estado. 2020 Law 22/2011, of July 28, on waste and contaminated soils. [online] available at <https://www.boe.es/eli/es/l/2011/07/28/22> [Accessed 23 July 2020]

⁵⁷ Legal Portal of Catalonia. 2020 LAW 9/2008, of 10 July, amending Law 6/1993, of 15 July, regulating waste. [online] available at <https://portaljuridic.gencat.cat/eli/es-ct/l/2008/07/10/9> [Accessed 23 July 2020]

⁵⁸ MSW Statistics in Catalonia (2020) available at: <http://estadistiques.arc.cat/ARC/#> [Accessed 29 October 2020]

The landfill tax and refund scheme were introduced in the Catalonia region in 2004 with heavy emphasis on tax refunds for the biological treatment of bio-waste. At least 50% of the revenue generated by the disposal tax must be allocated to biological treatment and analysis of bio-waste and mechanical-biological treatment of residual waste, while the remaining revenue is refunded to local authorities according to their performance on separate collection of biowaste. This is based on the quality of biowaste collected, and as such a number of tests are carried out on waste composition, using some of the funds from the scheme. This scheme shows how a public authority can promote separate collection of bio-waste in a structured and continuous way. Catalonia also ran several campaigns to engage citizens with biowaste and reducing contamination. These have been in the form of travelling exhibitions, school education programmes, TV and static advertising and even social media posts. This has resulted in collaborations with other institutional initiatives and awareness campaigns.

Figure 4 shows the how the funds from the Landfill Tax were distributed in 2016.

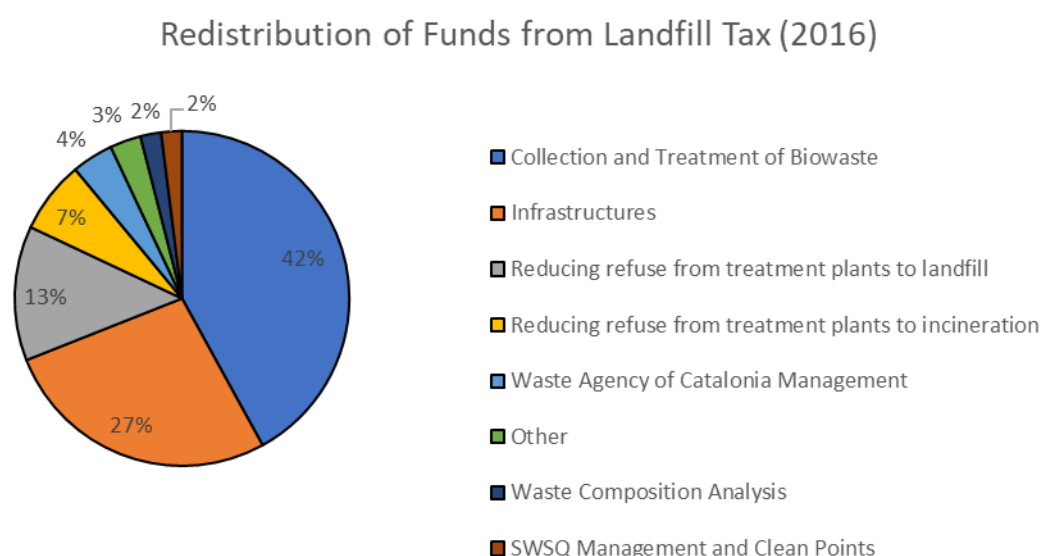


Figure 3 - Redistribution of funds from landfill tax in Catalonia (2016)⁵⁹

There has been consensus between some local authorities and Waste Agency of Catalonia to increase the landfill tax substantially year on year. The landfill tax for 2020 was increased to €47.1/t from €41.3/t in 2019. There is a planned increase to €70/t in 2024. This should further increase the separation and collection of biowaste. Municipalities in Catalonia that do not present an implementation plan for separate collections and citizen engagement will face a higher tax. Currently, practically all municipalities have implemented separate collection of biowaste and going forward, the next steps are to address the quality of the biowaste, reduce contamination below 10% and experiment with new collection schemes

Through tackling the need for purer and separate waste streams, Catalonia launched a regional plastic bag elimination campaign through project CERES⁶⁰ in early 2019, promoted by Ellen MacArthur Foundation. This project's goal is to reduce the annual use of packaging by 2 million units and to completely eliminate the use of plastic bags from January 2021. This project is focussing on introducing compostable bags at cashier points, compostable bags in the fruit section and encouraging reusable. Since the start of the project, the composting facilities have seen a 60% increase in compostable bags

⁵⁹ Waste Agency of Catalonia (2018) Bioeconomy in Catalonia

⁶⁰ Ellen MacArthur Foundation (2019) CE 100 Catalonia Workshop 7th-9th May 2019. [online] Available at: <https://www.ellenmacarthurfoundation.org/assets/downloads/CE100-Acceleration-Workshop-Catalonia-Summary.pdf> [Accessed 30 July 2020]

entering the site in the first few months. The bags take approx. 4 weeks to degrade and contribute to class A compost which is suitable for organic farming⁶¹.

5.3 Keenan Recyclers and their part in Organic Recycling in UK

The largest food and garden recycling business in Scotland, Keenan Recycling Ltd also collect throughout the UK. The growth of the business started in 2001 with garden waste composting and grew through business development funds to invest in a large-scale facility in Aberdeen to collect, treat and create waste as a resource. Keenan's have since expanded further and have opened a biofuel facility in Linwood, near Glasgow.

Food waste collected by Keenan's from households, offices, restaurants, food processors and other businesses is put through a de-packaging pre-treatment. This process utilises turbo separator technology combined with water injection to maximise the separation of organic materials from packaging. Currently there is no process in place which can define compostable packaging from plastic packaging and so all the packaging recovered is taken to energy for waste. The organic material recovered are liquidised to create biofuels which is optimised for anaerobic digestion. This process usually takes about 40 days, depending on the AD plant.

The In Vessel Composting (IVC) process takes approximately 8 weeks from the co-mingled waste arriving at the facility to its end route as a fertiliser. According to Keenan's, Comingled waste is ideal for incorporating higher volumes of compostables as this is able to go through the IVC treatment rather than energy from waste in a pure food waste stream. The waste is shredded and then blended with a mix of wood, food waste and water to create a blend for PAS100 certified soil at the end outcome. Keenan have a 99% pass rate for PAS100 grading and state that the majority of failings in the remaining 1% is down to plastic contamination. A larger influx of compostables with comingled waste will decrease this fail rate even further. This compost is then sold to farming and agriculture sectors as fertiliser for £5 per tonne, with additional costs for haulage.

Keenan Recycling have the fortunate position of being the largest organic recyclers in the north of Scotland and have a contract with the local authorities to handle their food waste. They charge £60/tonne for IVC and £20 per tonne for food waste which goes to AD. According to WRAP reporting on gate fees in 2019, this is competitively priced⁶². Where the waste goes is firstly based on proximity of the facilities and also the type of stream as a pure food waste stream is preferred by AD facilities to make biofuel. In the central belt of Scotland, there is a limited capacity and so gate fees are competitive. Keenan's also collect food waste throughout the UK and subsequently pay gate fees of varying amounts throughout the country. The range in pricing is varied due to competitiveness in the local areas, contracts, facility age and material grade.

Keenan Recycling see compostable packaging as an opportunity, but significant progress will need a shift in attitude and material choice. With the 2023 mandatory organic waste separation, they believe there needs to be much greater focus on alternatives to conventional plastic packaging and which are probably fiscal incentives/fees to support compostable packaging. This will not only increase the compostables in the recycling mix but minimise plastic contamination in compost output, reduce the degree of human error associated with removing plastics from organic recycling facilities and increase the amount of waste from de-packaging that goes to in-vessel composting rather than energy from waste.

⁶¹ Compost is categorised in Class A, B and C dependent on heavy metal content according to Royal Decree RD 506/2013. BOE (2013) Real Decreto 506/2013, 28th June 2013, Sobre productos fertilizantes.

⁶² WRAP (2019). Comparing the costs of alternative waste treatment options. Gate Fees 2018/19 Report [online] Available at: <https://www.wrap.org.uk/sites/files/wrap/WRAP%20gate%20fees%20report%202019.pdf> [Accessed 03 August 2020]

6 Findings & Recommendations

6.1 Policy

Across the different policies which have been reviewed in this report, there is evidence of a gap between EU and national level ambitions for plastic collection and recycling, bio-waste collection targets, and the standards to prevent soil contamination from plastics. Through discussions in stakeholder interviews and a comprehensive policy review, it is clear that part of this gap can be bridged under the development of policies through the replacement of certain packaging applications with compostable materials.

Policy makers and most interviewees have not fully appreciated the transversal role compostable materials can play; too often they are seen as another plastic, or an alternative to plastics. The SUP Directive is a good example of this oversight. Paradoxically legislation has recognised the role of compostables for many years, through the Essential Requirements of the Packaging and Packaging Waste Directive which lays down three standards that packaging materials must adhere to:

| Recovery operation | EN Norm |
|--------------------|---------------|
| Material Recycling | EN 13430:2004 |
| Energy Recovery | EN 13431:2004 |
| Composting | EN 13432:2004 |

Yet within national policies, the role of composting of packaging is rarely translated into legislative support, with the exception of Italy and this has gone hand in hand with support for organic recycling. Consequently, most Governments, and the EU, are focussed upon material recycling whilst the major waste companies are opting for energy recovery as the economic returns are greater.

The transversal role compostable packaging plays, as we have stated, is not appreciated because the materials themselves do not return as physical properties or as energy, but as a vehicle to ensure biowastes are cleanly recovered and returned to soil. The benefits of compostables is hidden and policy makers and stakeholders don't seem to appreciate the role compostables play or how a product that is used for packaging can become soil. But this is the whole objective of such materials, to mimic natural properties of biodegradability and to assist biowaste recovery.

