Study to support the finalisation of the legal proposal and the impact assessment for the review of the Packaging and Packaging Waste Directive

Final Report

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COWI

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CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Description
AD	Anaerobic Digestion
AQ	Air Quality
BBP	Biobased plastic
CBA	Cost-benefit analysis
DBBC	Deposit Bearing Beverage Containers
DfR	Design for Recycling
DRS	Deposit Refund Scheme
EPR	Extended Producer Responsibility
GHG	Greenhouse gas
LPCB	Lightweight plastic carrier bags
PCB	Plastic Carrier Bags
PPWD	Packaging and Packaging Waste Directive
RC	Recycled Content
RED	Renewable Energy Directive
SO	System Operator
SUP(D)	Single-Use Plastics (Directive)
VLPCB	Very lightweight plastic carrier bags

1 Introduction

Eunomia Research & Consulting Ltd, along with COWI, is pleased to present this report (under the Framework Contract ENV.F.1.FRA/2019/0001) under study request No 090202/2022/866067/SFRA/ENV.B.3 to support the finalisation of the legal proposal and the impact assessment for the review of the Packaging and Packaging Waste Directive. This report contains new and updated policy measures with their respective impact assessment, the impacts of three policy options and supporting information for legislative drafting.

This report contains all relevant deliverables since project inception:

- Stakeholder consultation in Section 2;
- Tasks 1 to Task 6 in sections 3 to 8;
- Additional information in section 9; and
- Impacts of the new policy options in section 10.

2 Stakeholder consultation

Extensive stakeholder consultation was carried out in the previous PPWD Impact Assessment study. In total, over 800 unique organisations were engaged with more than 1,800 contact points. Stakeholders were consulted through a combination of both public and targeted methods: inception feedback, public questionnaire, Member State questionnaire, online workshops and webinars, and one-to-one interviews. Feedback from stakeholders provided in the previous study was taken into consideration for this Support Contract.

Stakeholders were consulted to get their views on new or refined measures. Given the tight deadlines, a targeted approach was used. We received many responses from a wide range of stakeholders, and we are grateful to all the stakeholders who gave their feedback in such a short period of time.

2.1 Group engagements

Group engagements were carried out for each measure. These included engagements such as group meetings, questionnaires and surveys. See Table 2-1 for the number of stakeholders consulted for each task and engagement.

Table 2-1 The group engagements sent out to multiple stakeholders

Task	Type of engagement	Number of stakeholders (by organisation)
1	Questionnaire	45
2&3	Questionnaire	38
2&3	Group meeting	31
4	Survey	25
5	Questionnaire	19
6	Questionnaire	12

Group engagement for task 1 consulted on the definitions of recyclability, including "innovative packaging" and "at scale", the inclusion of a negative list of packaging characteristics, such as materials or components or features which would hinder recyclability and the Design for Recycling (DfR) assessment process. This was in the form of a questionnaire and responses were received from associations, NGOs, EPR Schemes, producers and waste management companies. A population-based metric for "at-scale" was the most supported approach by stakeholders (e.g. recyclable at scale if conditions fulfilled across Member States representing >75% of the EU population), alongside a simple Member State majority by count (recyclable at scale if conditions fulfilled in >18 EU Member States). Position papers were also considered. The need to maintain competition and innovation strength was highlighted, by ensuring SMEs have access to state-of-the-art infrastructure.

Group engagement for tasks 2 & 3 consulted on the plastic recycled content targets. The questionnaire asked for feedback on the targets' level, recycling capabilities, categories that should have separate targets or are incapable of including recycled content, exemptions and costs. Associations, producers, waste management companies and one NGO answered the questionnaire. A further online group meeting was held on 28th February 2022, to discuss the stakeholders'

feedback. Stakeholders consulted for this measure (and previously for recycled content in general) were generally supportive of plastic packaging recycling content targets. However, stakeholders supported the targets to be re-evaluated in ~5 years. This was to avoid unnecessary market prohibitions if new recycling technologies, such as chemical recycling, were not able to produce enough recycled content to meet the targets.

Group engagement for task 4 consulted on minimum requirements and mandatory DRS. Associations, producers, waste management companies, Commission organisations and NGOs were consulted. In general, there was support for the scope, retailers obligated to take-back, governance structure and return rate to be included in EU-level minimum requirements. The glass beverage packaging industry voiced their support for a 90% collection target for glass packaging (without separating beverage and non-beverage packaging), instead of the inclusion of glass in a mandatory DRS (to which they are opposed for single-use glass), however non-glass stakeholders in contrast favoured inclusion of glass beverage bottles in a mandatory DRS.

Group engagement for task 5 consulted on harmonised labelling of packaging to facilitate consumer sorting. A questionnaire was sent to industry and consumer stakeholders. Many stakeholders desired the need for accurate and harmonised labelling, with additional communication efforts for consumers. However, the differing locally available collection and sorting infrastructure across the EU was highlighted as a challenge.

Group engagement for task 6 was a questionnaire sent to NGOs, government agencies and associations on increased reporting requirements for plastic bags. A government agency raised the potential issue that could arise if data collection is linked to a charge. This would mean data on non-charged carrier bags is not collected which could cause challenges. An additional questionnaire was sent to 7 countries which were identified to have relevant contributions for the sustainable consumption reduction measure, with 3 responses.

2.2 Personalised engagements

Personalised engagements were carried out where necessary. These included engagements such as email requests, interviews, group meetings with select stakeholders and meetings with the Commission. See Table 2-2 for the number of stakeholders consulted for each task and engagement.

Table 2-2 The personalised engagements sent to stakeholders, either individually or as a select group

Task	Type of engagement	Number of stakeholders (by organisation)
1	Email request	5
1	Interview	6
2 & 3	Interview	3
2	Select group meeting	10
4	Meetings / interviews	4
5	Email request	16
5	Meetings / interviews	5
6	Meetings / interviews	6

Personalised engagement for task 1 was held with EPR schemes, producers and associations. This was to discuss packaging recyclability certifications, its uptake and costs and to get a better understanding of the size of national packaging markets.

Personalised engagement for task 2 & 3 was held with associations and certification bodies to understand more about the costs of recycled content certification. A select group meeting was held with medical technology and pharmaceutical associations and producers to hear their views about recycled content targets, as their products have further testing requirements, beyond food-contact regulations. Recyclate from chemical recycling (virgin quality) and biobased content was considered an option for these industries although the stakeholders highlighted further testing would still need to be done, which is a lengthy process.

Personalised engagement for task 4 consisted of a meeting with the Commission with a beverage carton association on collection targets, a meeting with UNESDA, ZWE and NMWE focused on the right of first refusal, and two further engagements with UNESDA and the Slovakian DRS operator to support legislative drafting.

Personalised engagement for task 5 was held with key Greek stakeholders on the removal of alphanumeric codes for waste sorters, as waste sorting is mainly manual in Greece. The stakeholders voiced their view that although alphanumerical labelling is included during the waste sorters training for the identification of material, if it was to be removed (and provided it was replaced by material component labelling), it would make minimal difference to manual sorters. An interview was conducted with the Danish pictograms scheme to support legislative drafting and further email exchanges were taken into account. Another meeting took place with JRC to understand the common areas with their work on labelling and separate collections. Eunomia also spoke to several trade associations and representatives in joint meetings:

- Unesda / Carlsberg / Danish Brewers Association
- EPTA / Metabo / Bosch
- Europen

Personalised engagement for task 6 has consisted of interviews:

- with Member States Germany and Luxembourg due to their objections to compostable carrier bags; and
- industry stakeholders and trade bodies which are relevant for compostability discussions.

2.3 Stakeholder workshop

A stakeholder workshop was held on May 30th where Eunomia provided logistics support in the form of:

- Providing the GoToWebinar platform and setting up the event;
- Sending the workshop invites to all stakeholders who had previously contributed or expressed interest since the start of the PPWD revision (January 2020) which amounted to more than 500 individuals;
- Replying to questions and support requests from the stakeholders in relation to the workshop organisation;
- Delivering a dry run session for the Commission presenters;
- Sending communications to the registered attendees on behalf of the Commission.

A short report about the workshop was delivered after the event (see Appendix D).

3 Task 1 – Recyclability

Eunomia provided an updated definition and impact assessment for measures 21a and 21b in the deliverable of 25 March 2022. However, this was provided in combination with the Commission's deliverable and it is not possible to separate out the sections and present in this stand-alone report. Similarly, Eunomia was worked with the Commission on the reviewing and commenting the legal draft but this has been done via separate exchanges which are not present in this report.

This section then is focused on the following deliverables: definitions, further details on the recyclability assessment process, additional clarifications and support for legislative drafting.

3.1 Definitions

3.1.1 Definitions that apply to economic operators

Given that the PPWD currently defines 'economic operators' in a broad sense[1] there is a need to define these more precisely as different obligations will fall on the different economic operators under the revised proposals.[2]

'**economic operator'** means the manufacturer, the importer, the distributor, the fulfilment service provider or any other natural or legal person who is subject to obligations in relation to the manufacture of products, making them available on the market or putting them into service in accordance with this regulation;

- This definition is the same as that of Article 3(13) of Regulation 2019/1020 on Market Surveillance with the removal of the words 'authorised representative'.[3] Legal consideration should be given to whether the words 'putting them into service' are sufficient to capture the usage of transportation packaging that is used, but not made available on the market.
- It is identical to that used in Art 3 (13) of the proposal for amendments to Regulation 1025/2012 on General Product Safety.

'manufacturer' means any natural or legal person who manufactures packaging and / or a packaged product or has such products designed or manufactured and markets that product under its name or trademark. A manufacturer will therefore include the producers of packaging units, as well as companies who produce packaged products i.e., companies that fill packaging units and label these for sale.

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[1] 'economic operators' in relation to packaging shall mean suppliers of packaging materials, packaging producers and converters, fillers and users, importers, traders and distributors, authorities and statutory organizations;

[2] Packaging and Packaging Waste Directive 94/62/EC Art 3 (11) . 'economic operators' in relation to packaging shall mean suppliers of packaging materials, packaging producers and converters, fillers and users, importers, traders and distributors, authorities and statutory organizations;
GPSD Art 3 (13) 'economic operator' means the manufacturer, the authorized representative, the importer, the distributor, the fulfilment service provider or any other natural or legal person who is subject to obligations in relation to the manufacture of products, making them available on the market in accordance with this Regulation;

[3] Art 3 (8) REGULATION (EU) 2019/1020 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011

- This definition is adapted from that of Article 3(8) of Regulation 2019/1020 with the addition of the term 'packaging' and/or packaged product. [4]

'importer' means any natural or legal person established within the Union who places packaging and / or a packaged product from a third country on the Union market;

- This definition is the same as that of Article 3(9) of Regulation 2019/1020. [5] With the addition of packaging and / or a packaged product.

'**distributor'** means any natural or legal person in the supply chain, other than the manufacturer or the importer, who makes packaging and / or a packaged product available on the market;

- This definition is the same as that of Article 3(10) of Regulation 2019/1020. [6] With the addition of packaging and / or a packaged product.

'**making available on the market'** means any supply of packaging and / or a packaged product for distribution, consumption or use on the Union market in the course of a commercial activity, whether in return for payment or free of charge;[7]

'**placing on the market'** means the first making available of packaging and / or a packaged product on the Union market;[8]

'**accreditation**' means accreditation as defined in Article 2(10) of Regulation (EC) No 765/2008;

'**national accreditation body'** means a national accreditation body as defined in Article 2(11) of Regulation (EC) No 765/2008

3.1.2 Definitions that apply to packaging

The definition of a functional unit of packaging in EN 13427 (clause 4.3) is not fit for purpose (below for reference):

> *The smallest part of a packaging considered in this standard is a component. Usually, a number of components will be brought together to form a functional unit of packaging, and these may in turn be brought together in a complete packaging system which could comprise primary, secondary and tertiary packaging (as defined in article 3 of Directive 94/62/EC).*[8]

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[4] Art 3 (8) REGULATION (EU) 2019/1020 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011

[5] Art 3 (9) REGULATION (EU) 2019/1020 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011

[6] Art 3 (10) REGULATION (EU) 2019/1020 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011

[7] 2021/0170 (COD) Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on general product safety, amending Regulation (EU) No 1025/2012 of the European Parliament and of the Council, and repealing Council Directive 87/357/EEC and Directive 2001/95/EC of the European Parliament and of the Council

[8] 2021/0170 (COD) Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on general product safety, amending Regulation (EU) No 1025/2012 of the European Parliament and of the Council, and repealing Council Directive 87/357/EEC and Directive 2001/95/EC of the European Parliament and of the Council

It will therefore need to be replaced by the following proposed definitions (in Art 3 of the new regulation) to underpin the DfR assessment:

'**Packaging unit'** means the packaging of a product as a whole, i.e., inclusive of all packaging components necessary for its functioning as packaging for a given product sold to the final user or consumer at the point of purchase. A packaging unit may be made up of both integrated components and separate components.

Secondary and transport / tertiary packaging that are discarded prior to the point of sale to the final user/ consumer will be considered independent packaging units.

EN13427 defines a packaging component as "a part of packaging that can be separated by hand or by using simple physical means" – we further subdivide this into -

'Integrated Components' means packaging components that may be distinct from the main body of the packaging unit but integral to the packaging unit. These would not need to be separated from the main packaging unit in order for the end user to consume the product. These would be discarded at the same time as the packaging unit, although not necessarily in the same disposal route. This may include, but is not limited to; labels, sleeves, caps, lids and closures, and decorative elements. [9]

'Separate Components' means packaging components that are distinct from the unit of packaging they form a part of, such that the complete and permanent disassembly of the separate components from the main unit of packaging is necessary for the end user to access the product. These separate components tend to be discarded prior to and separately from the remainder of the packaging unit. E.g., safety seals, peel-off lids, tear-off strips, etc.

'Packaging system' means a combination of packaging units required for making a product available on the market and may comprise of primary, secondary and tertiary packaging as defined in Article 3.

'Equivalent Packaging' means packaging units that are the same in design, material and components but may differ in size, product, and decoration. The only changes tolerated within the meaning of equivalence are only those that do not introduce sortability or recyclability disruptors. In the case of decoration, this may include the use of different inks, adhesives or direct printing that could alter the DfR assessment rating of the original packaging unit.

'Innovative Packaging' means packaging units that are manufactured using new materials, design or production processes, resulting in a demonstrable and significant improvement in the core function of the packaging unit in a given application (i.e., containment, protection, handling and delivery, aligned with Article 3 of the PPWD), OR such that the packaging format/ materials can be used in new applications with an environmental benefit. Improved presentation of products and commercial benefit to the producer are not considered core functions of packaging in the meaning of this definition.

[9] Composite packaging, as defined in PPWD 2018 is therefore considered one packaging unit. Art 3 amended 2b. "composite packaging" shall mean packaging made of two or more layers of different materials which cannot be separated by hand and form a single integral unit, consisting of an inner receptacle and an outer enclosure, that it is filled, stored, transported and emptied as such;

3.1.3 Glossary of other terms used in this measure

'**DfR Assessment'** means the process required in this regulation for demonstrating the rating of the design of a packaging unit in relation to its recyclability. The result of this process will thereby verify that the requirements for recyclability as laid out in this Regulation have been met;

'DfR Self-assessment Tool' means the online tool that is made by a notified body according to the criteria set by the EU Commission that allows economic operators to receive a DfR rating that determines whether their packaging unit has met the conditions required for recyclability as set out in this regulation.[10]

'DfR rating' means the outcome valuation of the DfR Self-assessment Tool. This is likely to follow a rating structure of A-F, but the details of this remain to be set in an implementing act.

'Recyclability Assessment' If a packaging unit is designated as Amber in the DfR self-assessment tool then the economic operator is required to authorise a notified body to conduct a recyclability assessment which tests in more detail the compatibility and performance of packaging and its components in a specific collection, sorting and recycling stream (i.e., at the Member State or regional level).

'**Recyclability assessment body'** means a notified body that performs recyclability assessment activities including testing, certification and inspection;

3.2 DfR assessment methodology

3.2.1 Overview of measure 22b

To demonstrate compliance with the recyclability requirements of this regulation, a DfR assessment of all packaging units placed on the market must be undertaken by manufacturers. The DfR assessment will be a two-staged process, consisting of self-assessed **DfR rating** and, in some cases, an additional third-party certified **recyclability assessment** (see Figure 3-1 and Figure 3-2). Packaging units that either attain the lowest ratings in stage 1 (E or F grade), or that fail the recyclability assessment in stage 2 will no longer be allowed to be placed on the market.

[10] Essential Requirement for packaging to be recyclable in 2030 (measure 21)

Figure 3-1 Stages of the DfR Assessment Process

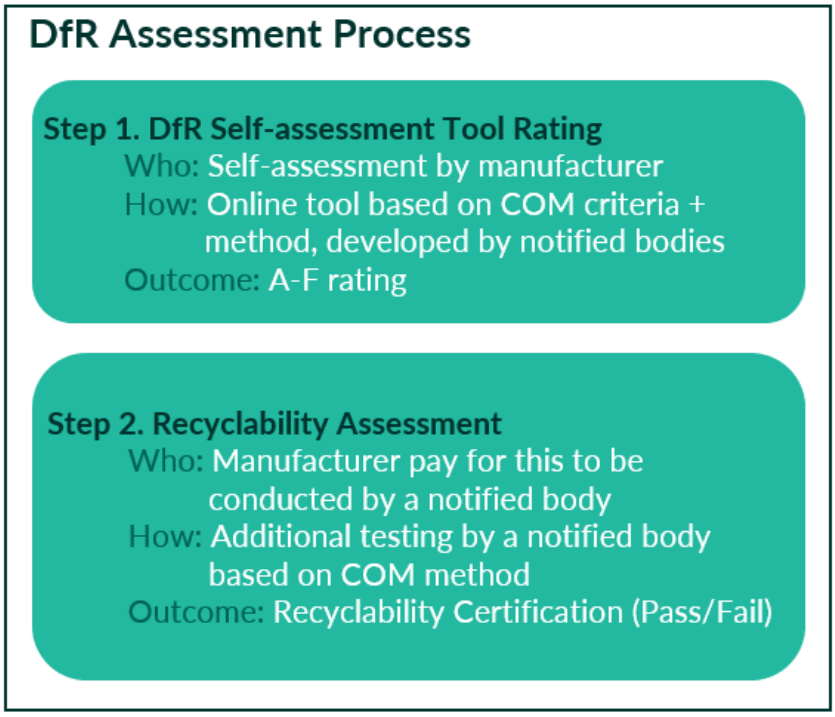
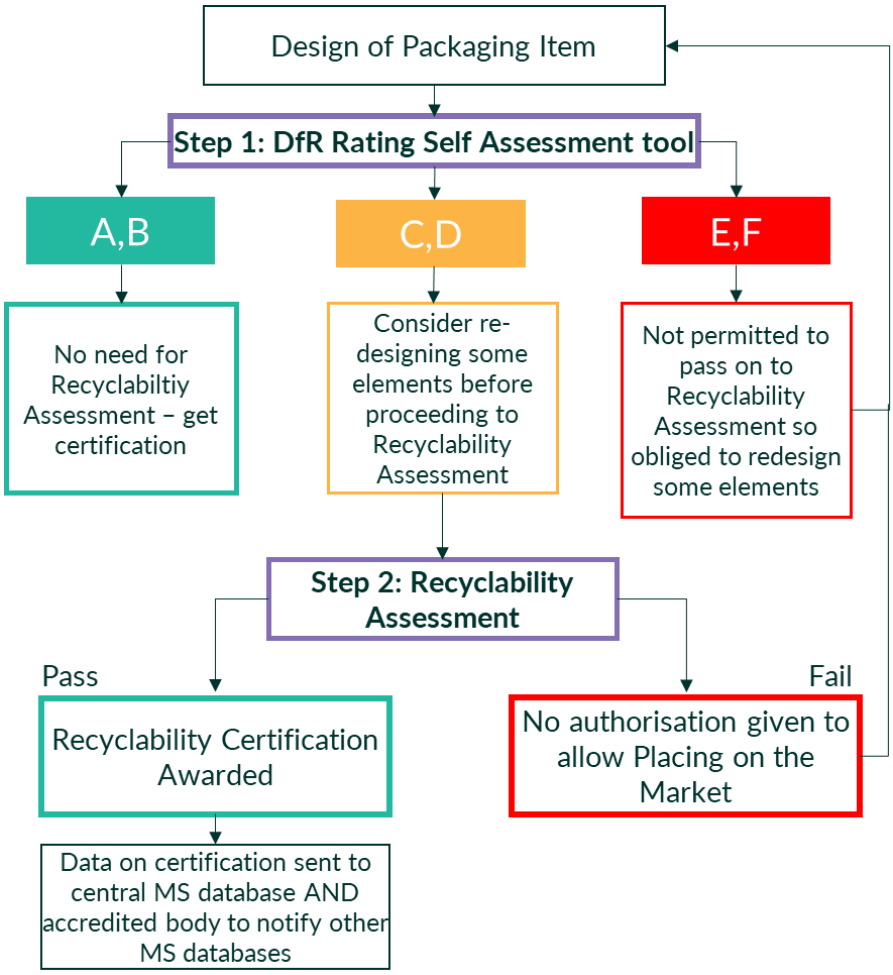


Figure 3-2: DfR Assessment Process



Reduced requirements are provided for packaging units with specialised functionality as listed in section 3.2.2., as well as innovative packaging and reusable packaging. During the exemption periods specified the manufacturers of these types of packaging will still be required to undertake the stage 1 assessment using the DfR Self-assessment tool, although they can continue to place their packaging on the market regardless of the outcome.

In summary, the key stakeholders and stages of the DfR assessment process covered in this regulation are:

- The Commission defines the technical criteria of the DfR self-assessment tool, the methodology for the Recyclability Assessment and the negative list of packaging features.
- The Commission and the Member States go through the necessary steps to establish notified bodies who will develop their own DfR self-assessment tool and Recyclability Assessment protocol based on the harmonised methodology and criteria set out by the Commission. This will include establishment of an IT platform that will enable the notified bodies to share information among themselves and with the competent authorities in each Member State.
- The economic operators will be required to assess their packaging units using one of the DfR self-assessment tools provided by notified bodies. The resulting grading of the packaging will be subject to data validation by the notified body.
- Depending on the rating given to their packaging item they may also be required to apply for certification to one or more notified bodies vis-a-vis a Recyclability Assessment. Notified bodies may charge fees to cover the costs of this service, which may vary depending on the extent to which testing is necessary.
- Notified bodies will be responsible for checking the recyclability of packaging in practice and at scale, by applying the criteria set out in the regulation and undertaking any further testing in line with the protocols to be established by the Commission.
- The notified bodies will share information and coordinate in order that a database of packaging units that are conforming to this regulation is maintained and issues of non-compliance or new certifications are shared and recognised across bodies.
- Certification and the underpinning technical documentation for a given packaging unit will be retained by the economic operator for the duration of its validity (proposed 3 years). It will also be provided to EPR schemes to demonstrate recyclability and provide a basis for eco-modulation of EPR fees.
- Market surveillance authorities will support with monitoring and auditing of packaging placed on the market to ensure that packaging is compliant with the regulation.

The obligations of all actors are detailed in section 3.3.4.

3.2.2 Exempt packaging units of specialised functionality

Certain specific categories of packaging types with specialised functionality should not be restricted from the market if their manufacturers cannot suitably demonstrate recyclability. The number of such categories shall be kept to a minimum and only include those that:

- may have a negative impact on public health were such packaging units to be prevented from being placed on the market and
- no suitable recyclable alternative exists or
- where recycling is potentially dangerous.