With no clear regulatory requirement, it gives weak signals to the market in the confidence of uptake and infrastructure which results in inertia. The market (retailers and brand managers) is free to develop their own solutions which creates a piecemeal approach with no unifying strategy to address the areas of concern (low recycling rates, contaminated compost/digestate etc) or drive the uptake of solutions (compostables) or provide supporting collection and processing infrastructure.

This is mirrored in the conversations with stakeholders, in which 54% stated that there was a lot of new policy required to drive the uptake of compostable packaging in order to meet the 2023 recycling targets.

Specific policies are required by member states to identify where compostables can offer a viable and sustainable solution and clear guidance is required for their adoption and utilisation. These policies should be developed in unison with the adoption of separate food waste collections so the communications to consumers are clear in terms of which bins to place compostable packaging in. Italy is a good example of where clear policy and supporting regulation can provide clarity and support the implementation of a national system which integrates organic waste collections and compostables.

The Italian case study demonstrates the case for mandating the use of compostable caddy liners, fruit and vegetable bags and flexible films where used for food packaging. Once this has been embedded it creates a solid foundation of collection and processing infrastructure that then facilitates the adoption of more compostable packaging options down the line as consumers become familiar with using compostables.

Evidence suggests that a much tougher stance on problem plastics that cannot be recycled is required. If packaging, like flexible plastics, that are heavily contaminated with food were obligatorily compostable, this would create the opportunity for other packaging solutions to be adopted – either reusable containers or compostables. Without this leadership the market remains in a state of flux.

6.2 EPR Schemes

Currently, 70% of EPR schemes reviewed through this research do not promote the uptake of compostable materials. They place a higher tariff on compostable packaging if they are in the scheme due to low demand and low tonnage. This situation will become an issue as we near 2023, as demand and tonnage for compostable packaging will increase. In modulated fees, there are fiscal incentives provided for the uptake of compostable packaging e.g. fruit and veg bags. There is clear evidence that where a country has a supportive EPR system there is an increased uptake of compostables (e.g. Italy).

Policy makers should use EPR systems to disincentivise unrecyclable packaging and drive the uptake of sustainable and compostable packaging solutions and to penalise lower cost and environmentally damaging alternatives like waste exports to energy from waste facilities.

Further development of the EPR scheme is paramount to reaching the European recycling targets by 2035, while minimising the environmental burdens prevalent in plastic packaging management. It is recommended that environmental fees should be set to reflect a product's recyclability (or not) and support the existence of a market for secondary material. This would serve to support the uptake of packaging types that are recyclable and penalise those which cannot be recycled. This is seen to work well in Italy with EPR scheme BIOREPACK where a modulated fee structure is set to discourage certain compostable materials entering the conventional plastics waste streams.

It is recommended that compostable materials are treated similarly to other packaging types, whereby money received through EPR programmes is cycled back to the organic recycling sector for collection, treatment, management, testing, monitoring, communications, market legality etc. The fact that organic recycling can help meet recycling targets provides a significant opportunity for other member states.

6.2.1 Fiscal Instruments

It is recommended that policy makers also look beyond EPR schemes to other fiscal instruments to support improved recycling and the capture of more biowaste resulting in less organic material being burned or sent to landfill.

There are examples of other fiscal instruments in addition to EPR schemes which also support the adoption of more sustainable packaging choices. These financial incentives can sit alongside EPR schemes such as those deployed in Catalonia through the Landfill Tax and refund scheme.

An example of an additional fiscal measure that will work alongside existing measures to incentivise the collection and recycling of plastic is the EU plastic levy. The levy is to be introduced on the 1 January 2021, it will be calculated on the weight of nonrecycled plastic packaging waste "with a call rate of €0.80/kilogramme with a mechanism to avoid excessively regressive impact on national contributions" that will place limits on the amount less wealthy countries will pay.

6.3 Increase recycling

100% of respondents agreed that conventional flexible plastic packaging poses a challenge within the recycling system.

There was consensus among stakeholders that there are certain uses for which plastics which are simply not sustainable – these are predominantly where flexible packaging becomes contaminated with food waste. These currently include teabags, coffee pods, sticky labels on fruit and vegetables, ready

meal trays and food caddy liners and fresh produce bags. In addition, flexible multi-layered packaging formats such as snack bags and granola bar wraps can also be substituted with compostable packaging. There is clear evidence from across the EU and the UK that almost all plastic films are currently not being collected for recycling nor effectively recycled. However, by removing those plastic materials which are contaminated with food waste, it will provide a cleaner waste stream which will help to increase the recycling rates of conventional plastic materials.

6.4 Increase the capture of food waste

72% of respondents agreed that compostable packaging would help increase the amount of food waste capture and decrease plastic contamination.

There is an identified issue with flexible packaging, especially for those which are likely to have high levels of food contamination. This opens an opportunity for compostable flexible packaging to help member states meet their recycling plastic targets, as well as effectively managing the collection of biowaste in a manner that will significantly reduce conventional plastic contamination in soils.

If flexible packaging which is heavily contaminated with food waste (food trays and films) were made from compostable packaging, then the packaging and the attached food waste could both be captured and recycled via composting. This is a 'win-win' as the packaging and food waste can be recycled together. Indeed, 28% of the stakeholders consulted said that there was potential for this. However, we would need citizens to be more aware of the different material types and how to dispose of them or plastic contamination could increase through incorrect disposal. Effective labelling would be very important.

6.5 Biowaste collections

It is clear that biowaste collections are the catalyst to drive the uptake of compostable packaging by providing the infrastructure through which compostable packaging can be captured. Biowaste collections provide an early opportunity through the adoption of compostable caddy liners. Many of the stakeholders interviewed supported the view that once compostable caddy liners were being used then this opened the way for a wider adoption of compostable packaging (fruit and veg bags etc) as end-users become familiar with the concept of compostable packaging.

It is important that policy supporting the uptake of compostable packaging keeps pace with the roll-out of biowaste collection systems across the EU by 2023 to ensure that the benefits of separate collections are realised. We also emphasise that policies must be made together with the composting and AD sectors which are terminals for biowaste and that the compostable fraction they receive must be of a high quality to support higher and cleaner capture rates.

100% respondents agreed that the most likely/easiest application for compostable plastic material would be as bags for food waste collection vessels/caddy's and fresh produce.

6.6 Compost Quality

A better quality of compost results from an increase in 'clean' compostable material entering the organic recycling facility and will decrease the contamination of compost by conventional plastic⁶³. This is evidenced through the Keenan case study where the vast majority of PAS 100 fails came as a result of plastic contamination. Where compostable packaging increases, this failure rate will be significantly reduced as the CIC study found in Italy. As a further example, the CERES project in Catalonia, found that an increase in compostable materials entering facilities resulted in compost being upgraded from Class B standard farming compost to Class A, organic farming compost due to lower particles per million of contamination source (i.e. plastic).

⁶³ Bio Market Insights. 2020. German study shows benefit of using compostable biowaste bags for quality of compost [online] Available at: https://biomarketinsights.com/german-study-shows-benefit-of-using-compostable-biowaste-bags-for-quality-of-compost/?utm_source=rss&utm_medium=rss&utm_campaign=german-study-shows-benefit-of-using-compostable-biowaste-bags-for-quality-of-compost [Accessed 6 August 2020]

A further recommendation is that stronger standards for compost and digestate are required to ensure they can be safely applied to land and to drive the market for organic fertiliser. In addition to improvements in nutrient value quality standards should mandate near zero plastics contamination in inputs as well as in outputs. It was noted by one of the stakeholders that - **“we do not want to pollute our soils in the same way we have polluted our seas”**.

6.6.1 Improve soil quality

Soil condition is at the heart of the new Green Deal for Europe and the United Nations Sustainable Development Goals, both of which aim to reduce biodiversity loss and pollution, reverse climate change while striving for a healthy environment and sustainable land use. Increasing soil organic carbon through the addition of organic fertiliser (compost) is a key part of improving the EU's soil health and creating a carbon sink to reduce GHG emissions⁶⁴.

It is recommended that incentives and education and awareness programmes are implemented to encourage the use of organic fertiliser to land to improve soil health.

6.7 Cost of plastic contamination

The study highlighted a considerable cost associated with the removal and disposal of conventional plastic contamination within the organic waste stream. The cost of dealing with this contamination ranged from 100-200€ per tonne (as stated by a German trade association). This was emphasised by a recent case study by REA who estimated plastic contamination in bio waste costs the UK £7.26 million per year⁶⁵. The Italian compost association CIC reported in 2019 an annual cost of plastic contamination to its plants of €100-€120 million despite having the lowest contamination rates in the EU of just 1.5%. When food waste collections become generalised across the EU, we can estimate that at 5% contamination rates, the annual cost to the biowaste sector will be in the order of €2.5 billion.

6.8 The importance of labelling

Stakeholders across all countries agreed that there is a need for clear mandatory labelling of compostable materials which will involve the need for products to be certified to the EN 13432 standard.

There needs to be clear, simple, and harmonised terminology to give guidance on end of life disposal and recycling with well-designed labelling required to make this successful. Labelling for recycle materials has seen positive improvements to the recycling stream through organisations such as On-Pack recycling Labelling (OPRL).

It is recommended that clear guidance be developed to differentiate compostable packaging from other plastics with guidance on the best disposal routes.

6.8.1 Terminology

One of the most important areas of consensus from the stakeholders was the need for clarity of definitions relating to compostable packaging. There is currently no established system of guidance for the communication of claims related to the compostability or biodegradability of plastics.

It is recommended that work is undertaken to develop consistent terminology. Terms like 'Degradable' or 'Biodegradable' are vague and unqualified and should be avoided. An example of where this has already been implemented can be found in Belgium⁶⁶ and France⁶⁷, where the term 'biodegradable' has been banned from being displayed on packaging.

⁶⁴ European Commission (2020) Report on the implementation of the Soil Thematic Strategy and ongoing activities [Online] Available at: https://ec.europa.eu/environment/soil/three_en.htm

⁶⁵ REA (2020) Estimated Costs of managing plastics arriving at UK organics recycling facilities and AD operator case study [Online] Available at: <https://www.r-e-a.net/resources/estimated-costs-of-managing-plastics-at-uk-organics-recycling-facilities/>

⁶⁶ Moniteur Belge, 2008/24387. Arrêté royal établissant des normes de produits pour la dénomination de matériaux compostables et biodégradables, Chapter 3, Article 5

⁶⁷ Loi n° 2020-105 relative à la lutte contre le gaspillage et à l'économie circulaire

6.9 Summary of findings

It is clear from the findings in this study that compostable packaging has a role to play in reducing plastic contamination within our environment as outlined in Figure 5 below. Compostable flexible packaging can play the role of the golden thread across three key EU policy commitments detailed within this study:

Key policy 1- Increase plastic recycling and reduced pollution

- Increasing compostable materials, particularly to replace flexible films, would increase the overall recyclability of materials and avoid polluting the environment (both marine and terrestrial).

Key policy 2- Increase biowaste recycling

- Compostable items such as caddy liners, or compostable bags used as caddy liners such as for fruit and veg and films would increase the biowaste quantities captured at facilities and reduce plastic contamination in compost.

Key policy 3 - Increase quality of biofertilizer

- Quality of compost is improved through higher volume of compostables and reduced plastic, which is main reason for compost failing quality checks.

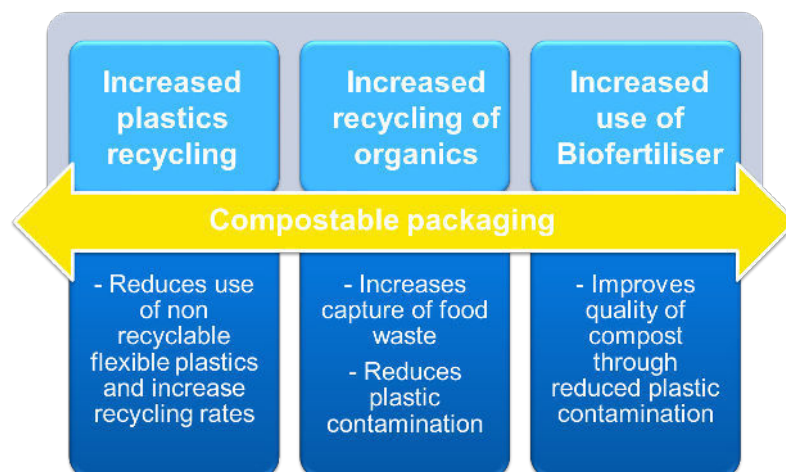


Figure 4 - illustrating how compostable packaging can support the achievement of key EU and national policies

7 Conclusions

In conclusion, following our review of international use and processing of compostable packaging and the legislative and policy frameworks that currently exist, it is clear that compostables, and in particular flexible compostable solutions, could play a significant role in achieving EU targets and objectives.

Across the EU there is a piecemeal approach to policy implementation that relates to packaging and specifically compostable packaging.

Where supporting policies exist then there are examples of compostable business models are successful and viable. This would suggest that the failure is not with the compostables themselves but the lack of support and coordination across the value chain.

Table 4 summaries the main policy recommendations.

| Main policy recommendations required to support compostable packaging |
|--|
| <ul style="list-style-type: none">• Mandate the use of easily implemented compostables which have proven to be successful such as food waste caddy liners, fresh produce bags, tea bags, coffee pods, sticky labels on fruit and vegetables, sandwich boxes and prepared food trays. Likewise mandate that traditional plastics shall not be used in these same applications to avoid cross contamination. |
| <ul style="list-style-type: none">• Adopt consistent policies to support the use of compostables and penalise other packaging that is non-recyclable for example through higher compliance fees through EPR schemes. |
| <ul style="list-style-type: none">• Implement stronger standards for compost with a near zero tolerance for plastic contamination in both inputs and outputs. |
| <ul style="list-style-type: none">• Develop clear and consistent labelling guidance to educate consumers and producers. |
| <ul style="list-style-type: none">• Develop clear and consistent terminology to avoid unhelpful and potentially harmful terms that confuse and disrupt the market. |

Table 5 - Illustrating the key policies recommendations required to support compostable packaging

Appendices

A1 Packaging Essential Requirements

The Essential Requirements were first introduced as part of the Packaging and Packaging Waste Directive⁶⁸ (Directive 94/62/EC). All packaging placed on the EU market is required to comply with the Essential Requirements. The requirements set out standards which must be met for the manufacturing and composition of packaging, the reusable and/or recoverable nature of packaging, and limit the hazardous materials in packaging.

The European Commission conducted a review of the Essential Requirements⁶⁹ as it was felt that they do not reflect current options for end-of-life management of packaging materials, the range of packaging materials and types placed on to the market, or the growing concerns regarding climate change and littering. There was also a concern that there was a lack of enforcement of the requirements due to their “vague nature”.

As part of the review of the Essential Requirements, the characteristics of packaging design could be found to inhibit the sorting, reuse and recycling of packaging material. Despite the fact that the recycling of organic matter can be counted towards a member state’s recycling target, the growth of composite and more complex packaging materials being placed on the market has magnified the issues of the current systems in place for end-of-life treatment across the EU. For example, compostable plastics are technically recyclable if they are separated into a pure feedstock for processing, however, this is not intended or currently implemented practically at a large scale in Europe. Across the EU, approximately 25% of bio-waste (equivalent to 30million tonnes per annum [M tpa]) is effectively recycled into high-quality compost and digestate per year⁷⁰. In comparison, the current recycling rate for LLDPE/LDPE flexible film in Europe is approximately 31%⁷¹ - it is estimated that around 62% of household and commercial PE flexible film is collected in Europe, 21% from households and 41% from the commercial stream. The output from the recycling process is PE polymer in pellet form.

Within the current Essential Requirements there is a lack of clarity in the definitions provided for biodegradable and compostable packaging, allowing them to be open for interpretation and misunderstanding of when their use might or might not be appropriate. There is recognition via the EU’s Strategy for Plastics in a Circular Economy that clarification of terms is required, and this is being explored further in a future study for the European Commission on the use of compostable packaging materials. The future study could impact the compostable packaging industry by limiting its use to compostable packaging to certain applications, regulating the marketing standards for compostable packaging materials and implementing further limits on micro-plastics found in compost to ensure quality in line with the EU Fertilising Products Regulation.

Relevance:

The review of the Essential Requirements offers an opportunity to provide clarification and standard around the terminology used for compostable plastic packaging materials with the aim of increasing the uptake in use of this type of material.

⁶⁸ European Commission. 2019. Packaging and Packaging Waste [online]. Available at: <https://ec.europa.eu/environment/waste/packaging/legis.htm>

⁶⁹ European Commission (2020) Effectiveness of the Essential Requirements for Packaging and Packaging Waste and Proposals for Reinforcement

⁷⁰ European Compost Network. 2020. Bio-waste in Europe [online]. Available at: <https://www.compostnetwork.info/policy/biowaste-in-europe/> [Accessed 14 May 2020]

⁷¹ Plastic Recyclers Europe (2019) Flexible polyethylene recycling in Europe. Accelerating the transition towards circular economy.

A2 EU A Farm to Fork Strategy

The EU's Farm to Fork Strategy⁷², published on 20th May 2020, aims to ensure that European citizens get healthy, affordable and sustainable food by 2030 with four key areas of focus:

- By 2030 reduce the amount of chemical and other hazardous pesticides used in the agricultural sector by 50%;
- Protect soil fertility by reducing fertiliser use by at least 20% by 2030 and to reduce the nutrient losses from soil by at least 50%;
- Reduce by 50% the sales of antimicrobials for farmed animals and in aquaculture by 2030;
- Aim to have 25% of total farmland in the EU under organic farming by 2030.

The EU has pushed for a sustainable streamlined approach to the food chain due to the number of deaths across the EU being attributed to unhealthy diets (one out of five deaths in 2017). Over half of the adult population are now overweight, contributing to a high prevalence of diet-related diseases (including various types of cancer) and related healthcare costs⁷³. To provide household consumers with accurate information to enable them to make better nutritional choices for food the EU wishes to develop a mandatory labelling system for front-of-pack nutrition information, as well as information regarding the environmental and social aspects of food production.

Another key aspect of the strategy is to tackle the high level of food waste across the EU. It is estimated that 88 million tonnes of food waste are generated in the EU each year with estimated cost of €143 billion to deal with this waste stream⁷⁴. The Commission will require Member States to monitor food waste generation and have food waste prevention plans in place as part of the aims to set legally binding targets to reduce food waste across the EU by 2023 to achieve the overall aim of halving per capita food waste at retail and consumer levels by 2030 in line with the UN's Sustainable Development Goal 12.3⁷⁵. In order to tackle the high levels of food waste there will be a review the misunderstanding and misuse of date marking ('use by' and 'best before' dates) which adds to the amount of food wasted each year in Europe⁷⁶.

The Farm to Fork Strategy acknowledges that food packaging plays a key role in the sustainability and safety of food systems.

Relevance:

Food packaging plays a key role in the sustainability of food systems. By promoting the use of compostable plastic packaging for food products, the waste which arises from food products will limit the amount of plastic contamination found in the wider environment.