These types of packaging should still undergo the DfR assessment (stage 1 only), and be subject to EPR fees, but should not be prohibited from being placed on the market. Specific packaging

should be proposed by the technical committees/ CEN expert groups responsible for developing the specific criteria related to each packaging category and agreed by the Commission before being subject to these reduced requirements. Some examples of packaging categories that could be considered are:

- Pharmaceutical packaging (e.g., PVC packaging components are included in the negative list with the exception of pharmaceutical packaging applications
- Packaging that is dangerous / hazardous if it reaches recycling streams. e.g. ant poison packaging containing carbide that leads to spontaneous combustion in presses.

3.2.3 DfR self-assessment tool criteria

The **DfR self-assessment tool** will assess the technical feasibility of recycling a given item of packaging by checking the compatibility of its individual components/ design elements in widely used sorting and recycling systems (i.e. at the EU level).

3.2.3.1 Criteria required for assessment in the DfR self-assessment tool

Each DfR guideline uses criteria to assess the recyclability of a packaging item. The review of DfR guidelines includes a rationalization of these criteria across material groups. These groups are plastics (rigid), plastics (film), paper, card, cartons and paper composites, metals and glass.

Table 3-1 Rationalised minimum DfR criteria for all materials

All materials – rationalised minimum criteria		
Additives	Closure systems	Labels/sleeves
Adhesives	Colours	Material composition
Barriers/coatings	Inks/printing	Product residues (ease of emptying)

It is noted that the above represents the minimum criteria that should be specified for each packaging type, though not all will be relevant across all packaging types (e.g. additives mostly only relevant for plastic packaging categories, barriers and coatings not likely to be relevant for glass packaging, etc.). Other criteria that are either not widely used in existing DfR guidelines, should also be considered and included (by the technical committees/ CEN) if likely to significantly impact the recyclability of a particular packaging category, for example:

- Size – particularly for smaller, compactable packaging materials and formats (e.g. EPS packaging, flexible plastic packaging, aluminium foil, etc.)
- Traceability – relevant across all packaging types to enable better data to support sorting and improved quality of materials
- Hazardousness – particularly relevant for plastic packaging and linked to the implementation of the measures under the separate intervention area explored in previous work
- Ease of dismantling – particularly for multi material packaging / composite packaging like beverage cartons and aerosol cans

3.2.3.2 Outputs of the DfR self-assessment tool

The output of the DfR self-assessment tool will be a rating of the packaging unit. As a minimum three overall ratings should be distinguished, (see Table 3-2).

Table 3-2 Rating structure of the DfR self-assessment tool

1.	2.	3.
Recyclable	Neither recyclable/ non-recyclable	Not recyclable
A: The package does not pose any recyclability issues	C: The package has some recyclability issues that affect the quality of its final recyclate	E: The package has major design issues that put in jeopardy its recyclability.
B: The package has some minor recyclability issues but could even potentially feed a closed loop scheme	D: The package has some significant design issues that highly affect its recyclability	F: The package is not recyclable either because of fundamental design issues or a lack of specific waste stream widely present in the EU.

The notified body developing a tool will be required to ensure that users of the tool are also provided with a report giving more detailed information on why their packaging unit has received the rating given. This report should highlight areas of concern which the economic operator could consider changing in order to improve the design for recyclability.

- Packaging units that are given an A-B rating are considered to have met the requirements for recyclability in this regulation
- Packaging units that are given a C-D rating will need to proceed to the Recyclability Assessment stage 2 which may produce a positive or negative rating.
- Packaging units that are given an E-F rating will be prohibited from being placed on the market. (see 3.2.3.4 Ensuring Compliance).

3.2.3.3 Negative list of packaging features

The list shared below is a first proposal of a list of features "to be considered" for inclusion in a negative list in an Annex or an Implementing Act. There is currently no evidence that these packaging design features/ materials will not become recyclable by 2025 and further by 2030, and considerable efforts are being made by industry to enable this.

We note that there therefore needs to be a review clause before the implementation of the negative list to consider technological developments in recycling. Given that 2025 is only a year after the Regulation is likely to be adopted, it is not practical to include the negative list in an Annex to the Regulation. Instead, it could be included in an implementing act.

Further, regular updating of the list will be required. Updates after 2030 are also envisioned to ensure that the relevant developments in packaging design and recycling technologies are accounted for. The use of an **implementing act would also enable these amendments to be made more easily than requiring changes to the Regulation itself**.

Including the negative list would help to **reduce the burden of developing DfR criteria** for packaging types which are widely accepted to be the worst performers or incompatible with standard recycling processes (i.e., requiring specialist recycling facilities). However, the **development of the negative list in an implementing act will also incur some administrative burden**, which, given the need to achieve industry and Member State consensus on the packaging features included in the list, may be considerable.

Packaging design features on the negative list would be ruled off the market with immediate effect, allowing for **quick environmental gains without the need to wait for the implementing acts/ standards** and DfR rating criteria to be published. However, it must be highlighted that **in the absence of a negative list, the packaging features on the negative list would still be ruled off the market** once subject to the DfR assessment, albeit this would take place in 2030 instead of 2025. The key advantage of the negative list is therefore the ability to remove the "worst offenders" from the market 5 years earlier than will otherwise be the case, and the environmental benefits that result therefrom.

PLASTICS

- Plastic packaging with non-NIR-detectable colours
- Plastic packaging with sleeves covering >50% of the surface
- Plastic packaging with additives changing the material density >1g/cm³
- Multilayer plastic packaging (containing more than one polymer) containing layers of aluminium, PET-G, PLA, PVC and PS
- PVC/PVDC packaging (and labels/sleeves) – potential exemption for pharmaceutical packaging
- XPS packaging
- PA barrier layers
- Non-EuPIA inks and inks that bleed
- PET packaging with non-water soluble / water releasable adhesives at <65°C
- Polyolefin packaging with non-water soluble/water releasable adhesives at <40°C.

PAPER/ CARD

- Paper-based packaging with plastic components that cannot be separated in standard processes
- Silicone/ wax coatings
- Insoluble adhesives + hotmelt adhesives with softening point < 68°
- Mineral oil colours, inks that are on the EuPIA exclusion list
- Two-sided plastic barrier/ coating/laminates
- Inks/ decorative elements using PP/PET metallised laminates, PET-metallised film

GLASS

- Non-packaging glass and infusible materials (i.e., material that does not melt at the same temperature as glass packaging) such as heat-resistant glass (e.g. borosilicate glass), lead crystal, cryolite glass
- Opaque/ dark colours (black, dark blue)
- Full surface sleeves and permanently attached/ labels with ultra-adhesive glues
- Ceramic/ porcelain components e.g., in closures

METALS (ALU/STEEL)

- PVC labels
- Lead materials

3.2.3.4 Ensuring compliance

If an economic operator places a packaging unit on the EU market after 2030 and

1) Does not have a DfR self-assessment tool rating of GREEN, or
2) Does not have a DfR self-assessment tool rating of AMBER, plus proof of a positive recyclability assessment, or

3) Has a DfR self-assessment tool rating of RED, or
4) Cannot provide a DfR self-assessment tool rating at all

AND

5) Has not demonstrated that the packaging unit can be classified as 'innovative', or 'reusable' Or
6) The packaging unit does not fall under the exempt packaging type list (section 4.1.2),

THEN
The economic operator is considered to be in breach of this regulation.

The Member States have the obligation to designate one or more competent authorities to be responsible for carrying out monitoring and enforcement of compliance of the economic operators. This could be included under the remit of the Market Surveillance Authorities and the Member State competent authorities – this is part of the justification for framing the recyclability assessment process as a 'conformity assessment' in the new proposal.

We suggest that the principles on which the penalties for breaching this regulation are should be agreed at an EU level and included in this regulation. If the penalties differ within each Member State this will create confusion for economic operators, and some may seek to operate where penalties are less severe.

3.3 Supporting information

3.3.1 M21a definitions

3.3.1.1 'At scale'

Packaging that has undergone the stage 1 DfR assessment and has not attained a high ranking (A or B) must also undergo a stage 2 recyclability assessment to determine its recyclability in practice.

This will determine whether the packaging is recyclable at scale through relevant industrial processes across the EU market, and whether it can therefore be PoM or not (pass/fail criterion).

'Recyclable at scale' means that the necessary infrastructure and processes for the collection, sorting and recycling of the packaging item must be available and accessible across the EU.

To demonstrate recyclability at scale, the packaging item must be recyclable in MS representing at least 75% of the EU market share (by volumes PoM) for the given packaging type.

- Economic operators who are placing packaging on only one MS market must therefore only assess the recyclability of the packaging in that MS.
- Economic operators who are placing packaging across the EU market must assess recyclability in all MS markets on which they are placing the packaging.
- They must be able to demonstrate (through third party certification vis a vis notified bodies) that the packaging item is recyclable in MS markets representing at least 75% of total volumes PoM.

Data on volumes of packaging PoM in different MS are likely to already be held by economic operators and reported to EPR schemes. However, it is likely that this data will need to be gathered at an increased level of granularity to enable the assessment.

To demonstrate recyclability in each relevant MS market, the packaging item must fulfil the following criteria as assessed by notified bodies:

- **The packaging must be collectable at scale**

  1. The whole of the Member State population has access and the ability to sort the packaging in an effective collection system other than inhabitants of sparsely populated areas, mountainous areas and islands qualifying for derogation under WFD.

  2. As the vast majority of waste collection systems do not operate regionally or EU-wide, this must be assessed at the Member State level.

- **The packaging must be sortable at scale**

  1. Packaging should be able to be oriented into defined and recognised waste streams.

  2. Additionally, there must be sufficient existing sorting capacity (including technologies and processes) to enable this.

  3. This should typically be determined at the level of Member States but may be assessed at regional or EU level where it can be demonstrated that packaging waste of the relevant type in a Member State has a realistic route to sorting capacity to allow market efficiencies to determine the best geographical location of these.

- **The packaging must be recyclable at scale**

  1. The packaging must be acceptable for recycling in an existing recycling stream.

  2. There must be sufficient reprocessing capacity for the sorted packaging waste material.

  3. This can be determined regionally or EU-wide but needs to be realistically accessible for the relevant collected and sorted material generated by a Member State. Reprocessing capacity should not be double-counted between certification schemes.

  4. Where packaging waste is exported for recycling to deal with insufficient recycling capacity in the EU, this must also be considered as part of the recycling capacity for that packaging type, so long as such exports are compliant with all relevant legislative requirements (in particular Article 6(a)(8) of the PPWD which references Regulation (EC) No 1013/2006 [Waste Shipment Regulation]).

Finally, the Commission shall develop and publish guidelines to assist Member States in the interpretation and practical implementation of these requirements, specifically regarding the adequacy of collection, sorting and recycling systems that should be considered. Examples of topics to be covered by the guidance were provided in earlier sections.

3.3.1.2 Packaging unit

The reference to stock keeping units (SKUs) can be removed in favour of the of the packaging unit that has already been provided and aligned with the CITEO approach.

The object of the assessment is a packaging unit (inclusive of all components such as labels/ sleeves, caps, lids and closures, decorative elements, etc).

Some kinds of packaging require complete and permanent disassembly into separate components in order for the product to be consumed such that the separated packaging components are discarded separately. For the purposes of assessing recyclability, these types of packaging may be assessed at the level of each separate component, with the weighted results for each component added up to determine the overall result.

The product contained in the packaging shall only be included for assessment to the extent that product residues impact the collection, sorting or recycling of the packaging unit, for example due to high levels of material contamination.

Equivalent packaging (i.e., packaging that is the same in material/ components and design but different in size, decoration and/or product) need only undergo a sortability assessment (to ensure that the difference size/ decoration/ product does not hinder the sorting process).

To clarify further, proposed definitions for these terms and illustrative examples have been provided (see section 3.1).

3.3.2 DfR classification based on existing guidelines

The red-amber-green (RAG) rating system was used to assess the extent to which the existing voluntary DfR guidelines reviewed in the course of the study could be readily employed and used to assess the recyclability of a particular packaging category as part of the DfR assessment proposed in measure 22b.

A **green rating** for packaging category means that the available DfR guidelines for that category are well developed and provide a robust basis for a harmonised recyclability assessment. A minimal amount of effort is therefore needed to ensure these are fit for purpose to assess recyclability at EU level.

An **amber rating** meant that there was some guidance available for improving the recyclability of that packaging category, though lacking in a robust framework for assessment (e.g. qualitative guidelines and principles as opposed to clear criteria and scoring system). Additionally, in some cases, only one set of guidelines for a packaging category was currently available or under development, or guidelines were being developed by one group of stakeholders rather than in consultation with all relevant actors, indicating a lack of consensus or harmonisation across all stakeholders at this stage. These would therefore require further development to produce a DfR rating system that would enable a packaging producer to develop compliant products at the EU level.

A **red rating** was applied where there is currently minimal or no DfR guidance available for a packaging type and significant work would be required to develop a DfR rating system. In the case of some material and packaging types, development of DfR guidelines may not be possible until an established recycling stream is available and interventions may therefore be limited to restricting from the market.

When rating DfR categories, Recyclass DfR guidelines and their application to plastic packaging materials were used as an example of a DfR guideline that could be readily employed. [11]

[11] https://recyclass.eu/tool/wp-content/uploads/2021/02/Guideline-PP-containers-coloured-02.2021.pdf
https://recyclass.eu/tool/wp-content/uploads/2021/02/Guideline-PP-containers-coloured-02.2021.pdf

The factors used to assess if existing DfR guidelines could be readily employed were as follows:

- **Coverage of key packaging elements –**A minimum set of recommended criteria was produced and included in the description of measure 22b.
- **Characteristics of guidelines –** Green ratings for packaging materials were given where DfR guidelines provided clear criteria, scoring systems and guidance on whether packaging would be recyclable. For example, RecyClass and COTREP provided clear technical guidance on recycling compatibility in terms of material composition, material colour and the presence of other components made from different materials. Other material packaging types had similar guidance, for example Suez CircPack and Cyclos HTP's assessment framework provided a similar standard of guidance for metals, glass and paper and cardboard. There were also cases where multiple guidelines provided useful guidance in different areas, for example the 4evergreen Alliance's guidance on the recyclability of different paper and card materials used alongside CircPack packaging design recommendations and CEPI's paper-based packaging recyclability guidelines (which do not provide any kind of scoring system).

Other factors

- **Presence of an established recycling channel –** Packaging types only received a green rating when there was a recycling channel which recyclability could be tested against. Where there is not an established recycling channel, for example PVC packaging or some complex packaging containing multiple materials, it was not possible to find clear DfR guidelines.
- **Consensus among DfR criteria –** Where several DfR criteria were consistent and agreed on an approach, this was viewed as demonstrating a consensus forming among stakeholders
- **Established –** Where criteria were established and in use (by producers but also certifiers), this provided evidence of the DfR guideline working as intended and being implementable
- **Methodology –** Where possible a clear and transparent description of how the DfR guideline was developed was preferred. The assessment methodologies underpinning the guidelines for green rated packaging types are transparent and robust, though not necessarily identical.

What was not covered

An independent assessment of the specific technical guidance in DfR guidelines, and the full extent to which these converged across different guidelines available, was not undertaken, neither was their applicability across the Member States assessed. Regarding the latter, all DfR criteria assess the recyclability of an item in relation to a recycling system. As recycling systems differ across Member States, DfR criteria may need to be adjusted to be representative across the EU. Finally, the process of development of each guideline was not evaluated, though where specific cases of good or poor practice were identified, this was taken into account (e.g. packaging types for which guidelines had been developed without consultation with sorters/ recyclers were not considered in the "green category").

3.3.2.1 Comparison of CPA/CEN approach

The CPA set out their DfR workplan and CEN Technical Committee 261 (packaging), sub committee 4 (environment) has started working on the first 3 standards related to packaging recyclability (confirmed to us by email). These 3 deliverables are:

- European standard(s) (EN) on the process and criteria to evaluate the recyclability of plastic packaging

- European standard(s) (EN) on the definitions and principles for design-for-recycling of plastic packaging
- European standardisation deliverables on design-for-recycling guidelines for plastic packaging products

With regards to the third deliverable, Table 3-3 below shows the comparison with the plastic packaging groups defined by CPA and the taxonomy of Measure 22b. All categories but one had been defined as medium implementation effort; once the CEN standards will have created the DfR for the last category (EPS packaging), this category could be recategorized as low implementation effort.

Table 3-3 Comparison of CPA/CEN categories with M22b

CPA/CEN	M22b taxonomy	Implementation effort grade
polyolefins flexibles	polyolefins flexibles – split into pe flexible films and PP film	low implementation effort
PS cups, trays and dairy packaging	PS cups, trays and dairy packaging – PS rigids	low implementation effort
polyolefins rigids	polyolefins rigids – PP and PE rigids	low implementation effort
PET beverage bottles	PET beverage bottles –PET bottles – split by transparent/light blue & transparent/other colours	low implementation effort
PET trays	PET trays – rigid packaging other than bottles and flags	low implementation effort
EPS packaging	EPS packaging	medium implementation effort (EPS)

3.3.3 Linking DfR to harmonised EPR fee modulation (M23)

Measure 22b is linked to measure 23, which is further linked to measure 42. This section clarifies the linkages between all 3 measures for the purposes of the legal drafting, with an implementing act to provide the details.

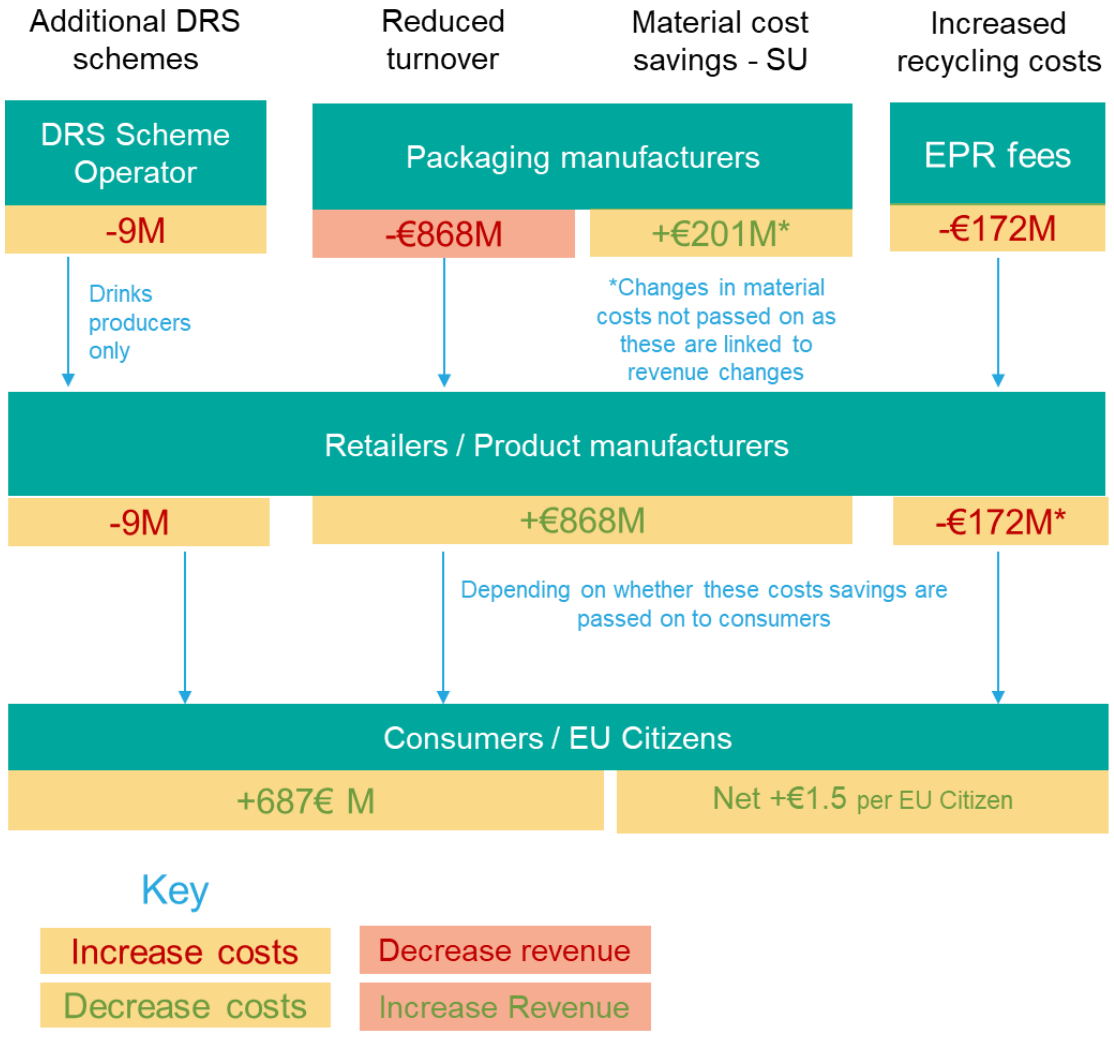
- Extended producer responsibility schemes shall be required to gather data at the level of the 29 packaging categories listed in Article XX as a minimum. EPR schemes may gather data at a greater level of granularity (for example by creating further sub-categories of packaging associated with different EoL costs and therefore fees) at their discretion.
- Extended producer responsibility (EPR) schemes shall ensure that the financial contributions paid by economic operators are modulated based on the recyclability of individual packaging types or categories (fee modulation).
- The results of the DfR assessment (both DfR rating and recyclability assessment) described in this regulation shall form a harmonised basis for such fee modulation across EPR schemes in all Member States.
- To enable this, evidence of the results of the DfR assessment must be provided by economic operators to EPR schemes alongside other reporting requirements.

- Where the results of the DfR assessment at EU level differ significantly from the recyclability of a given packaging at the Member State level, such that fee modulation may unduly incentivise the use of such packaging in the Member State, EPR schemes may choose, at their discretion, to apply zero modulation. The financial contributions paid by economic operators in this case shall reflect the costs of managing such packaging at EoL, without any further modulation on the basis of recyclability.
- Where multiple EPR schemes operate in a Member State, the basis for the magnitude of fee modulation must be made consistent e.g., set as an absolute monetary amount.
- The nature of the information reported to EPR schemes, as well as reporting formats and frequencies, shall be harmonised in an implementing act (measure 42). The implementing act will lay down detailed criteria on the uniform application of the above conditions related to EPR fee modulation.

3.3.4 Economic flows of M22b

Figure 3-3 shows how the costs modelled for this measure could be distributed broadly throughout the different actors in the value chain—the aim is to demonstrate the order of magnitude of potential costs. It is worth noting that M22b is closely linked to M21 and M22a, and the impacts are closely related.

Figure 3-3 Summary of Annual Economic Impacts and Revenue Transfers



3.4 Aspects related to legal drafting - obligations of all actors

In the text that follows we have sought to include relevant legal statements from other recent legislation, primarily the Batteries Regulation Proposal, to provide a skeleton legal content. [12] We recognise that the process outlined in the Batteries Regulation Proposal is based around a Conformity Assessment process which differs in some key ways from the Recyclability Assessment proposed here. Most fundamentally, a Conformity Assessment process results in an EU declaration of conformity valid across the entire EU market. The current formulation of the Recyclability Assessment will result in Certificates of Recyclability that are valid only for the Member States which have been included in the assessment process by the notified body. This means that in order for an economic operator to hold an EU wide certification it may be required to undertake the recyclability assessment process in all Member States where it is trading. This is a weakness of the current formulation of the process which we have tried to improve in the new proposal.