⁷² European Commission. 2020. From Farm to Fork [online] Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en

⁷³ European Commission (2020) A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system

⁷⁴ European Commission. 2020. Frequently asked questions: Reducing food waste in the EU [online]. Available at: https://ec.europa.eu/food/sites/food/files/safety/docs/fw_lib_reduce-food-waste-eu_faqs.pdf

⁷⁵ European Environment Agency (2020) Bio-waste in Europe — turning challenges into opportunities

⁷⁶ European Commission (2020) A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system

A3 Standards for compost

A3.1 ECN-QAS

The European Compost Network (ECN) developed a concept for a pan-European quality assurance scheme (ECN-QAS) in 2010. ECN-QAS sets out requirements for national quality assurance organisations, process management and compost and digestate quality criteria. It provides a common basis for existing quality standards in Europe and supports Member States to develop their own quality assurance schemes for compost.⁷⁷

In the medium term, it is anticipated that the development and implementation of the ECN-QAS will help support Member States to effectively recycle compostable waste materials into products that are beneficial for the environment and human health. The long-term aim for the ECN is to establish a benchmark for quality assurance schemes for compost and digestate products and establish a European-wide product standard for quality compost and digestate.

A3.2 United Kingdom - PAS100 & PAS110

In the UK, there are two standards which provide confidence in the quality and consistency of the compost material being produced - PAS100:2011 and PAS110:2010⁷⁸.

PAS100 is the standard which ensures that compost material made from green waste and green-food waste meet the relevant standard requirements⁷⁹. PAS110 covers the anaerobic digestion (AD) systems that accept segregated biowaste materials⁸¹. The Renewable Energy Assurance Ltd (REAL) operates the Certification Schemes which accredit materials to PAS100 and PAS110 specifications.

In 2018, PAS100 was updated to include:

- A new 'compost quality' clause making clearer the existing requirements to produce compost that is fit-for-purpose (suitable for intended use) by checking and agreeing with customers in writing any quality requirements that are more stringent or wider ranging than the minimum baseline quality requirements specified in the PAS.
- Requirements for a team approach to developing a Safety and Quality Control System (SQCS). PAS 100:2018 requires producers to set up a SQCS to consider hazards affecting quality as well as safety, relevant to the intended use of the compost. This also relates to the new 'compost quality' clause.

A requirement for compost to be re-assessed for compliance with the requirements of the 'compost quality' clause when stored for a period of six months or longer.

A requirement that restricts the dispatch of sampled batches of compost for use until after the test results have been checked for conformance to PAS 100.

The Environment Agency is undertaking a review of the accepted contaminant levels within compost material, specifically plastic contaminants. Currently, composting facilities received an input feedstock of material which typically contains 2-3% of contamination from plastic and other litter. The current PAS 100 standard allows an equivalent of approximately 150 plastic bags per tonne at a contamination rate of around 5% weight/weight (w/w)⁸².

⁷⁷ European Compost Network. 2020. Quality Assurance for Compost and Digestate [online]. Available at: <https://www.compostnetwork.info/about-ecn/workstructure/quality-assurance-compost-digestate/>

⁷⁸ WRAP. 2020. Laboratory Proficiency Scheme PAS 100 and PAS 110 certification [online]. Available at: <https://www.wrap.org.uk/content/laboratory-proficiency-scheme-pas-100-and-pas-110-certification-0>

⁷⁹ CIWM. 2020. PAS100 [online]. Available at: <https://www.ciwm.co.uk/ciwm/knowledge/pas100.aspx>

⁸⁰ Compost Certification Scheme. 2020. PAS100 Compost Quality Standard [online]. Available at: <http://www.qualitycompost.org.uk/standards/pas100>

⁸¹ WRAP. 2020. BSI PAS 110 – Producing quality anaerobic digestate [online]. Available at: <https://www.wrap.org.uk/content/bsi-pas-110-producing-quality-anaerobic-digestate>

⁸² Environment Agency (2019) Standard rules consultation no 20: revision of standard rules sets for biowaste treatment

The Environment Agency is proposing to limit this feedstock contamination level to just 0.5%. Compostable and biodegradable plastic will be permitted only if the packaging complies with EN 13432 or other recognised compostable packaging standards. Although there has been concern raised over the potential of increased littering of plastics labelled as ‘compostable’ or ‘biodegradable’ by end-users, there is limited evidence that these materials would be a significant proportion of the overall plastic material which is littered. The Environment Agency is looking to this stricter limit due to the reduced confidence in using compost and digestate for agriculture due to the leakage of micro-plastics into the soil and potential for an increased risk to workers.

This would require facilities to introduce strict acceptance procedures to demonstrate that contamination levels are minimised. The Environment Agency has suggested that an effective way to help control the feedstock is to exclude all non-compostable plastic and packaging. The proposals have been seen as contentious since facilities are reliant on the feedstock they receive from local authorities, and therefore, householders and local authorities will need to play a more significant role to reduce the contamination taking place at source.

A3.3 France – NF U44-095 & NF U44-051

France was one of the first countries to introduce a product status of compost material (later becoming “end-of-waste” status) through the Rural Code and the French compulsory standards NFU 44-051 and NFU 44-095. Of the nearly 2.5 Mt of compost produced annually in France, 80% reach the mandatory quality standards⁸³. These standards have helped to drive the quality of compost produced in composting facilities, regardless of the raw material feedstock.

The French standard NF U 44-051: 2006 (NF U 44-095 for composts from sewage sludges) describes both the agronomic quality (minimum carbon content, C/N ratio etc.) and the maximum values for a number of contaminant and inert compounds to which composts must comply with before it can be used on fields⁸⁴. The packaging contaminant levels are described in the table below:

| Inert materials and impurities | Films + PSE** > 5 mm | Other plastics > 5 mm | Glass + metal pieces > 2 mm |
|--------------------------------|-------------------------|-----------------------|--------------------------------|
| Limit values, % DM* | < 0.3 | < 0.8 | < 2.0 |

* DM: dry matter

** PSE: expanded polystyrene

Table 6 - Limit values for inert materials and impurities prescribed by the French Standard NF U 44051

A3.4 Italy – CQL Label

The Italian Composting and Biogas Association (in Italian: Consorzio Italiano Compostatori - CIC) introduced the “CIC Quality Compost Label” (CQL) for compost materials, to verify and assess the quality produced in composting facilities in Italy⁸⁵. The CQL was introduced in 2003 as a voluntary programme. By 2017, approximately 33% of compost produced in Italy had been assessed and labelled under the CQL programme (equivalent to about 600,000 tonnes)⁸⁶.

Under the CQL, compost is divided into three categories, based on what feedstock has been used:

- Green Compost (GWC): compost produced from green waste only;
- Biowaste Compost (BWC): compost produced from biowaste, including both food- and green-waste;

⁸³ FNADE. 2016. FNADE Position – Revision of the EU Fertiliser Regulation [online]. Available at: <https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=13856&no=37>

⁸⁴ Isabelle Zdanevitch, Olivier Bour (2011). Quality of composts from municipal biodegradable waste of different origins. 13. International Waste Management and Landfill Symposium (Sardinia 2011). pp.87-88. ffineris-00976230v2

⁸⁵ Italian Composting and Biogas Association (2017) Annual Report on Biowaste Recycling

⁸⁶ Italian Composting and Biogas Association. Presentation of the CIC’s quality label for compost [online]. Available at: <https://www.compostnetwork.info/wordpress/wp-content/uploads/CIC-QAS-Activity-Report.pdf>

- Sludge Compost (SWC): compost produced including also sludge inside the mixture of different feedstock

The figure below provides clarification on the type of audits carried out by the CIC on compost process.

| TYPES OF WASTE-AUDITS ON BIOWASTE PERFORMED BY CIC | |
|--|--|
| 1 | Composition of incoming food waste, so to determine the percentage of non-compostable materials not suitable for composting |
| 2 | Micro analysis which consist in product waste composition analysis of the contents of a single bag, for groups of bags of different types of material (<i>not described in the present document</i>) |
| 3 | Analysis on the type of bags used for the separate collection of biowaste, to distinguish the origin and type of material bags are made of |

Figure 5 - Types of waste audits on biowaste performed by CIC

Most of the products which have been awarded the CQL are made up from BWC or SWC (41 products, around 520.000 tons of compost produced from biowaste). In comparison, 13 green compost products (approx. 84,500 tonnes) have been accredited to the CQL standard.

Following several audits in 2015, the CIC were able to calculate the average amount (by weight) of contamination received in AD and composting facilities was 4.8%, with the best cases have less than 2% contamination. Of the contamination seen in AD and compost facilities 42.2% was due to plastic items and 23.4% was due to plastic bags and carriers⁸⁷.

Relevance:

Increase use of compostable plastics for collection of bio-waste, especially food waste, can help to reduce the amount of plastic contamination found in compost materials and ensure that the stricter limits regarding contamination levels are adhered to.

⁸⁷ Italian Composting and Biogas Association (2017) Annual Report on Biowaste Recycling

A4 Plastics Pact

Coordinated by the Ellen MacArthur Foundation⁸⁸, the Plastics Pact is a network of initiatives which brings together key stakeholders to implement solutions towards a circular economy for plastic. Each of the Plastics Pact initiatives are led by a local organisation and brings together governments, businesses, and citizens behind a common vision to reduce the use of plastics via a set of ambitious targets:

- Eliminate unnecessary and problematic plastic packaging through redesign and innovation
- Move from single use to reuse where relevant
- Ensure all plastic packaging is reusable, recyclable, or compostable
- Increase the reuse, collection, and recycling or composting of plastic packaging
- Increase recycled content in plastic packaging

The first national Plastics Pact was launched in the UK, led by WRAP in 2018. The number of other Plastics Pact initiatives has increased since 2018 on a global scale as can be seen in Figure 7.



Figure 6 - Global Network of Plastic Pact

The wider European Plastic Pact⁸⁹ was launched on 6th March 2020, it intends to support and strengthen the EU regulations by setting common objectives and to encourage cooperation, innovation and harmonisation at the European level. The European Plastic Pact brings together businesses from the whole plastic value chain along with public organisations, governments and NGOs to create a circular economy for plastics. In total 17 countries have joined the European Plastic Pact.