For the purposes of this document we have left in the legal texts on conformity assessment, until it is finalised what the right term for this process should be.

3.4.1 Obligations of the Commission

1 In simple terms the Commission will set the criteria for the notified bodies' accreditation, maintain a list of the accredited bodies, ensure coordination and cooperation between them and challenge their competence if needed.
2 The Commission will also set criteria for the DfR assessment tools and processes which these notified bodies will then develop and monitor the compliance of notified bodies with the process.
3 The Commission shall develop and publish guidelines to assist Member States in the interpretation and practical implementation of these requirements, e.g., what constitutes an acceptable level of service provision to inform the recyclability assessment.

1. The Commission shall be empowered to adopt implementing acts and other instruments required to implement the measure that may include harmonised standards laying down common specifications for the requirements relating to DfR assessment procedure.

Requirements relating to the DfR assessment procedure

1. The Commission shall define the minimum requirements of a DfR self-assessment tool as laid out in XXXX. The minimum requirements will include (detail in section 3.2.3.1)

   a) For each packaging category, the Commission must set out the design criteria that need to be assessed by manufacturers within the DfR self-assessment tool to be implemented as harmonised standards/ implementing acts.

   b) These standards will include thresholds for evaluating a packaging unit against these criteria (different levels of attainment within each criterion for a given packaging category).

[12] March 2022 Institutional File 2020/0353(COD) Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020

c) In a separate implementing act, the Commission will also outline an approach for measuring outcome ratings in relation to the evaluation of design criteria (A-F rating system proposed above).

d) The implementing act will include a template for the tool with accompanying data reporting requirements.

2. As part of this implementing act, the Commission shall also define a harmonised approach to establishing the testing protocols that will underpin the Recyclability Assessment to be conducted by notified bodies on packaging units that receive a C or D rating in the DfR self-assessment stage.

a) The protocols will be developed to enable an analysis of the compatibility of packaging with existing collection, sorting and recycling processes and infrastructure.

b) They must enable an assessment of recyclability that is robust, such that significant material losses are avoided and waste is turned into secondary material of a sufficient quality to find end market to substitute primary materials.

c) The approach to developing testing protocols will therefore include minimum requirements for any on-site or laboratory testing and the key indicators that must be tested for each packaging type (including but not limited to detectability, separability, contamination, and key material properties in the various material reprocessing steps).

d) The approach must also ensure that collection/ sorting/ recycling of packaging waste for use in higher quality applications are prioritised over downcycling.

e) The testing protocols must be aligned with the criteria established to determine recyclability at scale and in practice as laid out in the regulation.

f) Further guidance will be provided by the Commission on the interpretation of the recyclability at scale requirements.

Requirements relating to notifying bodies and notified bodies

3. The Commission shall define the criteria for the accreditation of the notified bodies (*BR Article 25)* - This has been provided in M22b description as part of a separate deliverable.

4. The Commission shall assign an identification number to a notified body[13]

5. It shall assign a single such number even where the body is notified under several Union acts.

6. The Commission shall make publicly available the list of notified bodies under this Regulation, including the identification numbers that have been assigned to them and the conformity assessment activities for which they have been notified.

7. The Commission shall ensure that the list is kept up to date.

8. The Commission shall challenge the competence of notified bodies (text from Art 32, BR is applicable)

Exchange of experience

[13] *BR Article 30*

9. The Commission shall provide for the organisation of exchange of experience between the Member States' national authorities responsible for notification policy.[14]

Coordination of notified bodies

10. The Commission shall ensure that appropriate coordination and cooperation between notified bodies are put in place and properly operated in the form of a sectoral group of notified bodies.

11. Notified bodies shall participate in the work of that group, directly or by means of designated representatives.

3.4.2 Obligations of the Member States

4	In simple terms the Member States will oversee the accreditation of notified bodies who will conduct the DfR assessment process and will coordinate with other Member States and the Commission in this.
5	The Member States will also oversee the monitoring and compliance checks on economic actors in their territory in regard to this regulation.

Requirements relating to notifying bodies and notified bodies

1. Member States shall designate a notifying authority that shall be responsible for setting up and carrying out the necessary procedures for the assessment and notification of conformity assessment bodies and the monitoring of notified bodies, including compliance with Article XXX

2. Member States may decide that the assessment and monitoring referred to in paragraph 1 shall be carried out by a national accreditation body within the meaning of and in accordance with Regulation (EC) No 765/2008.

3. Member States shall inform the Commission of their procedures for the assessment and notification of conformity assessment bodies and the monitoring of notified bodies, and of any changes thereto. The Commission shall make that information publicly available.

4. Member States shall notify the Commission and the other Member States of conformity assessment bodies authorised to carry out conformity assessment in accordance with this Regulation.

5. Member States shall ensure that an appeal procedure against the decisions of notified bodies is available.[15]

6. Member States shall designate one or more competent authorities responsible for carrying out monitoring and verifying compliance of the economic operators.

3.4.3 Obligations of Economic Operators

3.4.3.1 Note on Types of Economic Operators.

The recyclability assessment is conducted on the packaging as it will be sold to the end consumer who discards it, i.e., inclusive of all components like sleeves, outer wrapping, labels, etc. In most cases, the end consumer will be households but, in the case of secondary and tertiary or

[14] In Proposal for BR this is an article on its own Article 36

[15] In BR proposal this was a separate article Article 34 'Appeal against decisions of notified bodies'

transportation packaging, this will also include distributors and retailers who dispose of such packaging before selling to the end user or consumer.

To avoid legal loopholes, it is essential that the economic operator who is responsible for making the packaging available on the market as a consequence of the products it is manufacturing, and marketing is the one that is obligated. In cases where packaged products are sold to end-consumers, this will more likely be the filler or brand whose product, with the associated packaging, is sold to the end consumer. Retailers and distributors of packaging and packaged products that are not manufactured or marketed either by they themselves or under their trademark are not obligated.

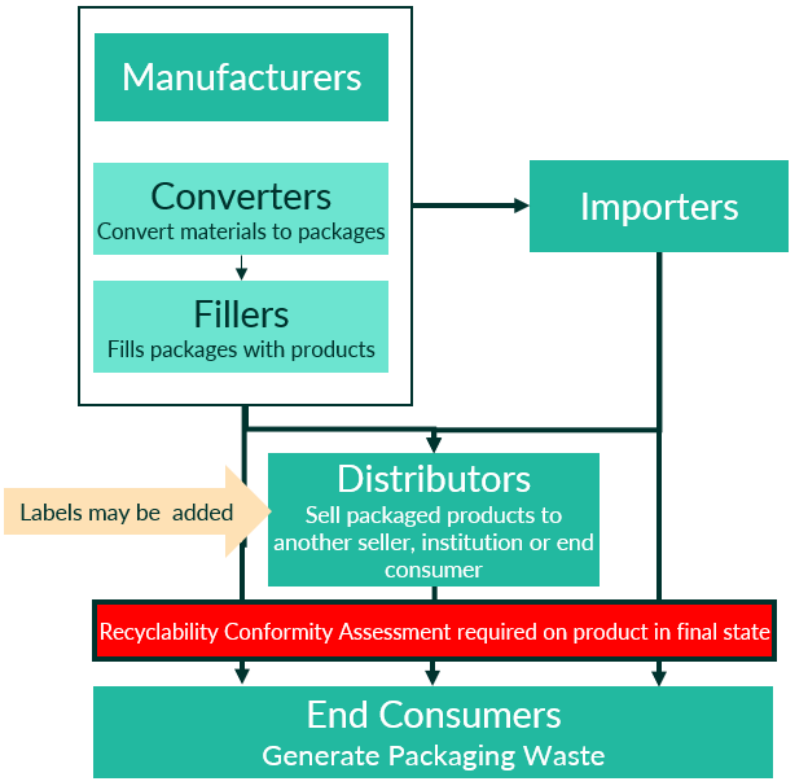
In relation to the obligations of this regulation, therefore, the term 'manufacturer' will include both packaging converters: those that convert raw materials to packaging units, and packaging fillers; those that fill the packaging units with products. Both of these economic operators could sell directly to the consumer, or to distributors and retailers who go on to sell to the end consumer on their behalf.

The rationale for placing the obligation at this point in the supply chain is that the manufacturer is the economic actor who holds detailed information on the packaging item and its construction. They will be best placed to provide the information that the DfR self-assessment tool requires. To comply with their legal obligation distributors and importers will have to ensure that the economic actors further back in the supply chain have undergone the recyclability conformity assessment process AND that they have not affected this in any way, such as through the addition of new labels. This is likely to require communication between the manufacturer and the distributors or importers on what the restrictions on labelling are in order not to breach the recyclability assessment.

In the case of importers/ fulfilment service providers of packaging and packaged products placed on the EU market from third countries, these should ideally be treated as manufacturers and obligated to ensure that packaging/ packaged products they import meet the packaging recyclability requirements laid out in the regulation. Any additional packaging they add to the imported product to facilitate delivery, for example, should additionally be compliant. While importers themselves may not be responsible for the design of such products and packaging, obligating manufacturers that are not based in the EU is likely to be challenging, and importers should be able to provide specifications to their suppliers and ensure that they have met the requirements. Given the challenges that this is likely to pose for enforcement, a simplified DfR assessment in the form of a DfR rating only (with no further recyclability assessment) could be mandated.

Obligated economic operators are responsible for ensuring that the packaging item they are selling, or using for protection, containment, handling etc. of a product, has a valid recyclability conformity assessment (which, based on the above, may include the outputs of either stage 1 or both stages 1 and 2 as described in the overview at the start of this section).

Figure 3-4: Position of Legal Obligation to hold valid Recyclability Conformity Assessment documentation



Fulfilment service providers and importers have not been shown in the above figure, but, as mentioned above, they should ideally be treated as manufacturers rather than distributors to prevent leakage. We note, however, that this is likely to be challenging to enforce.

1 In simple terms, the economic operators responsible for placing packaging on the EU market, or putting it into service in the EU, will be obliged to ensure that all their packaging units conform the recyclability requirements of this regulation. This applies equally to packaging items necessary for sale of a product to a consumer or a retailer, i.e., it includes secondary and tertiary packaging that is used in the EU.

2 All economic operators, including distributors and importers, are obliged to check that the packaging units they are using have the required documentation showing that they are certified as recyclable. However, it is unlikely that distributors and importers would be the ones putting the packaging items through the assessment process. Instead, they will require the economic operator one-step back in the chain to show this documentation OR provide them with sufficient technical information to undertake the assessment themselves. When a converter or filler is showing documentation of recyclability to a distributor or importer this must be accompanied by requirements that no additional changes are made that may alter the initial assessment.

3 The first step towards demonstrating compliance with the requirements of this regulation is that the economic operator completes a DfR self-assessment process using a tool from a notified body.

3.1 If an A-B rating is achieved, the report of this tool shall be retained by the economic operator and provided to authorities if requested.

3.2 If a C-D rating is designated, the economic operator is required to authorise a notified body to conduct the second stage of testing in the recyclability assessment. Again, if positive, the report of this assessment shall be retained by the economic operator and provided to authorities if requested.

3.3 If an E-F rating is designated the economic operator is required to redesign the item and repeat the assessment process. The economic operator is restricted from placing these units on the market until they have valid documentation showing conformity with the recyclability requirements of this regulation

4 Documentation remains valid for 3 years. After this the economic operator must repeat this process to revalidate the documentation.

5 The documentation will be valid for all packaging units that fall under the definition of equivalent packaging. (see section 3.1 Definitions)

6 If the economic operator changes the design of the packaging item beyond the definition of equivalence in the 3-year duration of the validity period, they will again be required to go through the process again.

7 If the design changes are substantial enough for the packaging unit to be classed as 'innovative packaging' (see section 3.1 Definitions) then the economic operator is still required to have the recyclability of the unit assessed by a notified body, but this will be according to less stringent criteria. Once the correct documentation is attained innovative packaging does not require re-assessment within 5 years.

8 Economic Operators responsible for packaging units with specialized functionality are not required to demonstrate the recyclability of these packaging units.

3.4.4 Obligations of Packaging Manufacturers

1. Before placing a packaging unit on the market or putting it into service, manufacturers shall draw up the technical documentation referred to in Annex XXX for the packaging unit and carry out the relevant conformity assessment procedure, as applicable and referred to, in XXXX, or have it carried out.[16] It is noted that individual packaging components will not be assessed, however, it is likely that the manufacturers of such components will need to provide technical information to enable the manufacturer of the finished packaging unit/ packaged product to undertake the recyclability assessment.

2. For the purposes of assessing recyclability, packaging units must be assessed at the level of each separate component, with the weighted results for each such component added up to determine the overall result.

3. Where compliance of a packaging item with the applicable requirements has been demonstrated by the relevant conformity assessment procedure referred to in XXX, manufacturers shall draw up an EU declaration of conformity in accordance with Article XXXX. The results of the assessment shall also be provided to EPR schemes to enable eco-modulated fees to be calculated and applied.

4. Manufacturers shall keep the technical documentation referred to in Annex XXX and the EU declaration of conformity at the disposal of the market surveillance authorities and national authorities for **3 years** after the packaging item has been placed on the market or put into service. After this period, the EU declaration of conformity will be invalid, and a new declaration of conformity will be required.[17]

[16] Wording on conformity assessment procedure needs adapting if stick with original methodology.

[17] Wording on declaration of conformity needs adapting if stick with original methodology.

5. Manufacturers shall ensure that procedures are in place for all packaging units of the same technical specification remain in conformity with this Regulation. In doing so, the manufacturer shall adequately take into account changes in the production process or in design. Changes that are deemed significant to be not deemed 'equivalent' packaging will require a new conformity assessment.

6. Manufacturers who seek to have their packaging units assessed as 'Innovative packaging' will be required to show evidence of a DfR rating, including the underlying evidence/ data to inform this rating (industry, voluntary, criteria or guidelines may be used here since EU recognised ones may not be available but should be reviewed and verified by an existing authorised certification body) and recyclability assessment (in line with the less stringent requirements for innovative packaging listed above).

7. Manufacturers shall indicate on the packaging item their name, registered trade name or registered trademark and the postal address, indicating a single contact point, and web address and e-mail address, where one exists.

3.4.5 Obligations of Importers

9 In simple terms, importers of packaging products are required to show proof that the units they are trading in, and those used in the transportation of goods fulfil the requirements of this regulation.

10 To achieve this importers have two options: 1) They could require the economic operator one step back in the chain to show this documentation OR 2) They could require the economic operator one step back to provide them with sufficient technical information to allow the importer to undertake the assessment themselves.

11 When a converter or filler is showing documentation of recyclability of a finished packaging unit to an importer this must be accompanied by requirements that no additional changes are made to the packaging unit that may negatively alter the results of the initial recyclability assessment.

1. Before placing a packaging item on the market or putting it into service, importers shall ensure that the packaging product has the required EU declaration of conformity, compliant with the requirements of XXX.

2. Where an importer considers or has reason to believe that a packaging unit is not in conformity with the applicable requirements set out in XXXX the importer shall not place packaging item on the market or put it into service until it has been brought into conformity.

3. The importer must ensure that while the packaging units are under their responsibility, any additional components added to the packaging/ packaged product does not conflict with the EU declaration of conformity by reducing its recyclability rating.

4. Importers shall indicate on the packaging item their name, registered trade name or registered trade-mark and the postal address, indicating a single contact point, and web address and e-mail address, where one exists.

5. Importers shall keep the technical documentation referred to in Annex XXX and the EU declaration of conformity at the disposal of the market surveillance authorities and national authorities for **3 years** after the packaging item has been placed on the market or put into service. After this period, the EU declaration of conformity will be invalid, and a new declaration of conformity will be required.

6. Importers shall, further to a reasoned request from a national authority provide that authority with all the information and the documentation necessary to demonstrate the conformity of a

packaging item with the applicable requirements set out in XXXX in a language that or languages, which can be easily understood by that authority. That information and the documentation shall be provided in paper or electronic form format and, on request, in paper format.

3.4.6 Obligations of Distributors and Retailers

12 Retailers and distributors of packaging and packaged products that are not manufactured and/or marketed, either by they themselves or under their trademark, are not obligated.

13 However, distributors of packaging and packaged goods should require proof that the units they are trading in, and those used in the transportation of goods, fulfil the requirements of this regulation.

14 To achieve this, distributors must require the economic operator one step back in the chain to show their certification

15 When a converter or filler is showing documentation of recyclability to a distributor or importer this must be accompanied by requirements that no additional changes are made to the packaging unit that may alter the initial recyclability assessment.

1. Before placing a packaging item on the market or putting it into service, distributors shall ensure that the packaging product has the required EU declaration of conformity, compliant with the requirements of XXX.

2. Where a distributor considers or has reason to believe that a packaging item is not in conformity with the applicable requirements set out in XXXX, the distributor shall not place packaging item on the market or put it into service until it has been brought into conformity.

3. The distributor must ensure that while the packaging units are under their responsibility, any additional labelling they add to the product does not conflict with the EU declaration of conformity by lowering its recyclability.

4. Distributors shall indicate on the packaging item their name, registered trade name or registered trade-mark and the postal address, indicating a single contact point, and web address and e-mail address, where one exists.

5. Distributors shall keep the technical documentation referred to in Annex XXX and the EU declaration of conformity at the disposal of the market surveillance authorities and national authorities for **3 years** after the packaging item has been placed on the market or put into service. After this period, the EU declaration of conformity will be invalid, and a new declaration of conformity will be required.

6. Distributors shall, further to a reasoned request from a national authority provide that authority with all the information and the documentation necessary to demonstrate the conformity of a packaging item with the applicable requirements set out in XXXX in a language that or languages, which can be easily understood by that authority. That information and the documentation shall be provided in paper or electronic form format and, on request, in paper format.

3.4.7 Obligations of Notified Bodies

16 In simple terms, organisations wishing to act as notified bodies will be required to go through a notification process within a Member State to establish themselves as notified bodies.

17 Adhering to the criteria set by the Commission in this regulation, the notified bodies will develop tools and processes for both step 1) DfR self-assessment and step 2) Recyclability assessment.
18 The notified bodies will then be responsible for ensuring that all economic operators whose packaging units are positively assessed using these tools and processes do in fact conform to the recyclability requirements of this regulation.
19 Notified bodies will be obliged to maintain records on the units assessed
20 Notified bodies will also be obliged to notify other Member States of the outcomes of their recyclability assessments

Operational Obligations

1. A notified body shall carry out conformity assessments in accordance with the conformity assessment procedures set out in Annex XXX and periodical audits in accordance with Article XXX, as determined by its scope of notification.

2. A notified body shall carry out procedures referred to in paragraph 1 in a proportionate manner, avoiding unnecessary burdens for economic operators, and taking due account of the size of an undertaking, the sector in which the undertaking operates, the structure of the undertaking, the degree of complexity of the packaging item to be assessed.

3. Where a notified body finds that the applicable requirements set out in Chapters XXX (could be harmonised standards, common specifications or other technical specifications) have not been met by a manufacturer, it shall require that the manufacturer or other relevant economic operator, to take appropriate corrective action in view of a second and final conformity assessment, unless the deficiencies cannot be remedied, in which case it shall not issue the certificate of conformity or approval decision.

4. Where corrective action is not taken or does not have the required effect, the notified body shall restrict, suspend or withdraw any certificates of conformity or the approval decisions decision, as appropriate.

8. The notified body shall adhere to the minimum guidelines specified in by the Commission in developing their own version of the DfR self-assessment tool, and the additional testing protocol required for the Recyclability Assessment.

Information obligations

5. A notified body shall inform the notifying authority of the following:

(a) any refusal, restriction, suspension or withdrawal of a certificate of conformity or approval decision;

(b) any circumstances affecting the scope of, or the conditions for, its notification;

(c) any request for information which it has received from market surveillance authorities regarding its conformity assessment activities;

(d) on request, any conformity assessment activities performed within the scope of its notification and any other activity performed, including cross-border activities and subcontracting.

9. A notified body shall provide other notified bodies carrying out similar conformity assessment activities referred to in Article XX covering the same packaging units with relevant information on issues relating to:

(a) negative and, on request, positive conformity assessment;

(b) any suspension, or withdrawal or other restriction of an approval decision.

4 Task 2 – Recycled content

The measure developed for this task builds upon *Appendix M - Assessment of the impacts of the possible measures: Intervention Area on Recycled Content* which presents the intervention logic for this intervention area. That report assessed three variants to ***Measure 35: mandatory recycled content targets*** as follows:

- **Measure 35a**: Material-specific target for plastic packaging
  - **average across all plastic packaging**
  - Set at the EU level
    - 25% (low ambition);
    - 30% (medium ambition);
    - 40% (high ambition).
- **Measure 35b**: Product-specific targets for plastic packaging
  - average across each of 5 plastic packaging product group
  - Set a product level
  - Range between 15% - 70%
- **Measure 35c**: Targets based on contact-sensitivity/ broad application of plastic packaging
  - **Set as a minimum requirement at product level**
  - Range between 10-70%

The continuation of the development of the above measures focuses specifically on Measure 35c where the evidence base is assessed for the size of the target(s) and the groups they apply to. The reason for developing this measure is that through stakeholder engagement during previous work, it was clear that the main barrier to recycled content is the legal requirements related to what the packaging is in contact with e.g. food; referred to throughout as 'contact sensitivity'. Secondary to this is the format of the packaging, however it is clear that there should be a balance between setting challenging, but achievable targets for specific packaging types with the increased burden defining, managing and enforcing many different targets (or in this case minimum product requirements). The following discusses and proposes how these aspects might be balanced under a new measure 35e.

4.1 Measure 35em and 35eh

This measure would set **mandatory targets for post-consumer[18] recycled content in plastic packaging from the years 2030 and 2040, with a medium (35em) and a high ambition (35eh)**. This measure is similar to measure 35c in that;

- The targets would be **applied as a requirement on each item of obligated packaging** as opposed to an average to be met across a group of packaging items;
- The basis for the targets would be **packaging placed on the EU market**, such that they would be implemented by operators monitored and enforced by the Member States.

However, these targets are aimed at three core groups; contact and non-contact sensitive and beverage bottles. "Contact Sensitive" is a term not yet defined in law, but under this measure refers to plastic packaging material that has specific requirements defined by its proximity to sensitive contents such as food, pharmaceuticals and cosmetics. Beverage bottles are already

[18] There is no definition of post-consumer in EU law, but ISO 14021 defines it as *"Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain."*

subject to 2030 targets set in article 6(5) of the SUPD and therefore are excluded from the 'medium ambition' targets. However, for the 'high ambition' targets, in order to be consistent in ambition for all plastic packaging, a target of 50% is also proposed for beverage bottles. See Table 4-1 for a summary.
When combined, the targets for these three product groups are calculated to provide indicative overall plastic packaging targets of 30%, 40% and 60% for medium, high and 2040 respectively. These are only indicative given that if any of these three groups change relative to each other this will change the overall recycled content proportions.