The European Plastic Pact's objectives try to harmonise the individual goals which have been set at national level by signatories:

- To design all plastic packaging and single-use plastic products brought to the market by participants to be reusable where possible, and in all cases to be recyclable by 2025.

⁸⁸ Ellen MacArthur Foundation. 2020. Plastics Pact [online]. Available at: <https://www.newplasticseconomy.org/projects/plastics-pact>

⁸⁹ European Plastics Pact. 2020. [online] Available at: <https://europeanplasticspact.org/>

- To shift towards a more responsible use of plastic packaging and single-use plastic products, aiming for a reduction in virgin plastic products and packaging of at least 20% (by weight) by 2025, with half of this reduction coming from an absolute reduction of plastics.
- To raise the collection, sorting and recycling capacity in the involved countries of all plastics used in packaging and single use products by at least 25 percentage points by 2025 and to reach a quality standard of the output of the collection, sorting, and recycling process that matches market demand for recycled plastics.
- To boost recycled plastics use in new products and packaging as much as possible by 2025, with plastics-using company achieving an average of at least 30% recycled plastics (in weight) in their range of products and packaging.

The European Plastic Pact does not have a specific target relating to compostable plastic packaging, however, it has stated that whilst compostable plastic packaging is not a blanket solution⁹⁰, it can be part of the solution for specific targeted applications, such as in the food waste sector.




Table 7 shows a summary of whether the countries included in the desktop review have a national Plastic Pact or if their Governments are signatories to the wider European Plastic Pact.

| Country | Independent National Plastic Pact | European Plastic Pact – Government Signatories |
|-------------|-----------------------------------|--|
| Austria | No | No |
| Belgium | Yes* | Yes |
| Finland | No | Yes |
| France | Yes | Yes |
| Germany | No | Yes |
| Ireland | YesYes* | No |
| Italy | No | Yes |
| Netherlands | Yes | Yes |
| Poland | No | No |
| Portugal | Yes | Yes |
| Slovenia | No | Yes |
| Spain | No | Yes |
| UK | Yes | No |

Table 7 - Plastic Pact signatories

*Not named 'Plastic Pact' - The Belgian Food Industry Federation (Fevia) published six targets regarding plastic packaging applicable to the Flanders region⁹¹/ Repak's Plastic Pledge.⁹²

Key:

| | |
|---|---|
|  | Both National and EU Plastic Pact in place |
|  | Either National or EU Plastic Pact in place |
|  | No National or EU Plastic Pact in place |

Several countries have introduced or plan to introduce specific targets for compostable packaging materials either in their Plastics Pact commitments or as part of wider packaging policies such as a Plastic Road Map. A recent report from SYSTEMIQ⁹³ presents a road map for cutting 80% of the plastic leakage to the ocean by 2040, and although recycling and reuse play a big role, the report also emphasises the need to substitute hard-to-recycle/non-recyclable materials with compostable

⁹⁰ European Plastic Pact. 2020. European Plastics Pact FINAL [online]. Available at: <https://europeanplasticspact.org/wp-content/uploads/2020/03/European-Plastics-Pact-FINAL.pdf>

⁹¹ Bioplastics News. 2019. New Plastics Pact in Belgium [online]. Available at: <https://bioplasticsnews.com/2019/06/26/new-plastics-pact-in-belgium/>

⁹² REPAK. 2020. Plastic Pledge [online]. Available at: <https://repak.ie/members/plastic-pledge/>

⁹³ SYSTEM IQ (2020) Breaking the Plastic Wave: A comprehensive assessment of pathways towards stopping ocean plastic pollution

alternatives. They estimate that 17% of the 'Business as Usual' plastic waste (equivalent to 71 million tonnes) can be substituted by 2040:

- 4.5 per cent to paper,
- 3.5 per cent to coated paper, and
- 9 per cent to compostable material.

There are several national Plastics Pact initiatives in place around the world. These include the UK, France, the Netherlands and Portugal on a European level. Currently, the Circula El Plástico in Chile is the only Plastics Pact in South America. In 2020, the first African Pact joined the network - The South African Plastics Pact. The European Plastics Pact is the first regional initiative to join the network. A number of other national initiatives are expected to be implemented in the near future⁹⁴.

7.1.1 The UK Plastics Pact

The UK was the first⁹⁵ in 2018 setting out 4 key objectives for signatories to achieve by 2025:

- Ensure that 100% of plastic packaging is reusable, recyclable or compostable
- Ensure that 70% of plastic packaging is effectively recycled or composted
- Take actions to eliminate problematic or unnecessary single-use packaging items through redesign, innovation or alternative (reuse) delivery models
- Achieve 30% average recycled content across all plastic packaging

The UK Plastic Pact has a significant number of signatories from the retail sector who are pushing their suppliers to make changes to product packaging in part as a response to consumer pressure.

The UK Plastic Pact and WRAP have taken an additional step to review the target linked to compostable plastic packaging. It is estimated that compostable plastic accounts for around 0.5% of consumer plastic packaging in the UK. This equates to approximately 8,000 (±1,000) tonnes, with 80% expected to be flexible plastics and 20% rigid. They have published a dedicated document providing guidance on the considerations required when looking at the use of this type of packaging material. According to the document "one of the most commonly cited situations where compostable plastics could be particularly useful is for flexible packaging/products that are likely to be contaminated with food and can facilitate the recycling of food waste"⁹⁶. The UK Plastic Pact and WRAP also identify that clear and appropriate labelling is required to ensure that end-users are correctly informed about how they can dispose of this type of packaging material. Other beneficial applications for compostable packaging which are explored in the document include loose fruit and vegetable bags, tea bags, coffee pods and food waste caddy liners.

A4.1 The French Plastics Pact

France implemented its own national Plastic Pacts with similar ambitions and targets to the UK in 2019. The Ministry of Ecological and Solidarity Transition and leading producers and retailers as well as NGOs have signed the pact. Below are the six targets listed in the French Plastic Pact⁹⁷:

- Elimination of problematic or unnecessary plastic packaging through redesign, innovation, and new delivery models is a priority
- Reuse models are applied where relevant, reducing the need for single-use packaging
- All plastic packaging is 100% reusable, recyclable, or compostable
- All plastic packaging is reused, recycled, or composted in practice
- The use of plastics is fully decoupled from the consumption of finite resources
- All plastic packaging is free of hazardous chemicals, and the health, safety, and rights of all people involved are respected

⁹⁴ Ellen MacArthur Foundation. 2020. Plastics Pact [online]. Available at: <https://www.newplasticseconomy.org/projects/plastics-pact>

⁹⁵ WRAP. 2020. The UK Plastics Pact [online]. Available at: <https://www.wrap.org.uk/content/the-uk-plastics-pact>

⁹⁶ WRAP (2020) Considerations for compostable plastic packaging.

⁹⁷ Ministère de la Transition Écologique et Solidaire (2019) National pact on plastic packaging

The French Plastic Pact also requires signatories to –commit to specific targets for their industry sector⁹⁸. The Pact has also been designed to allow evolution to broaden its scope to account for all segments of the plastic value chain, all plastic product types and packaging, and to possibly revise targets following annual reviews of members' actions.

A4.2 The Dutch Plastics Pact

The Netherlands also implemented their Plastics Pact in February 2019⁹⁹. Over 60 signatories have signed up to the Dutch Plastics Pact and in doing so have committed to achieving the below by 2025¹⁰⁰:

- single-use plastic products and packaging will be 100% recyclable;
- 20% less plastic packaging through, among other things, greater reuse;
- at least 70% of single-use products and packaging will be recycled;
- these products will comprise at least 35% recycled plastic.

A key feature of the Dutch Plastics Pact is their public platform to share best practices, which supports businesses to overcome challenges and matches organisations together to create solutions¹⁰¹.

Relevance:

The development of voluntary European and national level Plastic Pacts shows that there is an increased scrutiny on how plastic packaging materials are used and disposed, and the acknowledgement that compostable plastic packaging has role to play in the development of how plastics are viewed. The Plastic Pacts also show that there is increased awareness from producers and retailers, and a demand for action from governments and EU policy makers to reflect the targets in mandatory legislation.

⁹⁸ Ministère de la Transition Écologique et Solidaire (2019) National pact on plastic packaging

⁹⁹ Nederland Circulair. 2020. Plastic Pact NL [online]. Available at: <https://www.circulairondernemen.nl/subcommunities/more-with-less-plastic> [Accessed 30 July 2020]

¹⁰⁰ Food Packaging Forum. 2020. Dutch Plastic Pact publishes baseline data [online]. Available at: <https://www.foodpackagingforum.org/news/dutch-plastic-pact-publishes-baseline-data>

¹⁰¹ Nederland Circulair. 2020. Plastic Pact NL [online]. Available at: <https://www.circulairondernemen.nl/subcommunities/more-with-less-plastic> [Accessed 30 July 2020]

A5 Compostable Packaging Commitments

Several countries have introduced or plan to introduce specific targets for compostable packaging materials either in their Plastic Pact commitments or as part of wider packaging policies.