Table 4-1 – Measure 35e Post-consumer Recycled Content Targets

Product Group	2030		2040
	Medium Ambition	High Ambition	
Contact Sensitive	25%	30%	50%
Non-Contact Sensitive	35%	45%	65%
Beverage Bottles	Already included in SUPD (30%)	50%	65%
Total Indicative across all plastic packaging (not target)	*~30%*	*~40%*	*~60%*

4.2 Impact Assessment

The following recycled content measures were modelled in the CBA

- Measure '35em': Targets based on contact-sensitivity/ broad application of plastic packaging (medium ambition, 2030/2040)
- Measure '35eh': Targets based on contact-sensitivity/ broad application of plastic packaging (High ambition 2030)

4.2.1 Ease of implementation

Most of the considerations for the implementation are identified under Measure 35c, however it is important to reiterate that this measure also requires rules on the calculation, verification and reporting of recycled content against the targets that are covered under Measure 37. A key aspect of this will be to determine an approach to using 'mass balance' as a chain of custody method which is recognised as a key enabler of chemical recycling. This must take into account that the aim should be to create a framework for newer recycling technologies to contribute, but as highlighted in sections on *effectiveness* and *environmental impacts*, excessive reliance on some types of chemical recycling will reduce the overall possible positive impact of the measure.

Further to this, it is also recommended that the suggested implementing act also include some sustainability criteria which must be met alongside chain-of-custody verification. This can be implemented in a similar way to the REDII[19] and as described for the joint bio-based target under Measure w (Section 5). As a minimum, determining minimum GHG reduction thresholds will

[19] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, available at http://data.europa.eu/eli/dir/2018/2001/oj

ensure that only recycling that has a positive impact compared to the status quo can contribute to the target. Compared to REDII and Measure w, fewer (or no) other sustainability criteria may be necessary as the need to regulate bio-mass origin is not the same for recycled content. To reduce the burden on already established recycling processes that have a strong evidence base for high levels of net GHG reduction, exemptions (or a presumption of compliance) to this requirement could be included. Introduction of a minimum GHG threshold is consistent with the intervention logic that aims to facilitate a transition to a circular *and low carbon* economy. However, care must be taken in implementation that this requirement does not suppress the recycling innovations needed to reach the targets.

It is expected that the calculation rules and any sustainability criteria will be set by a Commission implementing act where accreditation criteria and the process will be defined. Member States would be required to appoint a notifying body that would be responsible for accrediting within that MS to the criteria set out in the legislation. To avoid 27 variations to this and economic operators requiring separate certification in each MS, the MS must recognise the notifying bodies in the other MS.

Finally, whilst an implementing act will be required, key definitions must appear in the parent legislation. In particular, as the current measure is aimed at creating a minimum requirement for *post-consumer* recycled content this must be defined.

4.2.2 Effectiveness - mass flows

There are many different factors that will influence the effectiveness and feasibility of this measure. The impact cannot be accurately forecast due to the lack of primary data and that this measure is the first of its kind on a global scale. However, the following provides some scenario analysis that can be used to determine which factors and what extend they affect the feasibility of the measure based on the level of the proposed targets.

The baseline mass flows remain the same from the previous measures whereby growth rate to 2030 returns 20,200 thousand tonnes of plastic packaging. The average recycled content across this group (excluding compostable packaging) is 16% overall and 13% excluding beverage bottles. This totals 3,200 kt of for all packaging and 2,100kt excluding beverage bottles. Calculations with and without beverage bottles are separated throughout due to the existing target under the SUPD for this product group. Meeting this target is already included in the baseline and therefore growth in recycled content excludes beverage bottles for the medium ambition target.

Figure 4-1 shows the modelled 2030 baseline scenario. With a 55% plastic packaging recycling rate target already set for 2030 in the current PPWD, it is estimated that 9.2mt of recycled post-consumer plastic will be available at that point. No material from other sources is included (or expected) due to the fact that currently plastic packaging is a source of recycled content for other industries (e.g. textiles, automotive). Additionally, recycled plastic for food contact, with its strict requirements, cannot come from non-food contact sources. Given the point of measurement is the point of entering the recycling operation after rejects, it is further estimated that a maximum of 90% of material that is mechanically recycled will become part of a product—totalling 8,300kt. Of this, 2,100kt is recycled content that is estimated to be contained in plastic packaging currently and 900kt accounts for the current (2018) amount going into other non-packaging products. This results in up to 5,300kt more recycled plastic available compared to 2018. Figure 4-1 also shows a second scenario where demand for recycled content from other applications is maintained at 31% to 2030, an additional 1,600kt will be taken by other industries leaving 3,700kt for the packaging industry.

The evolution of material moving from packaging to other products is unclear, but a key concern from stakeholders is that there is some reliance on this currently and to eliminate all movement between product types might be detrimental. Given this unknown, the current amounts are static to 2030 in the baseline.

Figure 4-1 Baseline Plastic Packaging Mass Flow (excluding beverage bottles) – current demand from other applications

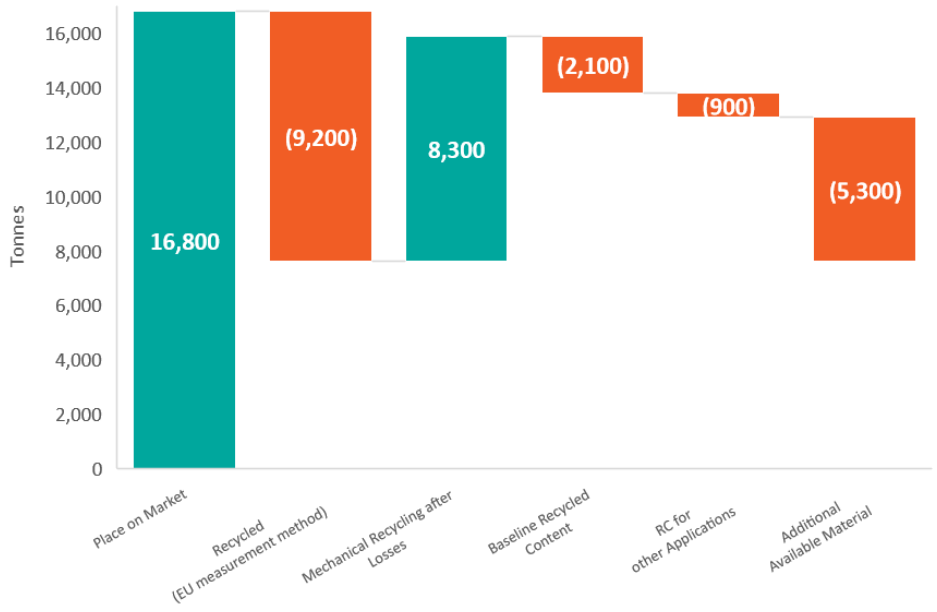
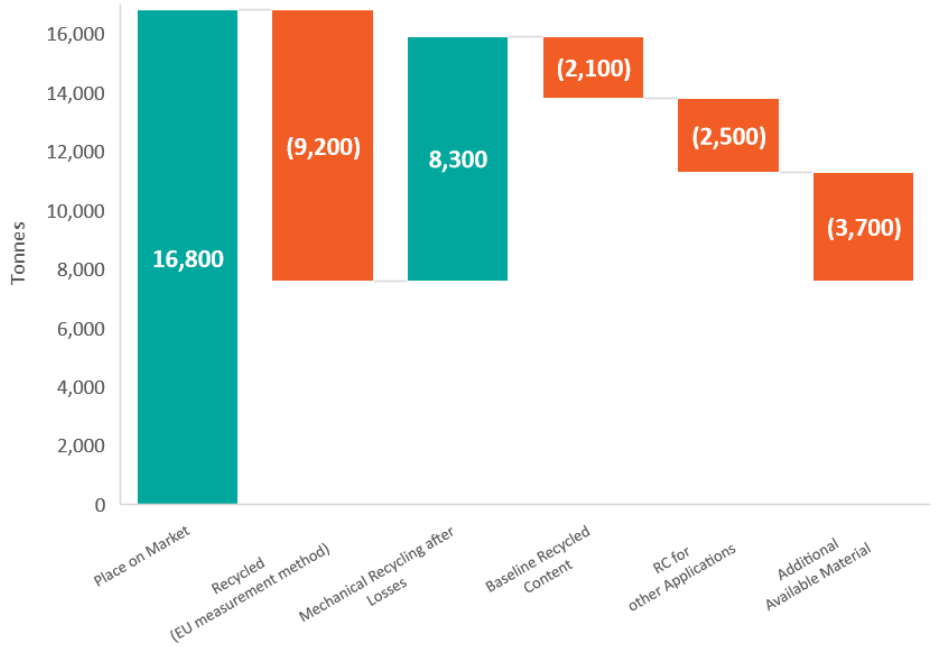


Figure 4-2 Baseline Plastic Packaging Mass Flow (excluding beverage bottles) – increased demand from other applications



It is also calculated that due to the 90% collection rate target that already exists for beverage bottles by 2030, an additional 1.8mt of recycled plastic (primarily PET) will also be available—totalling 7.1mt additional material (however, this impact assessment does not consider the impact of additional material resulting from the SUPD targets). With this pool of material (5,300kt) the potential for targets can be tested for feasibility. With an average of a 30% recycled content target

set across the packaging market there is an additional requirement for 2,980kt, for a 40% target this increase to 4,980kt. This means that of the available material, 56% and 93% respectively is used for recycled content in plastic packaging. This is also a 14pp and 24pp increase in recycled content respectively.

The setting of the individual group targets should therefore cumulatively seek to meet the overall average of 30% and 40% for the medium and ambitious scenarios accordingly. Table 4-2 shows the modelled mass flows for each of the groups that are used to meet these ambitions showing that this measure is expected to increase the amount of recycled content in plastic packaging by 3,000—11,700kt relative to the 2030 and 2040 baselines.

For context on the size of each group, in the 'high' ambition target, of the 5mt of additional material required, 34% goes into contact sensitive, 52% into non-contact sensitive and 14% into beverage bottles (based on their relative market sizes).

The scenario modelling shows that there is likely to be enough material in the system to meet these targets whilst allowing a for a 'buffer' to account for material movement between groups and outside of packaging. For example, if the demand for material from other sectors increases in line with Figure 4-2 the medium ambition target is still achievable. However, in this extreme case, the high ambition target would be unachievable as there would be a 1,300kt shortfall.

In should also be noted that the baseline mass flow data was compiled from several different sources as there is no official data collection that provides mass flows in suitable detail. The 'buffer' is also required to reduce the risk associated with the uncertainty in the model and the assumptions used.

Table 4-2 Additional Recycled Content in Plastic Packaging (ktonne)

Group	Material	2030		2040
		Medium	Ambitious	
Contact Sensitive	Polyolefin	900	1,140	2,900
	PET	160	230	770
	Other	280	340	770
	Total	**1,340**	**1,710**	**4,440**
Non-Contact Sensitive	Polyolefin	1,270	2,080	4,940
	PET	40	50	90
	Other	330	440	780
	Total	**1,640**	**2,570**	**5,810**
Beverage Bottles	Polyolefin	-	30	50
	PET	-	670	1,470
	Total	**-**	**700**	**1,520**
Grand Total		**2,980**	**4,980**	**11,770**

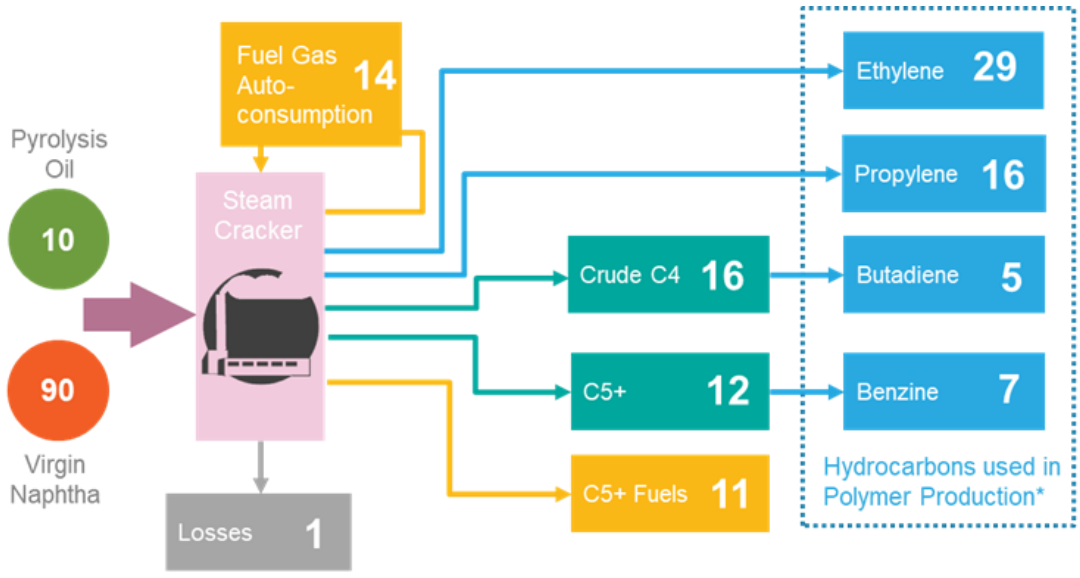
4.2.2.1 Chemical Recycling

The 'medium' 2030 scenario assumes that around 56% of the additional recycled material available will go directly into plastic packaging whereas the 'high' scenario takes 80% of the theoretically available material. However, the latter scenario relies much more heavily on

developments in chemical recycling which will potentially result in greater system losses. The exact material available will depend upon how much chemical recycling capacity is available and utilised for packaging. Currently there are very few alternatives to produce recycled food grade polyolefins, so there is a need for innovation and approval of chemical recycling technology. Additionally, the draft Regulation on recycled plastic materials and articles intended to come into contact with foods, and repealing Regulation (EC) No 282/2008 is aimed at increasing the availability of plastic recycled content for food packaging by providing a route for authorisation of innovative processes. If successful, this will increase the availability of mechanically recycling plastic from sources other than PET.

The main technology included for this impact assessment is pyrolysis of polyolefins. The contribution of this technology allows for virgin-grade polyolefins (PP, PE) to be produced in a steam cracker from the resulting pyrolysis oil (as shown in Figure 4-3). This requires a mass balance method for calculation of the recycled content as described in ISO 22095. However, as the calculation is an accounting exercise, the exact rules for mass balance will affect the amount of recycled content that results. Therefore, these rules need to be established in the legislation. Existing work carried out for the Implementing Act on the SUPD measurement method for recycled content details the options for measurement method. For mass balance it is recommended that at least the 'fuels excluded' method is used, whereby and fuels produced, or material consumed in the process itself are excluded from the calculation. This automatically results in around 26% 'losses'. The pyrolysis process itself is around 70% efficient. Combined, the losses in both processes mean that 50% of the input plastic material is lost.

Figure 4-3 Naphtha: Ethylene Steam Cracker Example



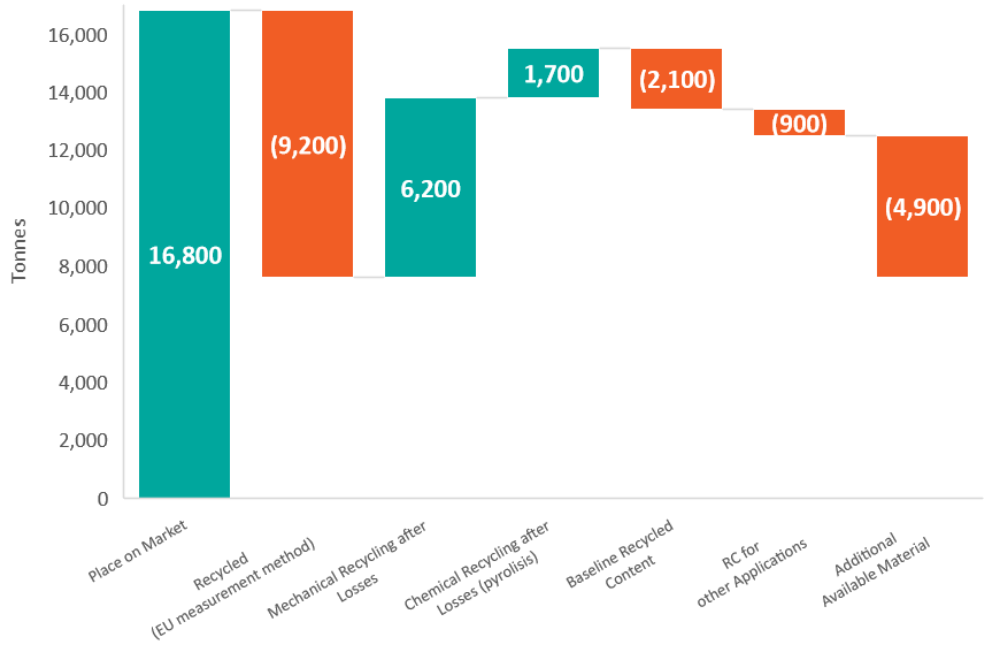
For the calculation on the contribution of recycled content from this process, a suitable calculation point must be established. Currently, one does not exist as there is no clear point in which end of waste is reached. However, for the purposes of this measure, that point is set at the gate of the steam cracker (which can be defined as the recycling process). This means that for the purposes of calculating the 55% recycling rate targets, the 30% losses in the pyrolysis process must already be taken into account. For the modelling of this measure loss rates from chemical recycling are therefore set at 26% (compared with 10% estimated for mechanical recycling).

The other key chemical recycling technology is depolymerisation of PET. This process has an efficiency similar to mechanical recycling and therefore does not affect the over yields in the same

way as pyrolysis is expected to. An output capacity of 0.7mt for PET depolymerisation which is assumed to go entirely to packaging.

Potential chemical recycling outputs are calculated from a membership survey conducted by Plastics Europe and using the "fuels excluded" mass balance allocation method. There will be competition from other sectors, such as the automotive, for the resulting recycled material, therefore it is assumed that 80% will go to contact sensitive plastic packaging, which allows for other sectors to utilise some of the material as it the case currently. This results in a total output capacity of 1.7mt for contact sensitive plastic packaging polyolefins from pyrolysis. Figure 4-4 shows how this affects the available material due to lower yields compared with mechanical recycling – a drop of 400kt tonnes for the same input material (8,300kt down to 7,900kt). However, it should be noted that due to the emergent nature of such technologies, there is considerable uncertainty around exact deployment at this stage.

Figure 4-4 Baseline Plastic Packaging Mass Flow – including pyrolysis (excluding beverage bottles)



If, under the 'high' scenario the full 1.7mt of chemically recycled polyolefins will be available, a ceiling to recycled content begins to be reached given the amount of material available to be used. This scenario, with the inclusion of chemical recycling takes over 86% of the available material (compared to the 80% with mechanical recycling only). If either, more material is sent to chemical recycling or the yields are even less than predicted, there would not be enough material left to reach the targets, unless the losses to other sectors are decreased or recyclates from other sectors enter plastic packaging. Equally, if less chemical recycling is deployed, there will be more material available, but technologies that can produce food grade packaging will be needed to fill the gap.

Additionally, the baseline model assumes that demand from other industries for recycled plastic from packaging will stay static at 900kt. If this is increased by 1,600kt as shown earlier in Figure 4-2 and chemical recycling is deployed as described above there will be 3,300kt for the packaging industry that requires 3,000kt for the medium ambition target (90% of the material). This scenario shows that the medium ambition target is still achievable particularly given the lack of market or legislative drivers for recycled content in order sectors. However, in this extreme case, the high ambition target would be unachievable as there would be a 1,700kt shortfall.

The results of this measure are also affected by the choice of the other measures in Option 3 and 4 (as further described in Section 9). As both options show a significant decrease in plastic waste arisings, this also reduces the pool of *additional* available material to be incorporated in recycled content (assuming 1.7mt of chemically recycled polyolefins is deployed). The result is that for both options the 'high' ambition scenario will require close to 100% of the additional available material in order to fulfil the targets. This increases the risk of some plastic packaging products failing to secure the material and the resulting competition increasing costs substantially. Maintaining at least a 30-40% buffer between is the amount of material that is *theoretically* possible to be available (based on the modelled measure) and what might be available in in practice will reduce this risk. Material, movement between packaging product groups, other industries competing for the material, the reliance on the meeting of current recycling targets, and the current technical limitations to higher levels of recycled content in contact sensitive applications all add to the uncertainty and the risk. This buffer may be reduced once actual data can be collected as part of supporting measures aimed at improving data collection (e.g. Measure 34b on mandatory reporting of recycling content).

The 2040 targets are modelled as aspirational based on the current understanding of the limits to circularity due to quality requirements and loss rates during the collection and recycling process. For example, with PET bottles, to maintain high quality recycled content has a theoretical limit of between 61-75%. This is lowered to 47-56% for other types of PET packaging.[20] The 2040 targets provide the plastic packaging industry with a clear long-term goal that creates a level of certainty around investment decisions.

4.2.3 Environmental modelling

Environmental modelling of these measures was conducted using the same methodology as described in Appendix D of the previous PPWD Impact Assessment study with the exception of the addition of chemical recycling data for GHGs and an adaptation of the system boundary. Air Quality (AQ) and water use data is not available for chemical recycling and therefore mechanical recycling is used as a proxy.

See Section 5.3.3 for details of sources for data used in the calculations. Table 4-3 shows the results for GHG emissions under different recycling scenarios, which demonstrates that mechanical recycling is likely to show the best overall GHG reduction. However, given the limitations of mechanical recycling, a certain amount of chemical recycling is likely to be needed and Table 4-4 shows the mixes used in the modelling of the scenario presented in the impact assessment. The assumption behind the mixes is that all *additional* food grade material come from chemical recycling. In reality, some food grade will come from mechanical recycling, but it is unclear how much and whether the GHG emissions associated with that would also be the same as current mechanical recycling. Therefore, the GHG estimates are considered to be conservative in this analysis.

[20] Zero Waste Europe (2022), How circular is PET?

Table 4-3 Recycled Content Recycling Technology Mixes Change in GHGs, thousand tonnes

Product Group	2030		2040
	Medium Ambition	High Ambition	
Mechanical Recycling only	-8,921	-12,820	-33,441
Chemical Recycling only	-3,011	-4,327	-10,617
Mix (scenario used for modelling)	-6,528	-12,041	-28,433

Table 4-4 Modelled Recycling Technology Mix Scenario

Product Group	2030		2040
	Medium Ambition	High Ambition	
PO Mechanical	59%	65%	63%
PO Chemical	41%	35%	37%
PET Mechanical	82%	83%	90%
PET Chemical	18%	17%	10%

This measure reduces the requirement for manufacture of virgin raw materials and the disposal in residual waste of the plastic packaging waste. The calculation of GHG emissions takes into account a split of chemical and mechanical recycling with the assumption that all additional recycled content required to meet the targets for contact sensitive plastic comes from chemical recycling. This results in 35-40% of polyolefins and 10-20% of PET coming from chemical recycling. The exact proportions are unknown, but the more chemical recycling is deployed, the smaller the GHG reductions will be due to higher energy use and lower efficiencies. Table 4-5 summarises the results.

Table 4-5 – Summary of Environmental Impacts for Measures 35em and 35eh

Indicator	**2030**		**2040**
	Medium Ambition	High Ambition	
Change in GHGs, thousand tonnes CO_2e (1)	-6,500	-12,000	-28,400
Change in water use, thousand m^3 (2)	-540	-930	-2,200
Change in GHG + AQ externalities, m€ (2)	-770	-1,350	-9,250

(1) Includes mechanical and chemical recycling mix
(2) Uses only mechanical recycling for all recycled content

The results should be treated with caution given the uncertainties round the exact deployment of technologies and the fact that the impacts are likely to vary considerably even within the same technology group. GHG emission data for chemical recycling is becoming more common but is still based on early stage demonstrator facilities. These facilities could both improve in future due to advances and economies of scale, but also the difficulties in obtaining inputs of homogenous

plastic waste streams without excessive contamination could also affect yields and subsequently reduce any benefits.

Despite the unreliability of the data (also hence why only GHG is included for chemical recycling), the overall conclusion that chemical recycling technologies do appear to have higher GHG impacts than mechanical recycling is the important aspect to consider. For example, for the 2030 medium ambition targets, the GHG reduction would be around 9,000kt CO_2e if only mechanical recycling were deployed. Mechanical recycling should therefore have the greatest role and chemical recycling deployed in a complementary manner for applications where recycled content would otherwise be challenging or impossible to include.

In terms of fossil fuel use, the production of one tonne of HDPE requires around 1.05 tonnes of crude oil and natural gas as a feedstock and a further 0.75 tonnes is burned during the process.[21] The medium ambition 2030 target would therefore reduce fossil fuel *feedstock* requirements by 3.1mt per year and by 4.5mt for the high ambition target.

4.2.4 Economic impacts

Similar to the other recycled content measures (35a-c) it is expected that the price of recycled plastic –and potentially the price for plastic packaging- will increase, at least in the short term and there are likely to be ongoing process changes required to allow for more incorporation of recycled content. Whilst it is difficult to estimate any increases and whether they will be permanent, there is clear evidence from the rPET market that the introduction of recycled content targets has a direct effect on price well before the 2025 implementation date. This is, in part, also due to the lack of supply, which highlights the need to institute mechanisms to increase supply as well as act on the demand side.

At the beginning of 2022 rPET was shown to have doubled in price over the course of a year and became more expensive than virgin PET.[22] The exact price differential frequently changes due to many factors including the price of energy and oil, but if a €100 per tonne price increase were to be maintained across the plastics packaging sector this would be an increase in costs to the industry of €270m annually for the medium ambition 2030 target using an average of 30% recycled content.

To put cost increases into context, for a 13g PET beverage bottle using *100% vPET* at €1,000-1,500/tonne the cost of the material would be €0.013 - 0.02 and increasing this by 10% by using rPET would result in a cost of €0.014 - 0.021. The effect on the consumer prices is largely unknown as there is potential for producers to increases prices accordingly, but as the increase is so small (€0.001 or 30% of this for the medium ambition target) this cannot happen for each product. Equally, the value of product being contained will also affect this; keeping the example of a beverage bottle, this could range from less than €1[23] for bottled water to over €2[24] for premium carbonated drinks – the bottle material cost therefore only accounting for 1-2% of the overall price seen by the consumer. This demonstrates that the price increase per packaging is relatively small

[21] Plastics Europe (2016), Eco-profile of HDPE

[22]https://www.packaginginsights.com/news/recycled-plastic-prices-soar-as-rival-industries-dip-into-beverage-producers-supply.html

[23] https://www.globalproductprices.com/Germany/mineral_water_prices/

[24] https://www.numbeo.com/cost-of-living/region_prices_by_city?displayCurrency=EUR&itemId=6&region=155

compared to the likely value of the product itself. Some of the many options available to producers could be one or more of the following:

- Increase product prices considerably beyond the costs e.g. adding €0.05 would be 50 times more than the additional cost.
- Increasing prices on selected (premium) ranges that can command a higher margin
- Increasing prices only in selected markets
- Absorbing the additional cost

Due to this uncertainty, it cannot be assumed that consumers will directly experience price increases as a result of recycled content requirements.

One important additional driver of the price differential is the fluctuation in oil prices that increasing recycling content insulates against—there is no guarantee that virgin prices will become and stay lower than recycled prices. Carrying out recycling and incorporating recycled content within the EU reduces the effect of the uncertainty of oil supply associated with geopolitical issues.

It should be noted, that due to the specific challenges faced by the product groups affected by the 'contact sensitive' targets (principally food contact packaging, but also other more niche groups as identified in the *ease of implementation* section), the economic impacts are likely to be significantly higher than for the noncontact sensitive. This is why the targets are set at lower levels compared with 'non-contact sensitive', but there are still considerable uncertainties around exactly how 'contact sensitive' targets will be met given the technological developments (e.g. chemical recycling) required and the economic costs of doings so.

Finally, those economic operators located in Member States that find it challenging to meet the 55% recycling rate targets for plastic packaging may have additional issues obtaining material at a reasonable cost. As previously mentioned, derogation or deferment may be an option if material supply is preventing adherence to the targets. Also, given the production of plastic packaging in Member States is not always consistent with its consumption there will be considerable movement of plastic waste between Member States to those that have greater recycling and/or convertor capacity. The exact impacts of any additional material movements are unclear, but may, to a certain extent, be offset by the material staying in the EU rather than being exported for processing outside.

Figure 4-5 shows how the costs modelled for this measure could be distributed broadly throughout the different actors in the value chain for the medium ambition target—the aim is to demonstrate the order of magnitude of potential costs. As noted above, the exact cost pass-through is not known, but there is a key transfer in revenue from the virgin plastics producers to plastics recyclers. A 10% price increase for recycled plastic is assumed and therefore converters (and subsequently retailers) are shown to have their costs increase accordingly. If these costs are passed through to the retailer and subsequently the consumer/EU citizen (which is uncertain) there could be an increase in prices of €270 annually. This should be balanced against the environmental monetised benefits to society of €770m (see Section 4.2.3) which results in an annual benefit of €1.70 per EU citizen. For context, the distributed costs are also shown for the high ambition targets in Figure 4-5.

Figure 4-5 Summary of Annual Economic Impacts and Revenue Transfers – Medium Ambition (35em)

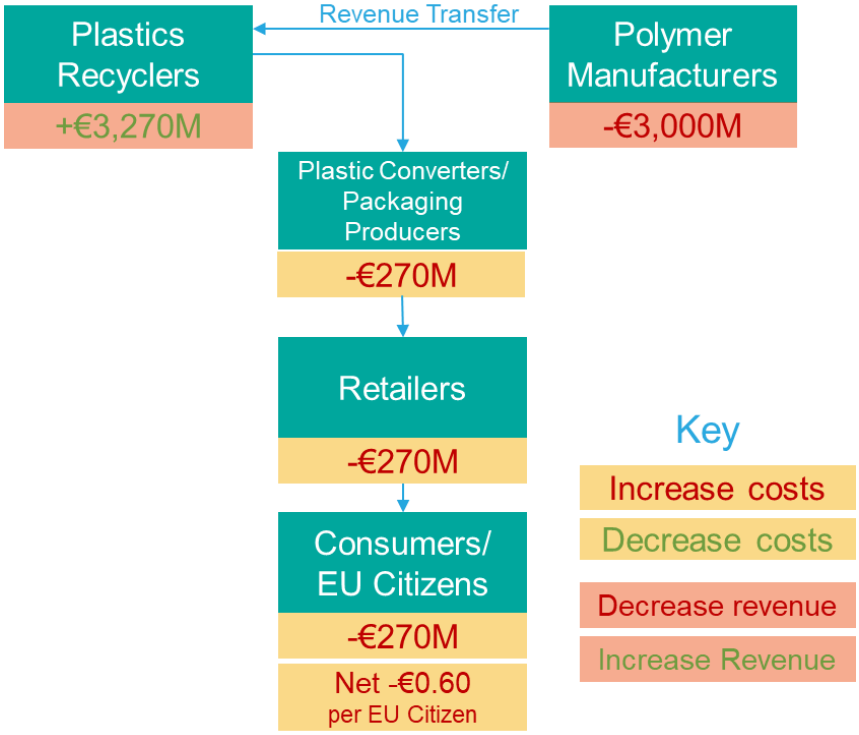
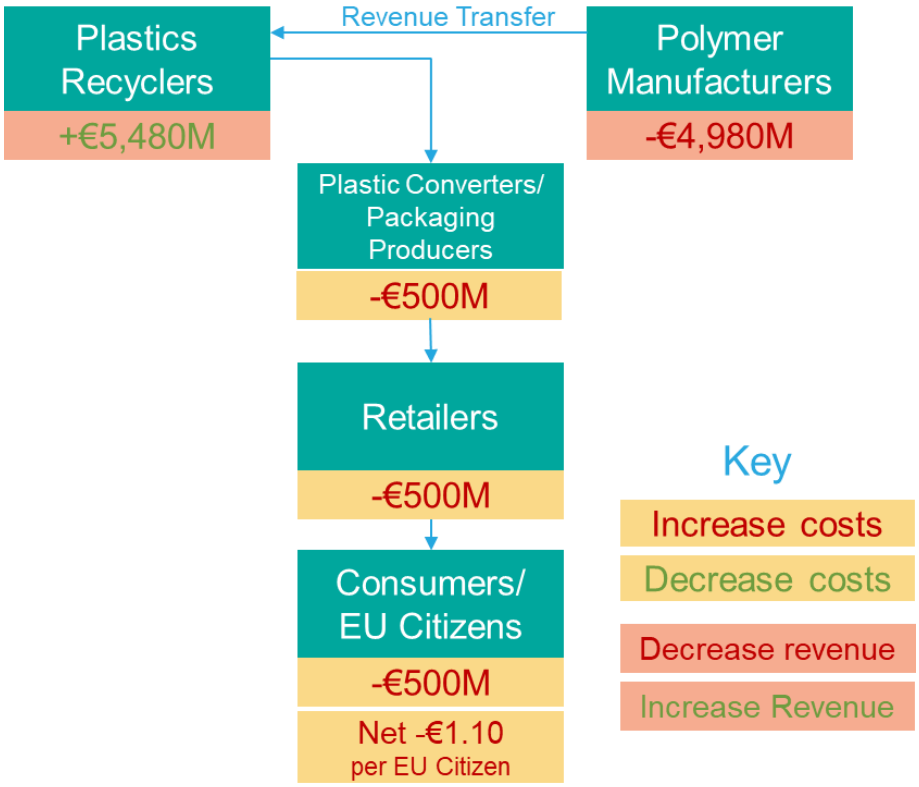


Figure 4-6 Summary of Annual Economic Impacts and Revenue Transfers – High Ambition (35eh)



4.2.5 Social impacts

There is likely to be job creation, although the benefits of this may not be entirely attributable to this measure. An increase in recycling rate is required for a corresponding increase in recycled content and this is supported by the existing PPWD target for plastic packaging of 55%. This measure does help to ensure 'high quality' recycling that is required for circular applications. Member States working towards this recycling rate target will necessarily need to invest heavily (and facilitate industry investment) in collection and sorting. What is uncertain is the final destination of the collected plastic. A large proportion may currently be destined for export outside of the EU, but the introduction of a recycled content target for plastic packaging ensures that more will stay within the EU. This means that there is likely to be an increase in plastics recycling related jobs in the EU (and a slight corresponding decrease in jobs related to residual waste treatment). For the current measure this is estimated to be between 26k (medium 2030), 43k (high ambition), and 100k (2040) of additional jobs (FTEs) although it is unclear just how many of these would have been created without this measure. Increased employment is based upon an increased number of jobs associated with collection and reprocessing of plastic waste (9.3 FTE per 1,000 tonnes) and a corresponding decrease in residual waste collection and treatment (0.7 FTE per 1,000 tonnes). This is in line with Appendix D of the previous PPWD Impact Assessment study.

One area that these additional jobs are likely to be realised is in research and development of new recycling technologies. The legal certainty that introducing a requirement for recycled content provides, will accelerate these developments and increase investment due to greater financial incentive.

The other key social impact will also be on health due to the reductions in GHG and AQ impacts resulting from the reduced need for primary material. There should be no negative health benefits to consumers as a result of incorporating more plastic recycling content in food packaging due to how highly regulated this is currently and will continue to be.

4.2.6 Administrative burden

As was the case for Measures 35a-c, additional administrative burden is anticipated for the Commission and Member States, including market surveillance authorities, PROs and third-party certification bodies that will be involved and monitoring and verification.

Under this measure **there will be an administrative burden for the Commission both in the development of the legislative proposal and subsequent supporting legislation**. This is related to the drafting of the legislative proposal comprising EU taxonomy of packaging categories for assessment, negative list of packaging characteristics, which will need to be regularly updated, and criteria and procedure for accreditation of certification bodies. It will also need to draft an implementing act on the measurement method for calculation and verification of recycled content (which should be consistent with the implementing act developed for the SUPD).

Member States will have a significant administrative burden related to the enforcement of this measure. This has been estimated with an average of 1.5 FTEs per Member State, resulting in recurring costs of €1.8 million (the same as Measure 22a).

Member States will also need to accredit the third-party certification bodies, which has been estimated at an average cost of €17,000, by an average of one certified body per Member State,[25] resulting in annualised costs (over 10 years) of €22,000.

Certification Costs to Industry

[25] Assuming that most certification bodies will operate in several Member States as is current practice.

Further to the description of the admin burden associated with certifying plastic recycled content under Measures 35a-c, the following estimates the magnitude of these costs. These are likely to be similar for all measures given the assumption that the whole plastics packaging value chain would be affected, and the target levels or product groupings will not have a considerable effect.

It is estimated that the EU plastics industry value chain has ~60,000 actors across raw material producers, recyclers, converters and compounders.[26] Packaging accounts for ~40.5% of the end use market for plastics.[27] And therefore it is assumed the same proportion of plastics industry actors are involved in the plastic packaging value chain across the EU (~24,300) and these actors will all require certifying.

A summary of the estimated administrative costs associated with certifying recycled content is presented in Table 4-6 and Table 4-7. Individual costs have been taken from various existing voluntary schemes and therefore are based on current practice. One-off costs are estimated to be €31-32m and recurring annual costs are estimated at €119-126m. The range reflects that in the future, as the recycled plastic industry develops, the number of actors involved, and therefore certificates required, may increase. For example, currently it is estimated that ~495 recyclers produce 4.3mt of plastics recyclate from packaging across the EU.[28] In order to meet the proposed recycled content targets it is estimated that between 342 and 1,347 additional operators may be required, depending upon the target level. Some certifiers also charge a price per tonne of material in addition to the business-level costs. These are the only costs which increase as a result of higher targets (i.e. more material). However, these fees are nominal compared with the other fees and therefore the annual cost per tonne of certifying plastic recycled content to meet the targets under this measure are €21 for medium ambition, €13 for high ambition and €8 for the 2040 target.

These costs are based on best available estimates, applied to the plastics industry as it is today. There are some additional nuances that should be considered when interpreting these costs:

- If a harmonised methodology for certifying recycled plastic content across the EU was introduced, the associated efficiencies would likely reduce costs for those currently certifying material – the estimated costs assume one harmonised scheme rather than the several that exist currently.
- There are numerous other factors driving the plastic packaging industry to audit and certify recycled content (e.g. other legislation such as the SUPD and national plastic taxes, EPR eco-modulation, brand / consumer pressure etc.). The industry is therefore already moving towards increasing the amount of certified plastic recycled content, though this measure may accelerate this shift. It not currently known what proportion of the plastics industry is already certifying recycled content, nor is it known how this would evolve in the absence of mandatory recycled content targets, and therefore it is not possible to estimate what portion of the costs presented may be additional to baseline costs. **The estimated costs are therefore an upper limit assuming that no certification is taking place currently and that every value plastic packaging value chain actor requires certification.**

[26] Based on information provided by Plastic Recyclers Europe

[27] https://plasticseurope.org/knowledge-hub/plastics-the-facts-2021/ https://plasticseurope.org/knowledge-hub/plastics-the-facts-2021/

[28] Derived from: PRE, 2020, *Report on Plastics Recycling Statistics*, https://www.plasticsrecyclers.eu/_files/ugd/dda42a_2544b63cfb5847e39034fadafbac71bf.pdf

Table 4-6: Certification One-off Costs

Type of cost	Stakeholder	Cost
Certification scheme registration	Applicant	€6.1-6.4m[1]
Main audit	Applicant	€24.6-25.6m[2]

[1]Based on €250 * 24,640-25,650 applicants. It is possible that the registration fee charged per applicant will decrease as the number of applicants increases.

[2]Based on 24,640-25,650 applicants * €4,000 main audit cost

Table 4-7: Certification Recurring Costs

Type of cost	Stakeholder	Cost per year
Applicant administrative costs	Applicant	€66-69m[1]
Annual monitoring audit	Applicant	€49-51m[2]
Certification / Licence fee – per tonne of material	Applicant	€4.1-5.1m[3]

[1]Based on 24,640-25,650 applicants requiring 75 hours to apply for certification and manage the audit process. Assuming €35.6 hourly wage for "ISCO 2 Professionals", Eurostat Structure of Earnings Survey, Labour Force Survey Data for Non-Wage Labour Costs.

[2]Based on 24,640-25,650 applicants * €2,000 monitoring audit cost

[3]Based on (24,640-25,650 applicants * €150 certification fee) + (€0.10 tonnage fee * 5.1mt of recycled content in packaging)

4.2.7 Stakeholder Views

Stakeholders consulted for this measure (and previously for recycled content in general) are generally in favour of plastic packaging recycling content targets in order to help drive the demand for plastics recycling and increase the circularity of plastic packaging. However, there are some concerns around the potential to switch to other materials if the measure results in high costs or unavailability of material.

This measure is aimed at addressing the concerns voiced for measures 35a and b that either were not considered to be granular enough (an overarching single target) or are overly complex with too many product-specific targets. The key distinction between contact and non-contact sensitive, particularly with regard to food grade applications has been well received given the challenges of the former. Given those challenges, many stakeholders also expressed the need for increase the number of authorised recycling processes beyond that of PET in order to meet the proposed targets. This, combined with the uncertainty around the deployment of new recycling technologies such as chemical recycling, means that there are calls for the targets to be re-evaluated in ~5 years to avoid unnecessary market prohibitions if the material is not available. There are concerns that without a right to priority access that other industries (potentially with higher margins) may out-compete the packaging industry for the material.

Generally, the access to material is the primary concern; users of recycled plastics claim that not enough material is *currently* available, however recyclers counter this with assurances that the material can be provided in sufficient quantities given the right legislative drivers in place.

As detailed in Section 4.2.1 there are also several highly regulated industries who also claim that they have additional hurdles to overcome in order to incorporate recycled content. This does not necessary mean it is impossible to incorporate recycled content but may increase costs significantly.

4.3 Aspects related to legal drafting

The following sections relate to key aspects that are important in defining the drafting of the legal text.

4.3.1 Defining post-consumer plastic waste

Post-consumer plastic waste from any application that is recycled into plastic material used in new packaging products will count towards the attainment of the recycled content targets. Therefore, we seek to define the term **post-consumer recycled plastics**.

This is broader than a definition of post-consumer recycled plastic **packaging** alone, which would mean that only recycled plastics from packaging waste can count towards the targets. Although there are few examples of non-packaging plastic waste currently being recycled into plastic packaging (particularly due to the food contact regulations), this may become more common in the future, e.g., chemical recycling processes may enable non-packaging plastic waste inputs to be recycled into packaging grade materials and applications.

The definition is however not so broad to encompass **all post-consumer recycled materials**, i.e., both plastic and non-plastic, that end up in plastic packaging items. This reflects the targets' objective to stimulate plastics recycling and overall circularity by increasing the demand for secondary plastic materials in the packaging sector. Recycled plastic packaging that originated from other material waste streams is not common, nevertheless, this should not count towards the attainment of the targets.

Finally, the term "post-consumer recycled plastic" is currently being defined such that any material that does not fulfil this definition shall not count towards the attainment of the targets. A legal definition of the term "pre-consumer waste" as used by industry, and reference to other existing legal definitions of "by products" and "product residues", are therefore unnecessary.

4.3.1.1 Nature of definition

Given that the term post-consumer recycled plastic is not defined elsewhere in EU waste legislation, a qualitative definition is proposed for inclusion in the regulation. Industry currently tends to rely on the definition of post-consumer waste in ISO 14021:2016:

> *Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.*

The above defines post-consumer waste (i.e., input into a recycling process) as opposed to post-consumer recycled material (i.e., output of a recycling process/ input to a production process) and therefore requires further development. In addition, the definition needs to be made more specific to apply to plastic products and the relevant points in the plastics value chain. Finally, the definition would benefit from illustrative examples to ensure harmonised interpretation of the key points.

The following definitions are proposed:

'Post-consumer recycled plastic' means the outputs of post-consumer plastic waste recycling that are used in the manufacture of plastic packaging in Article XX and pursuant to the definition of 'plastic' in Article 3(1) of the PPWD, and 'recycling' in Article 3(17) of Directive 2008/98/EC on waste.

and;

'Post-consumer plastic waste' is plastic waste generated by households or by commercial, industrial and institutional facilities in their role as end consumers of plastic products pursuant to the definition of plastic in Article 3(1) of the PPWD and 'waste' in Article 3(1) Directive 2008/98/EC on waste. The scope of this definition is limited to plastic waste that is generated after the relevant plastic product has been placed on the market and can no longer be used for its intended purpose. Plastic materials and waste generated during production or manufacturing processes, including all secondary processing, testing, storage and transfers prior to the product being made available for distribution, consumption, or use in its finished form shall therefore not be considered post-consumer waste for the purposes of this definition.

Further (based on existing definitions in the Single-Use Plastics Directive/ Blue Guide):

'placing on the market' means the first making available of a product on the Union market; and

'making available on the market' means any supply of a product for distribution, consumption or use on the Union market in the course of a commercial activity, whether in return for payment or free of charge.

The definitions above could be included in Article 3 of the regulation (alongside other definitions). Alternatively, given that the term is defined specifically to support the implementation of the recycled content targets, the definition could be included within the relevant article/ chapter on recycled content. In either case, given that the targets are applied at the level of the EU market the existing definition of placed on the market in the Blue Guide can be adhered to.

Both definitions (placed on the market and post-consumer recycled plastic) will therefore also form a basis for the implementing act that sets out the methodology for calculating, verifying and reporting against the RC targets.

Illustrative examples could be provided in an annex, or potentially expanded on and published as a part of the abovementioned implementing act.

4.3.1.2 Illustrative examples

To ensure harmonised interpretation of the above definitions, illustrative examples reflecting specific material streams generated along the plastics value chain are provided below.

- Off-spec, defective or scrap plastic materials, components or products (e.g. those rejected during quality control) will not be considered post-consumer plastic as these are generated during the production process.
- Obsolete/ damaged stock that is discarded will only count if it has been placed on the market (i.e. from distributor/ retailer storage, but not if the stock is still in the manufacturer warehouse)
- Installation processes carried out by manufacturers and commercial third parties in the course of their business are considered part of the production/ manufacturing stage, and plastic materials resulting during this stage will not count as post-consumer (e.g., offcuts from carpet and PVC window installation). However, if such installation is carried out by

households (i.e. in cases in which the installer is also the end consumer of the plastic product), then such offcuts may be considered to be post-consumer.
- Post-consumer plastic waste generated from products that were placed on the EU market from online sales, third country imports individual transfers etc. will be included.
- Secondary and tertiary packaging used by industry/ commercial facilities and discarded will count as post-consumer waste.

4.3.2 Exemptions

No exemptions to compliance with the target have been modelled although several industries have been consulted with regard to requests for exemptions or extensions to meeting the targets in this measure. The following identifies the key groups that require further investigation during the legislative process which predominantly consist of products that would fall under the 'contact sensitive' target.

Medical/Pharmaceutical/Veterinarian

The medical and pharmaceutical industry commonly use plastic packaging. However, this packaging is subject to strict controls that build on the current Food Contact Regulations (FCR). It should be noted that whilst compliance with FCR does not directly apply to the medical sector, it is typically used as a starting point from which other testing is applied. It is also not prohibited in the EU to use recycled content, but the barriers are such that very little is used in this industry and there has been little to no incentive to do so previously.