| Country | Compostable Packaging Commitments |
|---------|--|
| Austria | The Austrian government has banned the sale of non-biodegradable plastic carrier bags as of January 2020 ¹⁰² (100% biodegradable alternatives are now being promoted) - Developing Plastic Road Map ¹⁰³ |
| Belgium | <p>The federal level only provides the framework for transposing relevant EU legislation. Detailed legislation is decided by the three regions separately (Wallonia, Brussels, Flanders).</p> <p><u>Wallonia</u> – All single-use plastic bags are banned from point of sale; only reusable bags are allowed to be sold¹⁰⁴. From 1 March 2020: primary packaging of fruit and vegetables sold in bulk bags must contain, a minimum of 40 % bio-sourced material and they must be compostable at home; for packaging by the retailer of wet, liquid or liquid-containing foodstuffs sold at retail. These bags must have a minimum bio-sourced content of 40 % (60 % from 1 January 2025) and be compostable at home¹⁰⁵.</p> <p><u>Brussels</u>¹⁰⁶ – All plastic bags below 50µ thickness are banned in Brussels. Exceptions exist for bags with less than 15µ used for packaging aquatic plants and animals until 31 Dec 2029; bags at least 40% bio-based, and home compostable for fruit and veg sold in bulk until 29 Feb 2020; moist and liquids food packaging until 31 Dec 2024; Bags at least 60% bio-based and home compostable for liquids can be sold until 31 Dec 2029.</p> <p><u>Flanders</u> - Law in preparation to no longer use lightweight plastic carrier bags free of charge</p> |
| Finland | Plastic Roadmap is in development ¹⁰⁷ |
| France | In 2016, France adopted a 'Green Growth and Energy Transition law', making mandatory the use of bio-based, home-compostable packaging for certain uses like vegetable bags in supermarkets, with packaging to contain 30 per cent bio-based content by 2017, 40 per cent by 2018, 50 per cent in 2020, and 60 per cent in 2025 ¹⁰⁸ |
| Germany | <p>Article 21* of the Packaging Act (VerpackG)¹⁰⁹ ¹¹⁰ requires that “systems are obliged to create incentives for the production of packaging that requires participation as part of the assessment of the participation fee:</p> <ol style="list-style-type: none"> 1. to demand the use of materials and material combinations which can be recycled to the highest possible percentage taking into account the practice of sorting and use, and 2. To demand the use of recyclates and renewable raw materials” |

¹⁰² Republik Österreich. 2019. Plastiksackerliverbot im Nationalrat beschlossen [online]. Available at: https://www.parlament.gv.at/PAKT/PR/JAHR_2019/PK0762/index.shtml?utm_source=POLITICO.EU&utm_campaign=efa7d9a527-EMAIL_CAMPAIGN_2019_07_03_01_19&utm_medium=email&utm_term=0_10959edeb5-efa7d9a527-189683917

¹⁰³ Altstoff Recycling Austria (2019) Circular Plastics 2030

¹⁰⁴ Environment Wallonie. 2020. Interdiction des sacs plastiques en Région wallonne. Note information. [online]. Available at: http://environnement.wallonie.be/dechets/interdiction_SP_synthese.htm

¹⁰⁵ European Environment Agency (2019) Preventing plastic waste in Europe

¹⁰⁶ Environment Brussels. 2020. FAQ – Interdiction des sacs en plastique à usage unique (<50microns) [online]. Available at: <https://environnement.brussels/thematiques/dechets-ressources/vos-obligations/interdiction-des-sacs-plastiques/faq-interdiction-des>

¹⁰⁷ Muovitielkarta (2019) Reudce and refuse, recycle and replace. A plastic roadmap for Finland.

¹⁰⁸ French Government. 2016. Energy transition [online]. Available at: <https://www.gouvernement.fr/en/energy-transition#:~:text=The%20Act%20of%2017%20August%202015%20on%20energy%20transition%20for,order%20to%20boost%20green%20growth>

¹⁰⁹ Bioplastics News. 2019. European bioplastics demands complete implementation of new German packaging law [online]. Available at: <https://bioplasticsnews.com/2019/10/31/european-bioplastics-demands-complete-implementation-of-new-german-packaging-law/>

¹¹⁰ Resource. 2017. Germany: New packaging law sets new targets for packaging recycling [online]. Available at: <https://resource.co/article/germany-new-packaging-law-sets-new-targets-packaging-recycling-11933>

| | |
|-------------|--|
| Ireland | Waste Action Plan for a Circular Economy under development - includes the provision of an organic waste bin will be mandatory as part of a waste collection service for all households. ¹¹¹ |
| Italy | New compostable packaging EPR scheme announced & tax on non-recyclable plastic packaging (compostable plastic materials are exempt) has been delayed due to Covid-19 ¹¹² |
| Netherlands | All single-use plastic products and packaging marketed by Plastic-Using Companies will contain the highest possible percentage of recycled plastics (in kg12), with each company achieving an average of at least 35%. Moreover, the plastics used will as much as possible be sustainably produced biobased plastics, in order to reduce the use of virgin fossil-based plastics ¹¹³ |
| Poland | None |
| Portugal | All plastic packaging is 100% reusable, recyclable, or compostable by 2025 ¹¹⁴ |
| Slovenia | Ljubljana is committed to be a zero-waste city and will continue to increase the coverage of separate household waste collection (including segregated bio-waste) by 78% by 2025, and to 80% by 2035 ¹¹⁵ . |
| Spain | From January 2021, lightweight and ultra-lightweight plastic bags will be banned, apart from compostable bags. This ban coincides with the full implementation of segregated collections of bio-waste from households ¹¹⁶ |
| UK | All plastic packaging is 100% reusable, recyclable, or compostable by 2025 ¹¹⁷ |

Table 8 - Compostable packaging commitments in Europe

*Article 21 not yet implemented into German Law

¹¹¹ Department of Communications, Climate Action & Environment. 2020. Public consultation waste action plan for a circular economy [online]. Available at: <https://www.dccae.gov.ie/en-ie/environment/consultations/Pages/Public-Consultation-Waste-Action-Plan-for-a-Circular-Economy.aspx>

¹¹² Sustainable Plastics. 2020. Italy finally approves new stimulus plan, postpones Plastic Tax [online]. Available at: <https://www.sustainableplastics.com/news/italy-finally-approves-new-stimulus-plan-postpones-plastic-tax>

¹¹³ Plastics Pact NL (2019). Plastics Pact NL 2019-2025. Frontrunners to do more, with less plastic in the circular economy

¹¹⁴ Smart Waste Portugal. 2020. Pacto Português para os plásticos [online]. Available at:

<http://www.smartwasteportugal.com/pt/atividades/pacto-portugues-para-os-plasticos/metast/>

¹¹⁵ Zero Waste Europe (2019) The story of Ljubljana. Case Study #5

¹¹⁶ Futur Enviro. 2018. Spanish government passes Royal Decree to reduce plastic bag consumption. From July 1, all bags must be charged for (except ultra-light bags and thicker recyclable bags) [online]. Available at: <https://futurenviro.es/en/spanish-government-passes-royal-decree-to-reduce-plastic-bag-consumption-from-july-1-all-bags-must-be-charged-for-except-ultra-light-bags-and-thicker-recyclable-bags/>

¹¹⁷ WRAP. 2020. The UK Plastics Pact [online]. Available at: <https://www.wrap.org.uk/content/the-uk-plastics-pact>

A6 EPR Packaging Material Fees

A6.1 Austria – Altstoff Recycling Austria¹¹⁸

| Household packaging | Rates (€/kg) excl. VAT | |
|--|------------------------|-----------------|
| | from 01.01.2019 | from 01.01.2020 |
| 1.01.0 Paper, household | 0.090 | 0.120 |
| 1.02.0 Glass, household | 0.087 | 0.087 |
| 1.03.1 Ferrous metal, household | 0.260 | 0.275 |
| 1.03.2 Aluminium, household | 0.290 | 0.310 |
| 1.04.1 Plastic, household | 0.630 | 0.695 |
| 1.04.2 Beverage cartons, household | 0.580 | 0.650 |
| 1.04.3 Other composite materials, household | 0.640 | 0.730 |
| 1.04.4 Ceramics, household | 0.120 | 0.120 |
| 1.04.5 Wood, household | 0.018 | 0.018 |
| 1.04.6 Textile fibres, household | 0.150 | 0.150 |
| 1.04.7 Biodegradable materials, household | 0.400 | 0.400 |
| Commercial packaging | from 01.01.2019 | from 01.01.2020 |
| 2.01.0 Paper, commercial | 0.030 | 0.033 |
| 2.02.0 Glass, commercial | --- | --- |
| 2.03.1 Ferrous metal, commercial | 0.055 | 0.060 |
| 2.03.2 Aluminium, commercial | 0.070 | 0.080 |
| 2.04.1 Foils, commercial | 0.070 | 0.080 |
| 2.04.2 Moulded containers, commercial | 0.070 | 0.070 |
| 2.05.0 EPS, commercial | 0.190 | 0.190 |
| 2.06.0 Beverage cartons, commercial | --- | --- |
| 2.07.0 Other composite materials, commercial | 0.100 | 0.100 |
| 2.08.0 Ceramics, commercial | 0.100 | 0.100 |
| 2.09.0 Wood, commercial | 0.006 | 0.007 |
| 2.10.0 Textile fibres, commercial | 0.100 | 0.100 |
| 2.11.0 Biodegradable materials, commercial | 0.100 | 0.100 |

¹¹⁸ Altstoff Recycling Austria (2020) List of Tariff Rates

A6.2 Belgium – Fost Plus¹¹⁹

| Code | Material | Tariff EUR/kg (excl. VAT) |
|---|--|---------------------------|
| Recycle | | |
| 001 | Glass | 0,0403 |
| 002 | Paper – Cardboard (≥85%) | 0,0594 |
| 003 | Steel (≥50%) | 0,177 |
| 004 | Aluminium (≥50% and ≥50μ) | 0,0496 |
| 005 | PET bottles, flasks, caps* | 0,2461 |
| 007 | HDPE bottles, flasks, caps | 0,3578 |
| 011 | Plastic - Other | 0,7112 |
| 008 | Beverage cartons | 0,5740 |
| Valued | | |
| 012 | Complex packaging, the main material of which is paper and cardboard | 0,8535 |
| 013 | Aluminium packaging <50 μ composed of aluminium only | 0,8535 |
| 014 | Expanded polystyrene (EPS), compostable expanded polystyrene (XPS) plastic trays Complex packaging, the majority of which is plastic Aluminium plastic packaging | 0,8535 |
| 016 | Wood, cork, textiles, etc. | 0,8535 |
| Non-valued | | |
| 017 | Complex packaging, the majority of which is glass | 1,068 |
| 018 | Complex material, the majority of which is steel | 1,068 |
| 019 | Ceramic, stoneware, porcelain etc. | 1,068 |
| * the PET tariff applies to bottles and flasks made of transparent and also colourless, green or blue PET, as well as to PET caps | | |
| ** Except Expanded polystyrene (EPS), compostable expanded polystyrene (XPS) plastic trays | | |