Packaging for medicinal products for human use is governed by Annex I of Directive 2003/63/EC and the EudraLex Volume 3 Guideline on Plastic Immediate Packaging Materials is the primary document used by the industry to demonstrate compliance with the Directive. [29]

The document demonstrates that there is no rule explicitly banning recycled content in pharmaceuticals, but extra tests need to be undertaken for non-solid pharmaceuticals with the following requirements:

- Migration/extraction studies still need to be done on plastic packaging for pharmaceuticals even if food contact tests are carried out/ if the plastic packaging adheres to food contact Regulations (1935/2004 & 282/2008)
- if the recycled content meets food contact Regulations, interaction studies still need to be done;
    - interaction studies must test prove that the recycled content does not significantly alter the medicine and affect its quality/potency
    - these interaction studies can also include migration studies if deemed necessary (which is a decision for the producer to make). Migration studies would make sure that no component of the recycled packaging leaches into the medicine under normal conditions (e.g. storage)

If the recycled content does not meet food contact regulations, the testing requirements are more stringent and include;

- extraction studies to determine how many extractables can be extracted under extreme conditions;
- if one or more extractables are confirmed, migration studies must be carried out to ensure these extractables don't leach into the medicine;

[29] https://www.ema.europa.eu/en/plastic-primary-packaging-materials

- interaction studies must be done to ensure the packaging doesn't affect the quality/potency of the medicine; and,
- toxicological information on any leachables/extractables must be documented.

The process for testing and verifying new materials can be up to ten years in duration. However, material from chemical recycling (mass balanced and of virgin quality) could be used today with no issue if available.

The amount of plastic packaging produced by this industry is not currently known but a third party market report quoted by Medtech Europe in a position paper to the Commission estimates medical plastics packaging accounts for 7.2% by mass – around 1 million tonnes.

Veterinary medicinal products are also subject to EU law in the form of Regulation 2019/6, although it only addresses packaging with regard to labelling requirements and places no criteria on the packaging itself. However, the distinction is made between 'immediate packaging' in contact with the medicinal product and 'outer packaging' in which the immediate packaging is placed. It is clear for these products and others of a 'contact sensitive' nature, that this distinction should also be made and that if exemptions are granted, that it is not for the whole category, but only for those packaging in direct contact with the contact sensitive substance. The Eudralex guidelines on plastic immediate packaging materials document also applies to veterinary products and has the same requirements (regarding tests for extractables and leachables) therefore should be considered in the same way as medicinal products for humans.[30] According to Animal Health Europe, there is no data on the mass of packaging placed on the market in the EU, however the veterinary medicine sector is estimated to be only 3% of the human sector. If this directly equates to mass of packaging, the veterinary sector would account for 0.22% of plastic packaging or 31 ktonnes.

Plastics that come into contact with food for infants and young children are also subject to stricter requirements under 10/2011[31] whereby some types of common plastic food packaging would not be allowable in this application. This extends to recycled plastic, but the lack of supply of food grade recycled plastic more generally is exacerbated by these stricter requirements. For context, according to the industry, baby food accounts for 0.56% of the EU food market, by value.

Together, these market areas could account for ~8% of the plastics packaging market which would be around 1.6 million tonnes by 2030. However, it is unclear how accurate this figure is and also what proportion of this would be used in contact sensitive applications rather than as outer packaging.

For these product types, the approach adopted in Article 20 of the current PPWD may be appropriate, i.e. a provision for Delegated Act(s) *"to deal with any difficulties encountered in applying the provisions of this Directive".* Currently this applies to medical devices and pharmaceutical packaging but could also be extended to veterinary packaging. However, it should be noted that polymers resulting from chemical recycling are highly likely to be suitable for all contact sensitive packaging in these sectors due to their equivalence to virgin polymers (and that no further testing would be required to place them on the market).

Cosmetic Applications

[30] https://www.ema.europa.eu/en/plastic-primary-packaging-materials

[31] Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food Text with EEA relevance at http://data.europa.eu/eli/reg/2011/10/2020-09-23

Cosmetics packaging is also subject to requirements although there are no specific regulations governing the inclusion of recycled content in cosmetic produced under 1223/2009[32] (EU Cosmetics Regulation). However, an Implementing Decision for 1223/2009 suggest that 1935/2004[33] (Materials and Articles Intended to Come into Contact with Food) could be a useful reference to prove the safety and therefore packaging produced for food contact is likely to also be suitable for cosmetics. According to the cosmetics industry, plastic cosmetic packaging accounts for around 6% of the EU plastic packaging market.

Compostable Plastics

Compostable plastic packaging under this measure would likely be restricted from being placed on the market due to the **inability of most compostable plastics to use plastic recycled content**. This inability does not stem from the particular materials themselves—there are typically no technically restraints—, but the notion that compostable plastics by their nature, are not designed to be recycled, but to be composted. This means that the material is not available to be used in new packaging. As there is no requirement, and therefore no market for recycling of these materials, sorting plants do not selectively target them; they are typically treated as contamination.[34] There is one limited exemption to this as one plant that exists in Belgium that mechanically recycles PLA in limited amounts and some evidence of chemical recycling of PLA taking place.[35,36] PLA is notable in that it is one of the only compostable polymers that can be used on its own to replace common conventional polymers in *rigid* packaging— it has been used successfully in beverage bottles to replace PET as a 100% biobased alternative. However, the message that it can be both recyclable and compostable is also often confusing. This, coupled with the low volumes of PLA being used for packaging; around 41kt in the EU—0.3% of total packaging—, there is little incentive to target and recycle it at scale.

Aside from PLA, there are no other compostable polymers being recycled commercially and this is unlikely to change. Without a reliable supply of recycled material, it is not possible to include recycled content even for those polymers that can include it in theory. It is for this reason that applying a minimum recycled content requirement on all plastic packaging is likely to prevent compostable plastics from being used. It is estimated that 200kt of compostable plastic packaging is placed on the EU market currently (1.4% of overall), which will increase to 284kt in the 2030 baseline (figures from Section 5). The current measure is likely to shift all of this material away from compostable plastics, with the possible exemption of some PLA.

This is possible to address in the following ways:

- To provide a specific exemption only for those packaging products that also adhere to the requirements under measures (29b/d) in the intervention area on compostable packaging.
- Extend the definition of recycled content to include other non-plastic waste e.g. producing bio-based plastic from biowastes. This would still restrict compostable plastic made from biomass grown specifically for the purpose.

[32] Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products, available at http://data.europa.eu/eli/reg/2009/1223/2022-03-01

[33] Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC, available at http://data.europa.eu/eli/reg/2004/1935/2021-03-27

[34] Hann, S., Molteno, S., Hilton, M., and Favoino, E. (2020) Relevance of Biodegradable and Compostable Consumer Plastic Products and Packaging in a Circular Economy, Report for European Commission DG Environment, February 2020

[35] http://looplife-polymers.eu/

[36] https://www.plasteurope.com/news/TOTAL_CORBION_t248881/

- Measure w (see Section 5) on a joint recycled content and biobased plastic target allows for biobased compostable plastic to still be placed on the market subject to sustainability criteria.

None of these alternatives apply to ***fossil-based*** compostable plastics—that are estimated to currently account for 23% of the compostable plastic packaging market— which would, in effect, be restricted from the market unless they also contain the specified proportion of biobased plastic. In reality, exclusively fossil-based packaging plastics are very uncommon as it is typical to blend polymers into compounds to achieve the right level of biodegradability balanced with physical properties.[37] For example, fossil PBAT is often blended with biobased PLA to produce flexible films with high biodegradation properties. This means that the use of Measure w is not likely to impact the *fossil-based* compostable plastics market in a significant way.

Dangerous Goods Packaging

Packaging designed to be in contact with chemicals are subject to specific requirements (high molecular weight polyolefins) that can make incorporation of recycled content challenging. Some packaging may also be classified as hazardous waste in itself due to its contents (either as a residue after use or as a disposal means for the contents e.g. hospital waste) and therefore cannot be recycled. The industry already works to ISO 16103:2005 'Packaging – Transport packaging for dangerous goods –Recycled plastics material' which already significantly restricts recycled content. The regulatory framework is complex and not specifically governed by EU law, but through a broader international regulatory framework with regard to transporting dangerous goods which includes; the UN Recommendations on the Transport of Dangerous Goods (Model Regulations)[38], International Maritime Dangerous Goods Code (IMDG)[39] and the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).[40] It is therefore recommended that these packaging fall under the 'contact sensitive' target to lower the burden and take into account the complex international laws and agreements that are in place currently..

4.3.3 Multi-material (composite) Packaging

Packaging that is not principally made from plastic but contains plastic that cannot be separated by hand can be problematic to include recycled content. An example is beverage cartons (and the equivalent for foods) which are comprised of 65-80% paperboard, ~5% aluminium, and 20-30% plastic. These enter a paper recycling process whereby only the board is recycled, although more sophisticated separation and recycling processes have been developed but are yet to be widespread—including these products in the target(s) will likely accelerate this development. The industry is also currently exploring the use of mass-balanced chemically recycled polyolefins and bio-based as alternative feedstocks. The former would potentially count towards this measure and the latter would also contribute if Measure w is implemented.

Currently, composite beverage cartons are excluded from the SUPD target, but are considered to be included (along with food cartons) under "contact sensitive" targets for those parts of the packaging in contact with food. For other plastic layers of the composite packaging, targets related to "non-contact sensitive" should apply. An alternative approach is to apply the "contact sensitive"

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[37] Nova Institute (2016) *Market study on the consumption of biodegradable and compostable plastic products in Europe 2015 and 2020*

[38] https://unece.org/transport/dangerous-goods/un-model-regulations-rev-22

[39] https://www.imo.org/en/OurWork/Safety/Pages/DangerousGoods-default.aspx

[40] https://unece.org/about-adr

targets for all plastic in the packaging which may be preferable from a verification perspective (maintaining a chain of custody and verification for two streams of recycling content may be challenging).

4.3.4 De minimis thresholds

A de minimis threshold should be considered in the legislation to protect smaller companies from the burden of including recycled content due to the challenges of competing with much larger operators. The only example of this currently is the recently introduced plastics tax in the UK[41], where producers of fewer than 10 tonnes of packaging per year are exempt from the tax. It is unclear how this threshold was suggested, but it can be considered to be on the extreme low end of the annual capacity for a plastics converter.

By way of an example, European Plastic Convertors (EUPC) report that their members comprise of 50,000 SMEs and assuming these are evenly split across the plastics market, around 20,000 (40.5%[42]) would be producers of packaging. With 20mt of demand for packaging in the EU (although not all destined for the EU), this would mean, on average, each converter processes 1,000 tonnes of material annually. It would therefore be appropriate that the threshold be set in the 100's rather than the 10's of tonnes given the scale of operations. For example, if a threshold set at 100 tonnes is applied and it affects 10% of plastic packaging convertors (2,000), this would result in reducing the recycled content in the 2030 medium target by 200kt —around a 4% reduction in the total mass of recycled content and ~1 percentage point reduction in the overall average plastic packaging recycled content.

The implementation will also be important, as the inclusion of recycled content as a minimum requirement is different to a tax or a levy; it is impossible to retrospectively comply with the target requirements once the economic operator is over the threshold, therefore compliance would need to be based on the previous years' tonnages placed on the market i.e. minimum recycled content should be included for the following year if the de minimis thresh was reach the previous year. There would be an admin burden for all organisations that place plastic packaging on the market regardless of size, to declare whether they have met the threshold. Random, periodic, compliance checks by members States may also be required.

Importantly, the obligation may not always be on the plastics convertor as this will depend upon how the term 'placed on the market' is defined. This could apply to any value chain actor from the convertor onwards (i.e. one an item of packaging is produced) depending upon the intention.

4.3.5 Accreditation process

An accreditation process is required for which certain bodies are recognised as being able to verify the recycled content of plastic packaging. This is envisaged to be exactly the same process for recyclability assessment (i.e. modelling on the Batteries Regulation through the use of notifying bodies – see section 3.3.43.3.4). In addition to these criteria, the following specific criteria for recycled content verification are recommended:

- Member States shall require economic operators to arrange for an adequate standard of independent auditing of the information submitted, and to provide evidence that this has

[41] https://www.gov.uk/guidance/work-out-which-packaging-is-subject-to-plastic-packaging-tax

[42] https://plasticseurope.org/knowledge-hub/plastics-the-facts-2021/ https://plasticseurope.org/knowledge-hub/plastics-the-facts-2021/

been done. The auditing shall verify that the systems used by economic operators are accurate, reliable, and protected against fraud, including verification ensuring that materials are not intentionally modified or discarded so that the consignment or part thereof could become a waste or residue. It shall evaluate the frequency and methodology of sampling and the robustness of the data.

- Economic operators shall provide third party verification and traceability for recycled content and be subject to annual auditing. Certification schemes following standard EN 15343 (Plastics recycling traceability and assessment of conformity and recycled content) may be used to support verification and certification of recycled plastic content for segregated controlled blending chain of custody approaches. Mass balance chain of custody approaches must follow the framework described in the Implementing Act (see Section 4.3.6).
- All value chain actors that take legal ownership of the material must be certified by a third party and each site audited annually. This includes recyclers, processors and traders up until the point in which the product is placed on the market. End retailers that place the product on the market (but do not introduce any material changes to the packaging) do not require certification or auditing. A point of origin of the plastic waste does not require certification or auditing, however an annual self-declaration must be provided from each point of origin to the collector/recycler that certifies that the material is a waste and not a by-product and conforms to the definition of post-consumer waste. The point of origin must hold appropriate licenses and permits to act as a legal waste management company or is an entity that generates recovered material as defined in ISO 14021:2016.
- The exception to the criteria of legal ownership is when an operation that changes the physical or chemical properties of the material is undertaken by a contracted third party. Whilst the third party does not own that material it is still subject to the same auditing and certification procedure.
- Certification bodies must also comply with the following requirements be accredited to *ISO 17065 - Conformity assessment — Requirements for bodies certifying products, processes and services* and have mechanisms in place to ensure impartiality of the organisation and its auditors during the performance of their activities.

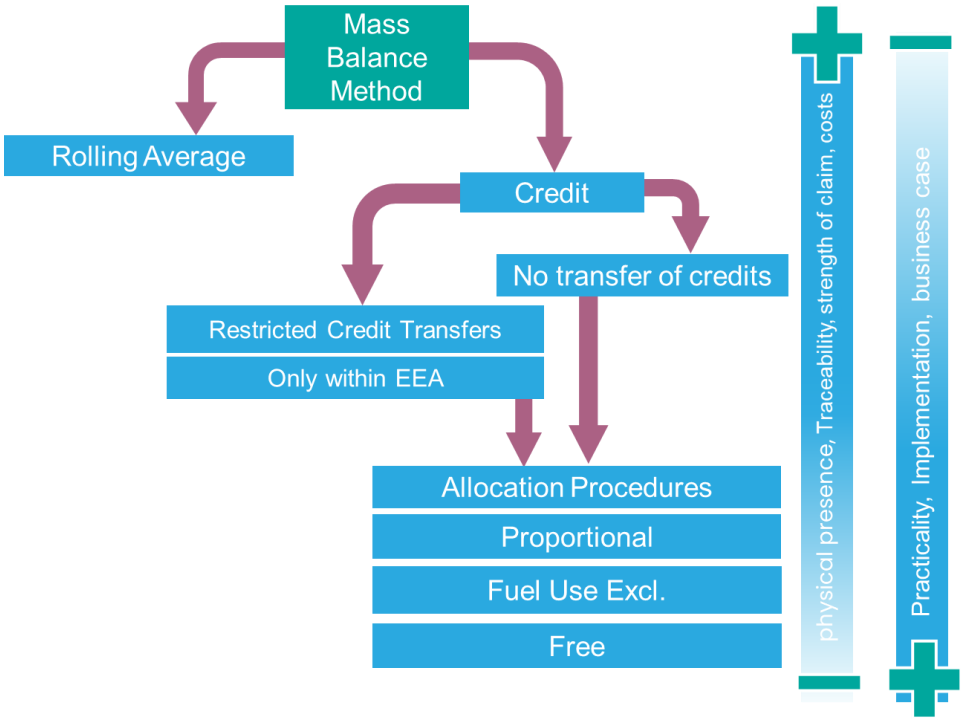
4.3.6 Mass balance

As identified in Section 4.2.2.1, chemical recycling technologies (most notably pyrolysis) are likely form an important part of the technologies required to achieve ambitious recycled content targets. However, the application of the chain of custody models is key to determining how chemical recycling can contribute. Specifically, ***mass balance*** is the model that is generally viewed (by stakeholders in the chemicals industry) as a necessary method for accounting for recycled content through the value chain. Although mass balance is outlined in ISO 22095 along with other chain of custody models, there are several different ways in which it can be employed with various rules and system boundaries that can influence how strict the method will be. Currently, voluntary certifications (e.g. ISCC plus, Redcert) are all very liberal with regard to such rules due to the need to balance being competitive with credibility (avoiding a race to the bottom). Research conducted by Eunomia for the SUPD implementing act concluded that voluntary schemes are likely to be incompatible with the requirements of an EU wide mandatory scheme that must take into account existing waste law. In particular, recycled input that results in products ***used as fuels*** or other means to generate energy according to the rules for calculation of recycling in the Waste Framework Directive (WFD) Art 11a(5) cannot be allocated to the output material.

This is why the recommendations for the SUPD were to—as a minimum—exclude fuel use from any mass balance calculations (the "fuel use excluded" allocation method). Figure 4-7 shows a decision

tree reflecting the key issues that affect how strict the method could be. This is a trade-off between maintaining a high level of physical presence and confidence in traceability versus the ability to implement and the extent to which tighter rules reduce the business case. Typically, chemicals industry stakeholders are in favour of a credit-based system with transfers and the NGO community believes that this is not credible and favours the rolling average approach.

Figure 4-7 Mass Balance Decision Tree



The above issues remain unsettled at the time of writing for the SUPD and it is likely that the Implementing Act will not include mass balance initially, and there will be a subsequent amendment to include a suitable method once more clarity is achieved. This is possible, because chemical recycling is not likely to be needed in order to meet the SUPD target in 2025 for PET beverage bottles as mechanical recycling is well established in the area. As discussed, the same is not true of the PPWD, however it is important that there is some alignment between the SUPD and the PPWD with regard to how mass balance is implemented. This is true regardless of the fact that the SUPD targets are on Member States and the PPWD *minimum product requirements* are likely to be aimed at producers. The same chain of custody requirements will be needed for both, but there may be differences in the verification methods between Member States during SUPD implementation.

Recommendation: to maintain alignment between plastic recycled content in the SUPD and PPWD, an implementing act should be specified in the new legislation. To ensure alignment, consistency should be maintained on the following aspects of mass balance:

- Whether rolling average or credit method is supported;
- Whether restricted credit transfers are acceptable; and,
- Which allocation procedure is acceptable.

If the above three aspects are not aligned, the is likely to be considerable confusion and additional cost to the value chain as different systems are implemented for different targets. A suitable timeline should be established that can build on the SUPD implementing act once that is adopted.

The follow text or similar could be included:

"By 1 January 2024, the Commission shall adopt implementing acts laying down the rules for the calculation and verification of the targets established in [paragraph]"

5 Task 3 – Biobased content

This task focuses on developing and introducing a new measure under the recycled content intervention area, which focuses on including minimum requirements for biobased content in plastic packaging. As this is a new area, the problem definition is elaborated in the following sections followed by the impact assessment of including a measure alongside the proposed recycled content measure(s).

5.1 Problem Definition

The following key problems have been identified:

- Lack of standardised methodologies and criteria for assessing sustainability;
- There is a lack of clear, robust and standardised methodologies and criteria for assessing the sustainability of biobased plastics in order to effectively and fairly compare them to fossil-based plastics. Accordingly, there are often concerns that choosing biobased plastic is not always environmentally beneficial.
- Lack of agreed labelling and certification criteria for biobased content.
- Currently existing certification schemes and labels for formal attestation or confirmation of biobased content show differences in the methodologies used to assess the biobased content (i.e. to which standard they refer) and in aspects related to governance and overall organisation. For example, clarity is needed on whether the stated percentage refers to the biomass content or the biobased carbon content, also in relation to the total carbon content of the product (e.g. approach used in EN 16640 versus ASTM D6866).
- The confusion around the differing proposed benefits of biobased biodegradable/ compostable vs biobased non-biodegradable/non-compostable.
- The term biobased is often used synonymously with compostable/biodegradable. However, the former described the feedstock origin whilst the latter describes a potential waste disposal pathway. These two aspects address issues at a different point in the lifecycle.
- There is a lack of a level playing field between biobased and fossil-based plastics
- The price differential between biobased and fossil based plastics (for equivalent drop-ins) means that the choice to use biobased plastics requires additional cost.

5.1.1 Baseline

There is currently no requirement for producers of plastic packaging to use material from a biobased origin for the EU market.
In the baseline scenario, the following are assumed to persist in the coming decades towards the target year 2040:

- The low market penetration of biobased plastic (BBP) BBP for packaging which is currently around 2.4% by mass
- The lack of standardised methodologies and criteria to assess the sustainability of current and future BBP;
- The lack of regulations and legislations on how to proceed with certified BBP;
- The lack of a level playing field for biomass use (BBP versus bioenergy); and
- The lack of standard economic factors to measure the competitiveness of BBP products in the market (including costs to develop materials, costs of feedstocks compared to cheap fossil fuels).

The development of the BBP packaging market to the baseline year of 2030 is assumed to increase in a CAGR or 4.5% which maintains the market share of 2.4% and is broadly in line with global capacity forecasts from EUPB[43] and the Institute for Bioplastics and Biocomposites.[44] This results in 490kt of biobased plastic on the market with 66% of this also being compostable/biodegradable.

5.1.2 Objectives

The proposed general objective is to promote the use of BBP where this offers genuine environmental benefits. The measure seeks to address four key areas with specific objectives:

- To establish a clear market signal in favour of incorporating BBP in packaging placed on the EU market without undue administrative burden or risk of unintended consequences;
- To allow economic operators to adapt supply and manufacturing processes associated with the calculation and verification of BBP in packaging ahead of the implementation of mandatory targets;
- To increase supply chain transparency (i.e. product claims must be verifiable and auditable by an independent third party); and,
- To ensure that environmental benefit is gained from to use of BBP compared with fossil based equivalents.

5.1.3 Intervention Logic

Rationale for Intervention

Conventional fossil-based plastics pose challenges for the environment throughout their life-cycle and there is a clear mandate to move towards a low carbon economy. Biobased plastics are considered to be an important way of reducing reliance of fossil fuels and therefore reducing GHG emissions.

Problems

- Lack of standardised methodologies and criteria for assessing sustainability;
- Lack of agreed labelling and certification criteria for biobased content.
- The confusion around the differing proposed benefits of biobased biodegradable/ compostable vs non-biodegradable/compostable.
- There is a lack of a level playing field between biobased and fossil-based plastics

Consequences

Increased use of non-renewable resources.

Measure

Include biobased content in a joint recycling content target which is legally binding on producers and sets minimum sustainability criteria.

Impacts

- Increased use of biobased plastics with environmental benefits in packaging.
- Increased transparency of sustainability of biobased feedstocks for plastics packaging.
- Reduced environmental impacts from plastic packaging

[43] European Bioplastics, Bioplastics Market Development Update 2020

[44] IFBB, Biopolymers facts and statistics 2021 Production capacities, processing routes, feedstock, land and water use

5.2 Measure Mw

This measure is predicated on the implementation of a recycled plastic content target and therefore is designed to work alongside Measure 35e. Measure 35e specifies three recycled content targets for plastic packaging based on whether or not the end use application is 'contact sensitive' and is placed on the economic operator for each individual plastic packaging item placed on the market in the EU. The current measure proposes that the economic operator may also choose to fulfil the same targets by incorporating biobased plastic (BBP) instead of, or alongside recycled content ("joint target"). It is also proposed that the biobased content must also meet sustainability criteria in a similar way to which biofuels are required to do so under the recast Renewable Energy Directive (REDII). This requirement will ensure that the net release of fossil-based carbon is lower overall in comparison to current fossil-based plastics. Furthermore, minimum GHG reductions should be set at an ambitious level for 2030 (e.g. 30% net reduction) and could then be raised again for 2040 to incentivise further improvements and forge a pathway towards net zero for packaging plastics.

5.3 Impact Assessment

The following biobased measures are modelled in the CBA:

- Measure '35w': Targets for Biobased content in plastics packaging, integrated into the recycled content targets

5.3.1 Ease of implementation

The implementation will require a supporting Implementing Act in order to define the measurement method and the specific sustainability criteria. The implementation would follow a similar approach to the REDII whereby sustainability criteria—including GHG thresholds—are introduced and defined which have the possibility to increase over time. The Implementing Act will also define the framework for verification and certification of the BBP and provide a framework for recognising voluntary schemes that demonstrate compliance with the mandatory sustainability criteria. As a minimum, the criteria should be set with the following priorities based on REDII whereby the requirements for biomass are aligned between the two legal instruments:

- Reducing climate impact
- Ensuring sustainable sourcing of biomass
- Promotion of residues and wastes
- Limiting indirect land use change and its impacts

In contrast to recycled content, it is possible to determine the actual biobased content of a plastic packaging product with a lab test using radiocarbon analysis. Therefore, a chain of custody approach is not necessary to calculate the mass of biobased plastic in a final product. There are several European and international standards that are commonly used, although EN 16785-1 is regarded as the key standard within the EU and can form the basis of requirements under this measure.

However, more recently, the use of a chain of custody based certification model is also being deployed under EN 16785-2 which is similar to the 'mass balance' approach used for chemical recycling. In the same way, it allows certification of material from mixed sources when the end product does not necessarily physically contain the biobased content. The system certifies that the correct amount of biobased content has been placed on the market and it can be assigned to any

product. During the development of the proposed implementing act it must be determined whether a mass balance method is desirable. The benefit is that is provides more options for biobased content and allows producers some flexibility in reporting. However, the direct measurement of biomass in a plastic product is simpler to enforce. Nevertheless, there will still be a requirement for supply chain verification to validate the meeting of sustainability criteria and biobased content testing cannot replace this.

There is still significant work that needs to be undertaken to provide the basis for any secondary legislation. Unlike biofuels under REDII, the main challenge is determining, in a fair and balanced way, what the comparison should be that reductions are benchmarked against i.e. the fossil-based reference product. This is challenging, as the raw material is not the end product, and it is possible that more or less material could be used for an equivalent application, depending upon the material properties. Ultimately, it may not be feasible to require direct biobased to fossil based comparisons, however benchmarks based on virgin or recycled plastics can also be used.

It should also be considered whether the biogenic carbon captured in biomass should be treated in the same way as REDII (i.e. zero rated) as the short cycling of carbon for fuels may not apply to plastic packaging if it is subsequently recycled—linking credits for carbon sequestration to recyclability may be mutually beneficial. Nevertheless, a standardised methodology for calculating GHG emissions will be required which can build upon the work already conducted by the JRC in this area.

Compostable Plastics

Compostable plastics are a subset of BBP (although they can also be made from fossil carbon) are subject to their own requirements with regard to the end-of-life addressed in their specific intervention area. Nevertheless, promotion of BBP also promotes compostable plastics and this measure provides a route for compostable BBP to remain on the market (subject to other requirements) when a recycled content target is also required; without this measure, or an exemption, the inability of most compostable plastics to use recycled content would effectively restrict them from the market. This measure allows these to exist but would also place additional sustainability criteria on them beyond those specified in their own intervention area.

Fossil-based compostable plastics are, in effect, restricted from the market unless they contain the specified proportion of BBP.

In reality, exclusively fossil-based packaging plastics are very uncommon as it is typical to blend polymers into compounds to achieve the right level of biodegradability balanced with physical properties.[45] For example, fossil PBAT is often blended with bio-based PLA to produce flexible films with high biodegradation properties.

5.3.2 Effectiveness - mass flows

In the baseline scenario, the following are assumed to persist in the coming decades towards the target year 2040:

- The low market penetration of BBP for packaging which is currently around 2.4% by mass
- The lack of standardised methodologies and criteria to assess the sustainability of current and future BBP;
- The lack of regulations and legislations on how to proceed with certified BBP;
- The lack of a level playing field for biomass use (BBP versus bioenergy); and

[45] Nova Institute (2016) *Market study on the consumption of biodegradable and compostable plastic products in Europe 2015 and 2020*

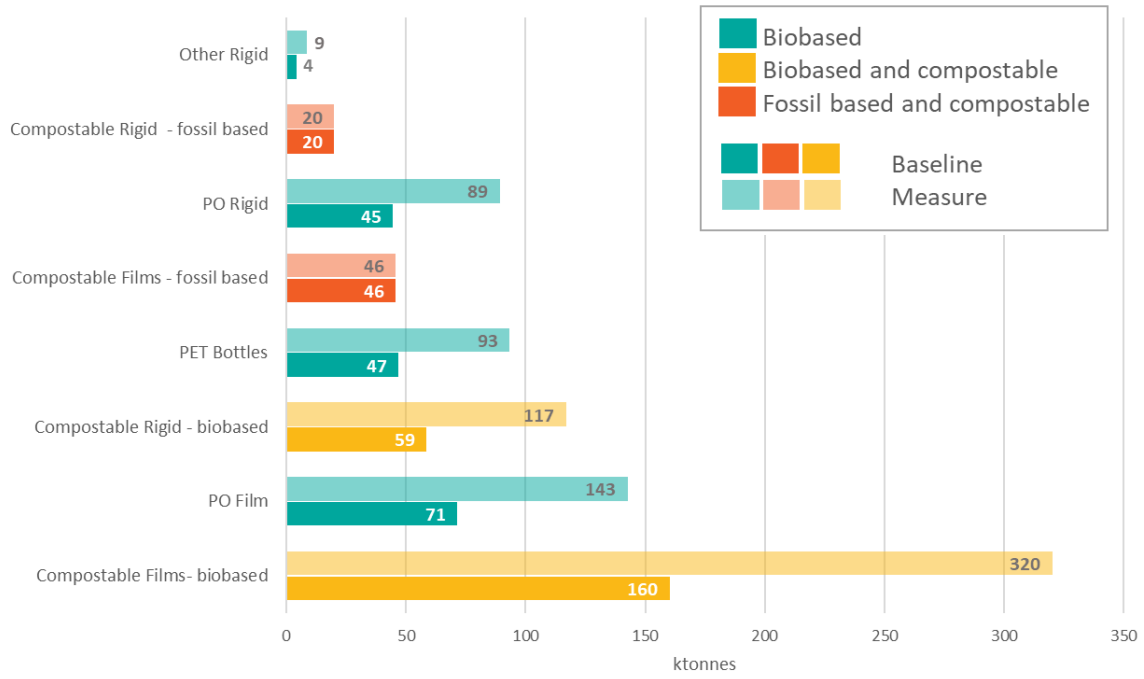
- The lack of standard economic factors to measure the competitiveness of BBP products in the market (including costs to develop materials, costs of feedstocks compared to cheap fossil fuels).

The current global production capacity for biobased plastic packaging is estimated to be 1,081kt.[46] Apportioning this to Europe by the value of the plastic packaging market in Europe compared to global assumes that 25% and 271kt is produced in the EU. In this instance production capacity is assumed to equal demand therefore this is expected to be the upper limit.

The development of the BBP packaging market to the baseline year of 2030 is assumed to increase in a CAGR or 4.5% which maintains the market share of 1.9% and is broadly in line with global capacity forecasts from EUPB[47] and the Institute for Bioplastics and Biocomposites.[48] This results in 386kt of biobased plastic on the market with 57% of this also being compostable/biodegradable. Figure 5-1 shows how this is apportioned to different packaging types according to the baseline model. For context, the additional 66kt of *fossil based* compostable plastic is also shown.

The measure is modelled to double the total of biobased plastic packaging to 771kt by 2030 which is expected to mostly be an increase in non-compostable biobased plastic that directly replaces virgin equivalents (e.g. drop-in bio-PE). Figure 5-1 also shows the effects of this by product type, noting that *fossil based* compostable plastic is not expected to be influenced by the measure and therefore remains unchanged.

Figure 5-1 Baseline/Measure 2030 Biobased Packaging EU Market Projection



Note: fossil based compostable packaging included for context – no effects on this type of packaging are expected or modelled under this measure.

[46] Bioplastics Market Development Update 2019 (EUBP)

[47] European Bioplastics, Bioplastics Market Development Update 2020

[48] IFBB, Biopolymers facts and statistics 2021 Production capacities, processing routes, feedstock, land and water use

In creating a joint BBP and recycled content target, the plastics packaging industry are presented with more options for compliance. In theory this should result in the target(s) being easier to achieve and therefore there creating a justification for raising them accordingly.

A 30% reduction in GHG emissions for BBP can be considered as a high threshold given the state of the market today, however only 25% of the BBP packaging market would need to achieve this by 2030 in order to meet the proposed joint target. Table 5-1 shows a potential scenario to demonstrate how a joint target might affect the point in which it is set. The baseline 2030 scenario assumes the same market share is kept with a CAGR of 4.5% from 2018.[49]

There is no way of determining at this stage, the exact effectiveness of the measure (resulting in an increased uptake of BBP in EU packaging), however the modelled scenario assumes the market share doubles by 2030 (an unprecedented CAGR of 14%). Thus, the BBP meeting the GHG threshold would yield 300 ktonnes, which is 1.4% of the overall plastic packaging input. This is potentially the percentage points in which a joint target could be increased by to compensate (e.g. a 25% target increased to 26.4%). In practice, this difference is well within the realm of error/accuracy for such a target and therefore raising accordingly does not appear to be beneficial or justified.

Table 5-1 - Biobased Plastic Packaging Forecast Scenario (ktonnes)

	2018	2030 (baseline)	2030 (measure)
Biobased Plastic Packaging Market (of total plastic packaging)	271 (1.9%)	386 (2.6%)	771 (5.1%)
Market reaching 30% GHG reduction (of total plastic packaging)	Unknown	Unknown	231 (1.5%)

5.3.3 Environmental modelling

Determining Environmental Equivalence

If a joint target is to be set, determining equivalence between biobased and recycled content is an important part of the justification. However, the system boundaries of the two are very different and not directly comparable without setting particular cut-offs. These may include:

- Comparing against primary material production (i.e. cradle to gate), not the full lifecycle as the material producer will not reasonably be expected to know what takes place downstream (e.g. processing etc.).
- Benefits of avoided waste treatment of the recycled material are included – in the below example this is incineration with energy recovery. It should be noted that without this 'credit' chemical recycling is significantly worse than primary fossil production.
- Biogenic carbon is set to zero – this is important for cradle to gate and assumes the carbon will be released at end of life. This is a conservative approach which excludes carbon sequestration benefits from recycling. While the industry on biobased plastics argues to include this carbon sequestration, at this moment there is no scientific consensus doing so. Awaiting this consensus, a conservative approach is valid.

[49] This growth rate is broadly in line with some published estimates, but it should be noted that biobased growth estimates typically vary considerably depending upon the author and estimates from the industry have often overstated growth over the last decade.

Table 5-2 shows example comparisons given the above assumptions between current primary production of the two main packaging polymers and the alternatives based on a target of 25% (medium ambition for contact sensitive applications under Measure 35e). For each recycling value 75% is from virgin sources (primary fossil) and 25% is from recycling. Recycling impacts include sorting, processing and in the case of chemical recycling, polymerisation into new polymers suitable for conversion. The equivalent amount of plastic diverted from incineration with energy recovery is also included as an offset for all recycling technologies.

Table 5-2 - Polymer Production GHG Emissions (tonnes/tonne material)

All targets set at 25% content in line with recycled content targets setting activity (Measure 35e).

	Primary Fossil	25% Biobased Content	25% RC - Mechanical Recycling	25% RC – Chemical Recycling
PE	1.85[1]	1.71[2]	1.11[1]	1.62[3]
PET	2.19[1]	2.03[2]	1.36[1]	1.63[4]

1. *See Appendix D of the PPWD Impact Assessment study*
2. *Works on the assumption that a minimum GHG reduction threshold is set at 30% - this would form part of 'sustainability criteria' built into the legislation*
3. *Data taken from Sphera (2022), Life Cycle Assessment of Chemical Recycling for Food Grade Film, On behalf of The Consumer Goods Forum (unpublished)*
4. *Average of Martijn Broeren, Erik Roos Lindgreen, and Geert Bergsma (2019) Verkenning chemische recycling -update 2019. Hoe groot zijn - en worden - de kansen voor klimaatbeleid?, Report for Ministry of EZK, April 2019n and results from The DEMETO Project* - https://www.demeto.eu/our-progress

Invariably, the benefit gained from including mechanically recycled material is higher than including biobased as emissions from the recycling process are lower than that of the biobased value chain (taking the conservative approach noted above. Further, some biobased plastics might have higher GHG reductions). In order to reach parity, both the biobased content and the GHG benefit threshold would need to be increased to ~65% which is likely to be an unrealistic threshold to meet (i.e. 65% biobased content with a 65% GHG reduction). Compared with chemical recycling of polyolefins (pyrolysis) the difference is smaller whereby increasing only the emissions reduction threshold to 50% will achieve parity.

Environmental impacts

Environmental modelling of this measure was conducted using the same methodology as described in Appendix D of the PPWD Impact Assessment study with the exception of the addition of chemical recycling and biobased plastic data for GHGs and an adaptation of the system boundary. The method applied to estimate GHG emissions for biobased plastic is to assume a minimum threshold of 30% reduction compared to fossil-based equivalent. Therefore it is not possible to also include AQ and water use data due to the likely high variability of these factors for different biobased polymers and would not necessarily directly link with the reduction in GHG i.e. a 30% reduction in GHG does not necessarily lead to a 30% reduction in AQ and water use. Indeed, water use is likely to be somewhat higher for biobased material due to agricultural practices. However, an inventory of water use is not an adequate comparative indicator of impact and the location of the water use/extraction has a much greater bearing on water use impacts than the amount being extracted.

There is no reliable data available on what might be the average environmental impact of biobased packaging on the market currently. The variation is likely to be wide and therefore determining the

spread of the best versus worse performing across the biobased market is challenging. In a scenario calculation substituting all fossil-based plastics with BBP in the EU, the EEA calculated that overall lifecycle GHG emissions would be reduced to 146 Mt of CO_2e in total for BBP yearly, 30 % less than the emissions of 208 Mt of CO_2e from the fossil-based value-chains.[50] In the absence of market data this reduction is also assumed for the assessment of the GHG impact of this measure.

The following key assumptions are therefore used for the modelling of the GHG impact of the measure:

- The BBP packaging market will double in size from the 2030 baseline and continue to increase at the same rate to 2040.
- All BBP packaging will have 30% in GHG emissions compared to fossil plastics – this is despite the fact that the target would only apply to the first 25-35% of the material (depending upon contact sensitivity application). The remaining amount could theoretically include much worse performing material.
- Biogenic carbon is set to zero and sequestration is not accounted for and therefore benefits are likely to be underestimated. This aspect should be explored in greater detail during the development of sustainability criteria.

Table 5-3 shows the results of the analysis compared with the baseline where virgin fossil production is assumed. The use of biobased material results in an overall reduction as would be expected. However, compared with the same material coming from mechanically recycled plastic waste there is a net increase in GHG impact.

Table 5-3 - Summary of Environmental Impacts for Measure Mw

Change in GHG Emissions (kt CO_2e)	2030	2040
Baseline Comparison (fossil)	-300	-1,700
Change in GHG externalities, m€	-30	-466
Recycled Content Comparison (mechanical)	+200	+1000
Change in GHG externalities, m€	+17	+269

Land use

Existing land use for feedstock for BBP packaging at present is very minimal. No data on land use for BBP feedstocks specifically in the EU was identified, but an estimate is made in the following. The land used to grow feedstock for the production of BBP amounted to approximately 0.79 million hectares in globally in 2019 and the global production capacity for BBP in the same year was 2.11 million tonnes.[51] This is equivalent of around 0.37 ha per tonne of BBP on average which results in

[50] EEA (2021). GHG emissions and natural capital implications of plastics (including BBP) [online]. Available at: https://www.eionet.europa.eu/etcs/etc-wmge/products/greenhouse-gas-emissions-and-natural-capital-implications-of-plastics-including-biobased-plastics

[51] European Bioplastics: Bioplastics market data 2019. https://docs.european-bioplastics.org/publications/market_data/Report_Bioplastics_Market_Data_2019.pdf

182k ha of land for the production of 491kt in the 2030 baseline. This would rise to 363k ha under the scenario for this measure. However, this estimate would entirely depend upon the current land intensity for biobased plastics being maintained. The yield from different crop types may increase or decrease this. For example, 1.47 kg of sugar is needed to produce 1 kg of PLA whilst 2.82 kg of sugar is needed to produce 1 kg of (biobased) PET. Typically biobased plastics can be produced from sugar or starch, but starch crops (corn, potato, wheat) are more land intensive than sugar crops (sugar cane and beet). [52] Furthermore, using recycled feedstocks (biowaste) may require no additional input of virgin biomass.

Further, the sustainability criteria to which the allowed BBP need to comply with, would limit several of the land related impacts, in particular linked to biodiversity.

5.3.4 Economic impacts

Assuming a 2-fold increase in the use of BBP packaging compared to the baseline, so that an additional 500kt is switched from fossil plastics to BBP, and assuming a price range of 1.0-1.5 EUR per kg for fossil plastics (e.g. PP, PE, PS) and 1.4-2.4 EUR per kg for BBP (e.g. bio-PP, bio-PE, PLA), this would **result in higher costs in the range of around 200 million EUR to 500 million EUR per year.** The higher material costs would likely be partly absorbed by value chain, but possibly passed on to consumers / end users via product prices. However, it is expected that the prices of BBP will drop when the economy of scale of production, conversion into products and logistics becomes more favourable.[53] Additionally, ever growing fossil fuel prices might reduce the price differential significantly as discussed under Measure 35e for recycled content, particularly for those biobased polymer manufacturers that can employ the use of renewable energy during production. This measure may contribute significantly to this given that currently, global BBP packaging production capacities around 1.1mt and forecasted to reach 1.5mt by 2030. If the scenario in this measure becomes a reality, *global* BBP capacity for packaging would grow by 30% and overall global BBP capacity would need to grow by an additional 15%.

There will be a shift of revenue from suppliers of fossil feedstocks (oil & gas and petrochemicals industry) to agriculture. Therefore, this measure could be a significant economic boost for agricultural regions suitable for production of feedstocks for BBP. It would also reduce the dependence on fossil-fuel imports.

5.3.5 Social impacts

It is unclear whether there will be a net impact on job creation. Whilst there would be potential for an increase in the BBP industry, due to the small volumes involved this may not be significant. However, considering that Europe imports the vast majority of the oil and gas involved in fossil fuel based plastic production, this should not necessarily lead to a loss of jobs but rather the restructuring of processing and manufacturing methods, which would most likely —in addition to the newly introduced administrative requirements as part of the certification process— lead to new jobs.

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[52] IFBB, Biopolymers facts and statistics 2021 Production capacities, processing routes, feedstock, land and water use

[53] Martien van den Oever, Karin Molenveld, Maarten van der Zee, Harriëtte Bos (2017): Biobased and biodegradable plastics – Facts and Figures. https://www.wur.nl/upload_mm/1/e/7/01452551-06c5-4dc3-b278-173da53356bb_170421%20Report%20Biobased%20Plastic%20Facts.pdf

Higher prices can be expected due to the higher cost of producing BBP at this time, which can vary from between 20-100% increases for drop-in equivalents (bio-PP, PE).[54] This may or may not be passed on directly to the consumer which will likely depend on the value and margins of the packaging product. Equally, prices are also likely to increase for the inclusion of recycled content

5.3.6 Administrative burden

As was the case for Measures 35a-e for recycled content, administrative burden is anticipated for the Commission and Member States, including market surveillance authorities, PROs and third-party certification bodies that will be involved and monitoring and verification, however for Member States, most of this is not in addition to the burden expected for implementation of recycled content measures as the current measure will be integrated.

Under this measure **there will be an administrative burden for the Commission primarily in development of the supporting legislation**. It will need to draft an implementing act on the measurement method for calculation and verification of biobased content along with developing a method for the sustainability criteria assessment.

Member States are not likely to have an additional burden related to enforcement beyond that already indicated under Measure 35e.

Certification Costs to Industry

The administrative burden associated with certifying biobased content in plastic packaging is likely to be similar to that associated with certifying recycled content and several certifiers currently run a dual scheme that has similar requirements for recycled content and biobased material.

A summary of the estimated administrative costs associated with certifying biobased content is presented in Table 5-4 and Table 5-5. Individual costs have been taken from various existing voluntary schemes which also operate recycled content verification. The verification and auditing process is expected to be similar in terms of time and costs and therefore the cost base is similar to Measure 35e. With BBP assumed to take 5% of the market for plastic packaging, the value chain actors are assigned accordingly. As discussed under *ease of implementation*, whilst it is possible to determine biobased content of the end product from lab testing, the requirement for certification of the sustainability criteria requires a full value chain approach. In practice, testing all products at the SKU level is also likely to be impractical and expensive; for example, application and lab testing fees are around €1,000[55] per product and apportioning packaging SKU count to the BBP packaging would result in 600,000 SKUs and a total market cost of €600m initially and for every retest.

One-off costs are estimated to be €2-3.2m and recurring annual costs are estimated at €8-13.7m

Table 5-4: Certification One-off Costs

Type of cost	Stakeholder	Cost
Certification scheme registration	Applicant	€0.4-0.6m[1]
Main audit	Applicant	€1.5-2.6m[2]

[54] Martien van den Oever, Karin Molenveld, Maarten van der Zee, Harriëtte Bos (2017): Biobased and biodegradable plastics – Facts and Figures. https://www.wur.nl/upload_mm/1/e/7/01452551-06c5-4dc3-b278-173da53356bb_170421%20Report%20Biobased%20Plastic%20Facts.pdf

[55]https://www.dincertco.de/din-certco/en/main-navigation/products-and-services/certification-of-products/packaging/biobased-products/

Type of cost	Stakeholder	Cost
*[1]Based on €250 * 1,558-2,562 applicants. It is possible that the registration fee charged per applicant will decrease as the number of applicants increases.* *[2]Based on 1,558-2,562 applicants * €4,000 main audit cost*		

Table 5-5: Certification Recurring Costs

Type of cost	Stakeholder	Cost per year
Applicant administrative costs	Applicant	€4.2-6.9m[1]
Annual monitoring audit	Applicant	€3.1-5.1m[2]
Certification / Licence fee – per tonne of material	Applicant	€0.7-1.7m[3]
[1]Based on 1,558-2,562 applicants requiring 75 hours to apply for certification and manage the audit process. Assuming €35.6 hourly wage for "ISCO 2 Professionals", Eurostat Structure of Earnings Survey, Labour Force Survey Data for Non-Wage Labour Costs. *[2]Based on 1,558-2,562 applicants * €2,000 monitoring audit cost* *[3]Based on (1,558-2,562 applicants * €150 certification fee) + (€0.10 tonnage fee * 5.1mt of recycled content in packaging)*		

5.3.7 Stakeholder views

Stakeholders are broadly supportive of this measure particularly from those industries that produce packaging for contact sensitive applications. This measure is viewed as an additional way of meeting the target for producers who may be relying on new or underdeveloped technologies such as chemical recycling. The potential result is that there may be fewer justifiable calls for exemptions from the recycled content targets which supports the targets being more ambitious.