¹¹⁹ Fost Plus. 2020. Rates [online] Available at: <https://www.fostplus.be/en/enterprises/your-declaration/rates>

A6.3 Finland - RINKI¹²⁰

| MATERIAL | | Recycling fee * |
|----------|--|-----------------|
| | | €/ton |
| FIBRE | Corrugated cardboard packaging for consumers | 9.50 |
| | Corrugated cardboard packaging for firms | 9.50 |
| | Industrial wrapping and sacks | 14.00 |
| | Industrial cores | 14.00 |
| | Carton and paper packaging | 49.50 |
| | Carton liquid packaging | 105.00 |
| PLASTIC | Plastic packaging for consumers: | |
| | Conventional plastic packaging ** | 119.00 |
| | Biodegradable plastic packaging | 119.00 |
| | Conventional shopping bags ** | 119.00 |
| | Biodegradable shopping bags | 119.00 |
| | Conventional small bags ** | 119.00 |
| | Biodegradable small bags | 119.00 |
| | Plastic packaging for firms | 54.00 |
| METAL | Aluminium packaging for consumers | 126.00 |
| | Aluminium packaging for firms | 26.00 |
| | Tinplate packaging for consumers | 126.00 |
| | Tinplate packaging for firms | 26.00 |
| | Steel packaging | 26.00 |
| GLASS | Glass packaging (non-deposit) | 98.00 |
| WOOD | FIN pallets (stamped 100 x 120 cm) | 1.45 |
| | EUR/EPAL pallets (stamped 80 x 120 cm) | 1.45 |
| | Rental pallets | 1.45 |
| | Other wooden pallets | 1.90 |
| | Cable reels | 1.45 |
| | Other wooden packaging | 1.90 |
| OTHER | Other packaging | – |

¹²⁰ Rinki. 2019. Bulletin for companies: Producer responsibility fees for packaging in 2020 [online]. Available at: <https://rinki.fi/news/news-releases/bulletin-for-companies-producer-responsibility-fees-for-packaging-in-2020/>

A6.4 Ireland - Repak¹²¹

| Packaging type (€/tonne) | Paper | Glass | Aluminium | Steel | Plastic | Plastic Bottles | Wood | Paper Comp. | Metal Comp. |
|---|---------------|---------------|---------------|---------------|----------------|-----------------|---------------|---------------|----------------|
| Materials Manufacturer | €2.05 | €2.05 | €2.05 | €2.05 | €2.36 | €2.36 | €2.05 | €2.05 | €2.05 |
| Converter | €2.05 | €2.05 | €2.05 | €2.05 | €2.36 | €2.36 | €2.05 | €2.05 | €2.05 |
| Brandholder/Importer | €22.73 | €9.18 | €83.62 | €78.51 | €102.53 | €102.53 | €10.60 | €75.78 | €111.48 |
| Distributor | €2.05 | €2.05 | €2.05 | €2.05 | €2.36 | €2.36 | €2.05 | €2.05 | €2.05 |
| Retailer | €4.10 | €4.10 | €4.10 | €4.10 | €4.71 | €4.71 | €4.10 | €4.10 | €4.10 |
| TOTAL Per tonne (if paying full fee) | €32.98 | €19.43 | €93.87 | €88.76 | €114.32 | €114.32 | €20.85 | €86.03 | €121.73 |

A6.5 Italy - CONAI¹²²

| | |
|-----------|---|
| Steel | 3,00 €/t |
| Aluminium | 15 €/t |
| Paper | 35,00 €/t from 1 st January 2020 and 55,00 €/t from 1st June 2020 55,00 €/t from 1 st January 2020 and 75,00 €/t from 1st June 2020 for multimaterial packaging with predominance of paper suitable for containing liquids |
| Wood | 9,00 €/t from 1st January 2020 |
| Plastic | Level A: 150,00 €/t, Level B1: 208,00 €/t, Level B2: 436,00, Level C: 546,00 €/t from 1st January 2020 |
| Glass | 27,00 €/t and 31,00 €/t from 1st July 2020 |

¹²¹ REPAK. 2020. Regular Member fees [online]. Available at:

https://repak.ie/images/uploads/downloads/Repak_RegularFeesJan2020.pdf

¹²² CONAI. 2020. Environmental Contribution [online]. Available at: <http://www.conai.org/en/businesses/environmental-contribution/>

A6.6 Portugal – Punto Verde¹²³

| €/Kg | Green Dot Fees 2020 | | | | | |
|---------------------|---------------------|---|---------------|-------------------------------|-----------------------------------|--------------------|
| Materials | Primary packaging | Service packaging excluding checkout bags | Checkout bags | Multipack secondary packaging | Non multipack secondary packaging | Tertiary packaging |
| Glass | 0,0211 | 0,0211 | | | | |
| Paper and Cardboard | 0,1196 | 0,1196 | 0,1196 | 0,1196 | 0,1196 | 0,1196 |
| Beverage Cartons | 0,1919 | 0,1919 | | | | |
| Plastic | 0,2035 | 0,2035 | 0,2035 | 0,2035 | 0,2035 | 0,2035 |
| Steel | 0,2102 | 0,2102 | | 0,2102 | 0,2102 | 0,2102 |
| Aluminium | 0,0294 | 0,0294 | | | | |
| Wood | 0,0524 | 0,0524 | | 0,0524 | 0,0524 | 0,0524 |
| Other Materials | 0,1250 | 0,1250 | | | 0,1250 | 0,1250 |

A6.7 Slovenia - Slopak¹²⁴

| Type of Packaging | Price €/t (exc. VAT) |
|--|----------------------|
| Glass | |
| Glass | 6,50 |
| Paper | |
| Paper – Sales | 16,50 |
| Paper – Group & Transport | 16,50 |
| Plastic | |
| Plastic – Sales | 195,00 |
| Plastic – Sales PET | 130,00 |
| Plastic – PVC | 195,00 |
| Plastic – Group & Transport | 195,00 |
| Metal | |
| Metal – Aluminium | 110,00 |
| Metal – Iron, Steel | 140,00 |
| Wood | |
| Wood | 32,00 |
| Other materials | |
| Textiles, straw | 195,00 |
| Non-recyclable | 195,00 |
| Composite materials | |
| Composite materials, in which paper predominates | 16,50 |
| Composite materials, in which plastic predominates | 195,00 |
| Beverage cartons | 9,00 |
| Packaging contaminated with hazardous substances | 570,00 |

¹²³ Sociedade Ponto Verde. 2020. Green Dot Fees 2020 [online]. Available at: https://www.pontoverde.pt/aderentes_uk/2_1_valor_a_pagar.php

¹²⁴ PRO Europe (2020) Participation Costs Overview 2020, p.45

A6.8 Spain – Ecoembes¹²⁵

| Green Dot Rate | 2009-2019 | 2020 | 2021 |
|---|-----------|-------|-------|
| Material | €/kg | €/kg | €/kg |
| Steel | 0,085 | 0,095 | 0,110 |
| Aluminium | 0,102 | 0,102 | 0,102 |
| PET | 0,377 | 0,433 | 0,490 |
| HDPE (rigid body and UNE bag) | 0,377 | 0,377 | 0,402 |
| Flexible HDPE, LDPE, compostable and other plastics | 0,472 | 0,739 | 0,856 |
| Carton for drinks and food (e.g. brick container) | 0,323 | 0,355 | 0,424 |
| Paper and paperboard | 0,068 | 0,076 | 0,082 |
| Ceramics | 0,020 | 0,020 | 0,020 |
| Wood and Corks | 0,021 | 0,021 | 0,021 |
| Other materials* | 0,472 | 0,739 | 0,856 |
| *Other materials: in this section will be all those materials that do not appear included in any specific group | | | |

¹²⁵ Ecoembes. 2020. Tarifas Punto Verde por Material [online]. Available at: <https://www.ecoembes.com/es/empresas/ingresos-punto-verde/tarifa-punto-verde-por-material>

A6.9 The Netherlands – Afvalfonds Verpakkingen¹²⁶

| Material Type | Tariff 2020 €/kg (exc. VAT) |
|--|---|
| Glass | 0,0560 |
| Paper/Cardboard | 0,0220 |
| Plastic – Regular tariff | 0,6000 |
| Plastic – Reduced tariff* | 0,3400* |
| Biodegradable Plastic** | = to the regular plastic tariff 0,6000 |
| Aluminium | 0,0500 |
| Other Metals | 0,0800 |
| Wood | 0,0200 |
| Other Materials | 0,0200 |
| General tariff | 0,7700 |
| Beverage Cartons | 0,3800 |
| Returnable bottles | 0,0200 |
| * Lower plastic rate | |
| As of January 1, 2019, it is possible to use a differentiated rate for plastics. A lower rate applies to packaging that can be properly sorted and recycled with a positive market value (see table). The conditions for eligibility for the differentiated rate are set out in a separate regulation. | |
| ** Biodegradable plastic (bioplastic) | |
| From 2013 to 2018 we applied a lower rate for biodegradable plastic that is certified according to the European standard EN 13432. Biodegradable plastic packaging is in principle biodegradable in industrial composting plants if it meets the EN 13432 standard. In recent years, the processes of composting plants have accelerated significantly. The plastic does not break down quickly enough and remains in the compost. If the biodegradable plastic ends up with the other plastic waste, it can affect the quality of the recycle. Biodegradable plastic must therefore be disposed of with residual waste for the time being and not in the organic waste / green bin or other plastic waste. This made us decide to abolish the lower rate. | |

¹²⁶ Afvalfonds Verpakkingen. 2020. Tarieven [online]. Available at: <https://afvalfondsverpakkingen.nl/verpakkingen/alle-tarieven>

A7 Stakeholder Questionnaire

Key questions were asked to all stakeholder groups.

Key Questions

- *In what type of applications do you think compostable packaging can help meet EU targets on waste and recycling?*
- *Does flexible plastic packaging pose a challenge within the recycling process?*
- *How do you think that compostable packaging can help to reduce plastic contamination in organic waste collections?*
- *How can compostable packaging help increase the amount of food waste being captured?*
- *Can compostable packaging materials be successfully integrated into the bio-waste collection and management system that will be mandatory from 2023?*

A7.1 Questionnaire for Policy Makers

Conventional Flexible Packaging

1. With conventional flexible plastic packaging being recycled at the level of $\pm 5\%$ across Europe, what measures are needed to achieve recycling targets (e.g. EU targets/Plastic Pact commitments) for this type of packaging?
2. What are the main barriers of recycling flexible packaging?
3. What happens to flexible packaging under your current waste management system? Where do these materials go for recycling and what is the final product of this process?
4. Do you believe that the EPR system in your country is effective in providing funding to the waste management sector for the recycling of flexible plastic packaging materials?
5. What policies are in place to reduce contamination of food waste in traditional plastic recycling system? What is their level of success? What are the challenges?

Bio-Waste Collections

1. Under the EU's revised Waste Framework Directive bio-waste is required to be collected separately from households by 2023; how do you plan to implement this in your country?
 - a. What role (if any) do compostable plastics and paper have in the separate food waste/bio-waste collections?
 - b. Will you mandate specific separate food waste collection or allow co-collection of food and garden waste?
 - c. Will you apply for TEEP exclusions for example for high rise buildings or rural areas?
2. How will you ensure collection of food waste is kept free from plastic/microplastic contamination?
3. What measures are being implemented to address the issues of plastic contamination in bio-waste outputs such as compost and soil fertilisers?
4. What do you feel are the biggest barriers to increasing the collection and processing of food waste in your country?

Compostable Packaging

1. Do you have or have you had compostable packaging materials collected as part of your waste management system?
 - a. If not, why are compostable packaging materials not collected?
 - b. If not, would you consider including their collection in future waste management strategies?
 - c. Do you have composting/AD facilities able and willing to accept compostable materials?
2. Do you think compostable packaging materials have a role to play in meeting EU waste and recycling targets?

3. Are you aware of organic recycling being counted as part of EU's targets for recycling?
 - a. Do you see compostable packaging playing a role in your plans to meet EU recycling targets – with particular reference to the requirements that bio-waste will not be able to go to incineration or landfill from December 2023?
 - i. How will compostable packaging be integrated into your waste collection and processing systems?
 - ii. Will you encourage home composting or use industrial composting facilities?
4. What are the main regulatory or policy drivers that exist to increase the uptake of compostable packaging in your country?
 - a. Do these go above and beyond the EU's Packaging & Packaging Waste Directive, Single-Use Plastic Directive, Landfill Directive, and the Waste Framework Directive?
5. What are the main barriers which have impacted on the uptake of compostable packaging materials in your country?
 - a. e.g. collection and/or processing of compostable materials?
6. Do you think that compostable plastic packaging has a role to play in substituting traditional flexible packaging?
 - a. If yes, in which setting do you think compostable packaging would have the most benefit? If no, why and how do you plan to increase the recycling of conventional flexible packaging and collection of bio-waste whilst decrease the plastic contamination of soil?
 - b. Do you think that packaging which is heavily contaminated with food waste should be compostable?
7. Has there been any voluntary/industry led actions to increase support for compostable plastic packaging (e.g. Plastics Pact and national bio-economy strategies)?
 - a. If yes, what measures are being implemented to meet these commitments (e.g. Plastic Pact targets)?

A7.2 Questionnaire for EPR Organisations

General

1. Do you as the EPR packaging compliance scheme support increasing the infrastructure available to be able to process compostable packaging materials?
 - a. If yes, how?
 - b. If not, why?
2. Does your country have separate food waste collections in place for consumers?
 - a. How is it being financed?
 - b. If no, what is the plan to install one in order to comply with the EU requirements and how will it be financed?

Conventional Plastics

1. What is the current rate of conventional flexible packaging? Does the EPR fee reflect the cost of managing conventional flexible packaging?
2. What processes are in place to increase the recycling rate of conventional flexible plastics to help meet EU recycling targets?
3. How are flexible plastics processed for recycling?
 - o How are they separated out from other plastic formats (e.g. rigid formats/ polymer types/ polymer colour)?
 - o What is flexible plastic packaging being recycled into?
4. Why can some flexible packaging not be recycled?
 - o E.g. contamination, mixed feedstock
 - o What happens to the non-recyclable flexible packaging?
 - o What are the plans to reduce their incineration in order to meet the requirements of the regulation and the various plastic pact commitments?

Modulated Fees & Material Fees

1. The new Waste Framework Directive amendments require EPR schemes to modulate fees being paid by producers to reflect the true costs of waste collection and treatment at end-of-life and the use of economic instruments to implement the waste hierarchy. Has your EPR system implemented modulated fees?
 - a. If not, when do you plan to implement modulated fees?
 - b. How will plastic materials be aligned to the modulated fee system?
 - i. Is there/will there be a difference in fees between flexible and rigid plastics?
 - ii. Is there/will there be a difference in fees for polymer type?
2. What is your assessment regarding the economic viability of mechanical or chemical recycling of flexible plastic packaging vs. compostable plastic packaging being recycled?
3. If compostable packaging is declared by producers, do you offer a reduction in material compliance fees for producers for this material?
 - a. If not, will you offer a reduction in material compliance fees for compostable packaging, with the introduction of modulated fees in future?

Funding system

1. Do you provide funding or incentives to the waste management sector for the development of infrastructure capable of processing compostable packaging materials with bio-waste?
 - a. If not, would you in future if compostable materials are collected under an EPR system provide funding or incentives to the waste management sector for the development of infrastructure capable of processing compostable packaging materials with bio-waste?
2. Do you provide funding or incentives to the local municipal authorities to develop separate/enhanced collections of compostable packaging materials with bio-waste?
 - a. If not, would you in future if compostable materials are collected under an EPR system provide funding or incentives to the local municipal authorities to develop separate/enhanced collections of compostable packaging materials with bio-waste?
 - b. If there are currently no funding/incentive mechanisms in place, what kind of funding/incentive structure do you think would need to be put in place to grow the capacity in your country to process compostable packaging?

A7.2.1 Questions for EPR scheme with compostable materials

1. What compostable packaging materials are included in your system?
 - a. e.g. plastic bags, caddy liners, flexible packaging
2. What challenges have you faced with compostable packaging in waste streams?
3. Are the material fees collected from producers for compostable packaging materials placed on the market, directed to the organic material reprocessors who deal with this specific compostable packaging?
4. Can you describe how the compostable packaging materials are collected and processed?
 - a. Do you track the compostable packaging material through its waste journey?
 - b. Are collections of compostable packaging carried out on a national scale or only within certain local regions?
5. Is there separate label requirement on compostable packaging materials to inform consumers of its nature and how to dispose of it?

A7.2.2 Questions for EPR scheme without compostable materials

1. Could compostable packaging be collected as part of an organic waste collection system? Do you have the infrastructure to treat compostable packaging?
2. How is it funded? How does the organic recycling sector that is processing compostables is getting paid for this?

A7.3 Questionnaire for Organic Recyclers

Funding

1. As an organic material reprocessor do you receive any funding from the existing system of EPR material fees paid by packaging producers?
2. What are the costs associated with the composting process?
3. Do you charge gate fees?
 - a. If yes, are you able to share these with us?

Operational understanding

1. Do you collect the organic waste yourself?
 - a. If not, how is the organic waste collected and transported to your facilities?
2. How long does the composting process take?
3. Do the recycling facilities which are able to process compostable packaging accept both food and garden waste as well?
 - a. In your opinion would compostable packaging work better in a food only setting or a garden and food setting?
 - b. Does the organic waste come co-mingled or already de-packaged?
 - c. Do you have a preference for how you receive the input material?
4. Can you confirm who pays for the delivery of the organic waste to you?
5. On average what price are you able to achieve for the final product?

Compostable packaging

1. Do you know what % of compostable material that is collected is effectively recycled?
2. What is your attitude to compostable packaging – do you see it as an opportunity or a challenge?
3. Have you worked with compostable packaging material?
 - a. Do you have to remove these products first in treatment process of food waste?
 - b. How would compostable packaging fit into your current system?
 - c. Do you think compostable would be effective in reducing plastic contamination from soils?

Plastic contamination

1. Do you have a problem with plastic contamination in the bio-waste stream?
 - a. If yes, do you see a difference in amounts of rigid and flexible plastic?
 - b. If yes, how do you remove plastic contamination from the bio-waste material?
 - c. If yes, are you able to put a figure on the cost of dealing with plastic contamination during the processing of bio-waste materials?
2. Do you have any plastic contamination in your organic output?
 - a. Is plastic contamination a growing problem for you?

A7.4 Questionnaire for Trade Associations

1. In your opinion what are the main regulatory or policy drivers that exist to increase the uptake of compostable packaging in your country?
 - a. Do these go above and beyond the EU Frameworks and Directives?
 - b. Has there been any voluntary/industry led actions to increase support for compostable plastic packaging?
2. What are the main barriers that exist which have impacted on the uptake of compostable packaging in your country?
 - o Do you have any examples of where compostable packaging materials have been able to overcome these barriers?
3. Do you believe that the EPR system in your country is effective in providing funding to the waste management sector for the processing of packaging materials?
4. Do you support increasing the infrastructure available to be able to process compostable packaging materials? If not, why?
5. Do you have any examples of where compostable packaging materials have been deployed successfully?



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