The BBP plastics industry are also supportive of the measure, including the verification of sustainably sourced raw materials similar to that of REDII. However, some key issues were raised around how the baseline comparison would be calculated and whether the proposed 30% GHG reduction is a suitable metric. These issues are previously discussed in the implementation section.

6 Task 4 – Deposit Return Schemes (DRS)

Measures considered around DRS implementation were all new, though they developed from discussion of setting collection (as opposed to recycling) targets in previous work. Additionally, a measure setting collection targets but not specifying a DRS was also reconsidered. Measures were therefore as follows:

- **Measure a**: Mandating a DRS for single use drinks containers in all Member States, but with no specific requirements around design
- **Measure b**: Specifying a range of minimum design requirements in addition to measure A
- **Measure c**: Specifying a specific minimum requirement providing producers with a right to first refusal for material collected in a DRS
- **Measure 26cc**: Waste collection targets for certain packaging types

Both Ma and Mb were originally scoped and analysed together (as some degree of minimum requirement is needed to both define a DRS, and to model costs). This consisted of a core measure for plastic and cans, with an option to additionally include glass. A plastic and cans only option was chosen by the Commission, and provided for the Impact Assessment submission. Eunomia also provided content separating Ma and Mb into separate measures for the purpose of the Impact Assessment, though the combined submission was ultimately preferred by the Commission.

6.1 Measure Ma & Mb: Mandatory DRS and Minimum Requirements

6.1.1 Description of the measure

This measure will both set out a requirement to introduce a DRS (Measure Ma) and state minimum requirements for DRS provision in all Member States (Measure Mb). This will require Member States to have a DRS for required materials by the end of 2027, and for new DRS systems to meet a selection of other minimum design requirements. Member states would be free to go over and above the minimum requirements. Implementing Ma alone could be challenging as at least some minimum requirements would be needed to specify what constituted a DRS. Therefore these measures are dealt with in combination here.

The objectives of this measure are to:

- Support achievement of existing Commission separate collection targets for plastic drinks bottles[56]
- Drive high collection rates of drinks containers made from other materials (specifically cans, though glass is also formally considered)
- Increase the supply of good quality recyclable material suitable for closed loop recycling across all Member States through a system that is convenient for consumers to use
- Reduce drinks container litter

Setting minimum requirements will also help to deliver greater consistency across Member States to improve consumer and economic operator familiarity with DRS behaviours and requirements.

[56] 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 minimum requirements will be designed so they allow for innovation and DRS designs that are suitable to local circumstances. There are many possible permutations that could be looked at as options, but the minimum requirements set out in Table 6-1 reflect a core proposition based on stakeholder views and expert analysis.

Setting minimum requirements across all Member States will alleviate the decision-making burden during DRS design, and may facilitate faster implementation. Minimum requirements will be designed to include best practice features and bring together lessons learned from existing DRSs.

This DRS measure primarily targets and captures single-use containers. In addition to the design principle for the DRS itself (outlined below) a minimum requirement to consider the interaction between refillable bottles and single-use containers, to ensure the former is not disadvantaged by the introduction of a DRS, is also recommended. Some Member States may not have a refillable bottle market justifying national provision; in Member States where one exists, practice to date has sometimes seen it continue parallel to a single-use DRS, and sometimes be incorporated in the same legislation.

Careful consideration should be given to how any minimum standards relate to existing DRS provision. It would not be desirable to:

- require changes to existing schemes that are already high performing; or
- changes to schemes that have recently launched and have made recent large infrastructure investments, and where performance and consumer behaviours are still settling in.

Potential mitigations to avoid unintended consequences in this regard would include:

- a requirement to harmonise existing schemes only when those schemes update themselves;
- some requirements could be applied on different timelines; and
- exemptions to the harmonisation requirement might be considered for existing schemes achieving over 90% capture.

The priority would be to avoid disrupting effective schemes, even if some aspects of delivery were not fully aligned. Non-alignment is most likely to be an issue if glass (or other containers in addition to plastic bottles and beverage cans) are required as part of the minimum requirements. Beverage cans and plastic bottles are a common feature in all existing EU schemes.

Table 6-1 shows the proposed minimum requirements. The proposed minimum requirements for this policy measure have been based on existing schemes achieving 90% or over.

Table 6-1 Minimum DRS requirements

Minimum Requirement	Sub Objective	Rationale
Material scope to include cans and plastic bottles	Target high value and easy to collect and recycle material	Material value for cans and plastic bottles is relatively high (compared to glass and Liquid Paper Board (LPB) cartons) and when collected through a DRS, the high-quality materials are suitable for closed-loop container-to-container recycling (see also measure Mc). Cans and plastic bottles are easily collected through RVMs and have much lower transport costs when compared to glass. Cans and plastic bottles are typically in scope for all existing DRSs and can be collected with identical system infrastructure, and already have well-established end markets. Glass and LPB cartons have not been included as a minimum requirement due to the more complicated logistics and RVM requirements of these container types, and more limited recyclability of LPB cartons. LPB cartons have a lower market share than the other materials Single use glass does however obtain high collection rates when included in DRS, albeit at a higher cost. The method of collection and handling however impacts whether collected material is suitable for closed-loop recycling.
Require all beverage types excluding wines, spirits[57] and milk, and all containers up to 3 litres[58]	Target easy to collect and recycle material	A high percentage of the wines and spirits market is imported and containers rarely have a national barcode. There are lots of small producers and container designs are not always as suitable for the collection infrastructure and reprocessing. There are hygiene and odour concerns with including milk/dairy and milk/dairy substitutes which could spoil material, reduce material value, and increase collection point maintenance costs. It may be possible to overcome these issues, but this is perhaps too demanding for a "minimum" requirement
Target of 90% separately collected return rate for all DRS materials, with an incentive to encourage performance over 90%	Maximise supply of material collected	A high return rate supports the objective to develop the recycling industry by boosting supply and quality of materials. 90% return rate is achieved by many existing DRS's and is a realistic objective. Supportive policy or governance can ensure that performance continues to be optimised beyond 90%; specifying how this can be done might be beyond the scope of the minimum requirements as financial incentive mechanisms can vary.

[57] The intention here is to exclude large spirit bottles not premixed drinks in more common container formats

[58] A minimum size threshold is usually also selected, though with slightly less consistency than the upper limit of 3 litres; we recommend the final specification clarifies both.

Minimum Requirement	Sub Objective	Rationale
Separately charged and fully refundable deposit	Incentivise consumers to return containers	The deposit amount must be clearly communicated and consumers must be refunded the full deposit value on redemption. The deposit must exclude VAT. Deviations from this approach can confuse or demotivate consumers, and may also impact system costs (e.g. if VAT is paid on deposits, either the consumer or the system lose money on every deposit paid in).
Obligate retailers to be involved through return-to-retail model, but allow exemptions for small retailers depending on local circumstances	Convenient for consumers to participate	Return-to-retail is associated with the highest return rates globally which provides a large network of high density return locations that are convenient to consumers. Return-to-retail supports an efficient DRS with shared infrastructure and staff. The return-to-retail model may be supported by bulk redemption depots, food and beverage areas, public and community spaces, and nothing in this requirement should stifle innovation. This measure could specify a store size above which retailers are obligated to take-back, or leave this to Member State discretion.
Clearly mark containers to show eligibility	Convenient DRS for consumers	Deposit bearing containers must be marked such that it is clear to consumers which containers will receive a deposit refund when returned to encourage consumers to participate in returning used containers.
Spend minimum of 1% of turnover on communications campaigns	Maximise public participation	Public communications are essential to engage the consumers and motivate participation in the DRS. A budget of 1% of net costs of the DRS is typical for DRSs with 90% and over return rates.
DRS must be a not-for-profit system	Producers only fund necessary costs of DRS	Unredeemed deposits and material revenue must be reinvested in the DRS to maintain a high performing system with producers only funding the necessary costs.

Minimum Requirement	Sub Objective	Rationale
Centralised DRS	Delivery of efficient DRS	The benefits of a centralised DRS over competing schemes include; avoiding duplicated infrastructure, staff, admin and logistics; optimising material revenues reduced confusion for consumers; less work and costs to retailers; lower risk of fraud; and reduced regulatory costs to government.
Government oversight (and enforcement if schemes underperform)	To ensure compliance	Penalties for poor performance
Reporting transparency		The scheme operator must provide regular transparent reports on performance and financial accounts to government, retailers, producers and the public.
Industry-led and owned DRS funded by the producers in line with producer responsibility principles		The beverage industry must be responsible for the environmental impact of their products. The industry can utilise their expertise of logistics and communications to deliver a successful DRS.

6.1.2 Effectiveness

Modelling for this measure shows the following improvements in 2030 compared to an business-as-usual approach for the same year. **Note that this shows the increase in material actually recycled after process losses are accounted for**, not the increase in material collected. Collection rates in excess of 90% are modelled as the DRS needs to perform at this rate to deliver overall collection levels of 90% once DRS-exempt containers are accounted for. The recycling rate for plastic bottles is lower than 90% due to process losses for this material.

Table 6-2 Core Design: Minimum Requirement DRS for plastic and cans

Material		Tonnage recycled (thousand tonnes) (DRS & other routes combined) 2030 (with measure)	Recycling rate achieved	Percentage point increase in recycling rate against baseline
Plastic Beverage Containers		2,720	81.6%	+2.0pp
Metal Cans	Aluminium	489	93.9%	+9.9pp
	Steel	206	93.3%	+1.9pp

This understates the potential impact of DRS, as the 2030 baseline assumes the SUPD target of 90% collection for plastic drinks bottles is already met. It is further assumed the SUPD target will be primarily met by the implementation of a DRS for plastic bottles (with performance supplemented to a much lesser extent by EPR), based on analysis of credible pathways to 90% collection in this study overall. The recycling improvement for plastic shown above therefore only relates to a small assumed optimisation effect resulting from the DRS design and coverage requirements of this measure.

In practice it may be that not all Member States will reach the SUPD target and that therefore the assumed baseline is over-optimistic on performance in the business as usual scenario. In such cases this measure on DRSs might prove to be a key driver of SUPD target achievement, and the measure would contribute to impacts on plastic beverage container collection and subsequent recycling much greater than shown here. Conversely, Member States seeking to achieve the SUPD target via provision of a DRS for plastic beverage bottles may also include beverage cans in such a scheme (this minimum combination is almost universal in DRS around the world). This could mean baseline DRS coverage assumed for beverage cans is overly pessimistic.

Table 6-3 Expanded Design: Additional capture of glass

Material	Tonnage recycled (thousand tonnes) (DRS & other routes combined) 2030 (with measure)	Recycling rate achieved	Percentage point increase in recycling rate
Glass Beverage Containers	11,066	92.3%	+13.9pp

A well designed DRS is a proven means to achieve 90%+ capture for plastic, cans, and glass beverage containers, and is already being chosen as an approach by many EU Member States in relation to achieving the plastic bottle collection target set out in the

SUP directive.[59] While official data on recycling rates for PET and aluminium beverage containers specifically is not widely available, the maximum recycling rate for plastic bottles, without using a DRS, is thought to be around 70%.[60] Cans can achieve higher recycling rates without a DRS, but a study for the European Commission in 2011 showed six out of eight of the top can recycling countries had a DRS.[61] Lithuania's introduction of a DRS raised can recycling from around 38% (estimated in 2011) to 93%.[62]

Materials collected through a DRS are of higher quality, achieve a higher material income, and are more suited to closed-loop container-to-container recycling. Collecting plastic bottles via a DRS is likely to be essential to meet the recycled content target set out in the SUP directive[63].

Based on existing DRS's the evidence shows introducing a DRS can reduce littering of deposit-bearing items by at least 85%, and this should be considered a significant policy benefit.[64]

Introducing minimum requirements will deliver a more consistent approach to DRS across all Member States, leading to less confusion for consumers using the DRS and therefore increasing participation.

6.1.3 Ease of implementation

This is an established policy option that has been introduced by a number of European countries. Setting minimum requirements based on existing good practice DRSs will provide a framework from which Member States can work and help to simplify and expedite implementation.

The implementation timeline required to contribute to targets for 2030 is realistic. Figure 6-1 shows some standard timelines for preparation (legislation and planning), and implementation, plus a launch year. Schemes may take a couple of years to reach peak performance thereafter. We propose 2027 or 2028 is the latest launch date to reach 90% collections by 2030.

a) *Phase 1* - DRS preparation (4 – 9 months)
b) *Phase 2* - DRS Implementation (14 – 24 months)
c) *Phase 3* - Go-live and Support (12 months)

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[59] SUP Directive (2019) EUR-Lex - 32019L0904 - EN - EUR-Lex (europa.eu)

[60] ICF & Eunomia (2018) *Plastics: Reuse, recycling and marine litter – Impact assessment of measures to reduce litter from single use plastics*. Report for the European Commission, DG Environment. 30 May 2018

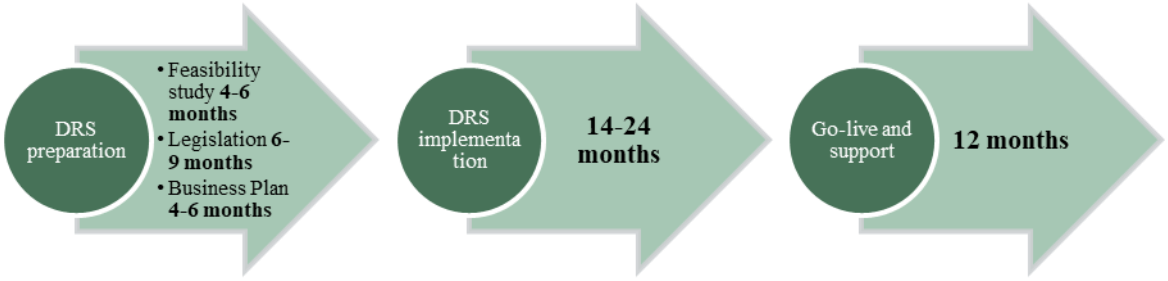
[61] Eunomia et al. (2011) *Options and Feasibility of a European Refund System for Metal Beverage Cans*. Final Report for the European Commission, DG Environment. 16th November 2011.

[62] Reloop, and CM Consulting (2018) *Deposit Systems for One Way Beverage Containers: A Global Overview*, 2018, https://reloopplatform.eu/wp-content/uploads/2018/05/BOOK-Deposit-Global-27-APR2018.pdf

[63] SUP Directive (2019) EUR-Lex - 32019L0904 - EN - EUR-Lex (europa.eu)

[64] Eunomia (2017*) Impacts of a Deposit Refund System for One-way Beverage Packaging on Local Authority Waste Services*, 11th October 2017

Figure 6-1 Typical DRS implementation timescale



6.1.4 Administrative burden

Costs to the **scheme operator** are all inclusive in the economic modelling, including the administrative burden of running the scheme and any reporting to government.

Additional administrative costs may however be incurred as follows by some actors:

- **Member States** will pass most system responsibilities to the system operator once initial legislation is passed, however they may incur further one-off administrative costs if they choose to remain involved in further elements of scheme design or set up. They may also incur small ongoing costs for monitoring scheme performance.
- Producer fees modelled below cover all payments to the scheme operator.
- **Producers** will also incur:
  - one-off costs for any labelling and product line changes prior to system launch. Labelling costs would match the per stock keeping unit (SKU) costs identified for labelling measures in section 7, and their additionality would depend on the timelines for implementation of both labelling and DRS measure
  - one-off staff costs to register the business or specific products with the scheme operator; some of these costs might recur (e.g. with a new product launch). These costs should be minimal (and it should be remembered that compliance costs for alternative EPR schemes would be avoided in turn).
  - possible ongoing costs if multiple product lines need to be managed for different markets (e.g. more production switches, greater storage space, more complicated logistics, or greater stock levels overall to avoid stock outs). No producer has been able to reliably isolate these costs in relation to existing systems.

6.1.5 Economic Impacts

The assumptions around the baseline were explained in section 6.1.2 – i.e. that Member States will deploy a DRS for plastic beverage bottles to achieve the SUPD target, and that this DRS measure will only result in minor optimisation for these items. This means changes in overall costs for plastic beverage containers resulting from this measure are relatively small. However there may be a significant transfer in *where* these costs arise as any marginal increase in collection rates will see a reduction in unredeemed deposits for consumers, and a matching increase in producer fees to compensate.

For the core measure there is a net annualised cost change of €917m in 2030. This consists an additional €355m in producer fees for beverage cans, and could be as high as an additional €680m in producer fees for plastic beverage containers, depending on the extent of cost transfer due to system optimisation against the baseline. At the same time savings of around €55m in EPR fees (reflecting reductions in alternative waste management costs) are envisaged across all materials. The cost of unredeemed deposits[65] to consumers will increase by €485m for beverage cans, but may fall by as much as €544m for plastic beverage bottles if the measure leads to optimisation of DRS provision; this final component will balance against the potential increase in producer fees, and will not effect the net cost. The scheme also receives income from material sales (approximately €577m), but these are substituting for material purchase from other sources.

For the expanded design (covering plastic bottles, cans, and glass) there is a net annualised cost change of €2,930m in 2030. This cost comes from €3,310m in producer fees (all materials), a producer saving of €480m in avoided EPR costs, and a €100m increase in the cost of unredeemed deposits for consumers. The breakdown of costs for plastic bottles and metal beverage containers is the same as above, with a similar sensitivity about whether plastic bottle costs are recouped from unredeemed deposits or producer fees, dependent on the extent of system optimisation.

Figure 6-2 **shows both costs and cost transfers between key economic actors as a result of measures Ma and Mb for plastic and cans.** The values for an expanded measure including glass or other materials would be different, but the components would be the same. For simplicity, the diagram excludes the flow of money for *redeemed* deposits[66], which is cost neutral. Key features of the diagram are:

- The Scheme Operator (SO) obtains income three sources. Two are material sales and unredeemed deposits, with any difference between these income streams and SO operating costs made up via producer fees charged to drinks producers.
- Drinks producers are likely to pass producer fee costs (plus any other operational or compliance costs or savings) to retailers via the product prices charged, and retailers are in turn likely to pass this to consumers, though some costs may be absorbed at either stage.
- Costs for this measure do not fall equally on all EU citizens. There is only an additional cost in places that do not already have DRS coverage that is comparable to the minimum requirements of this measure[67]. Impacted

[65] The values for unredeemed deposits calculated here assume a 90% return rate (the modelled rate is in practice a little higher in some countries) and an average deposit level. The final value of the financial flow will depend on precise design and performance across Member States.

[66] This circular flow is initiated by the producer paying the System Operator (SO) when products enter the market, is recouped by producers from retailers, who in turn recoup it from consumers. Consumers get their money recouped at a return location, which is in turn paid by the SO, closing the circle.

[67] In calculating the "per citizen impacted" figure we have scaled the EU population in proportion to the number of drinks containers currently within DRS scope, which is around 20% (rather than by

consumers will all pay a share of any cost pass through, but only those choosing not to return containers will bear a share of the unredeemed deposit costs.

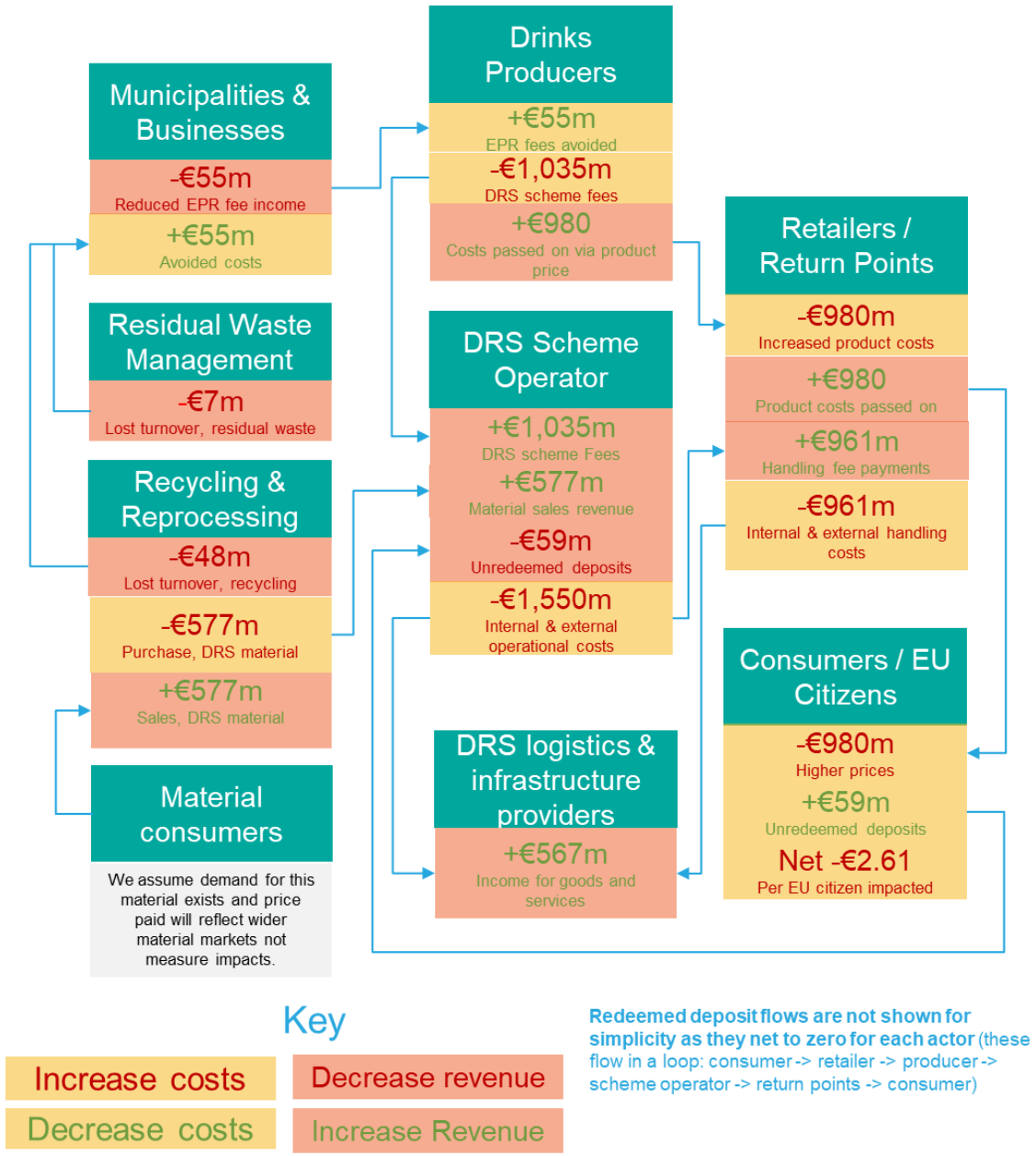
- Retailer handling fees are typically set to cover retailer return point costs, making the cost of running a return point cost neutral. Some costs are internalised by retailers (e.g. space utilisation and staff time) and some will be paid for external services (e.g. to Reverse Vending Machine (RVM) providers). Likewise, some SO expenditure will also go to equipment and service providers (for IT systems, counting infrastructure, logistics etc). The actual value of these flows will depend on the operational and contracting models chosen in specific markets, and the splits shown here are indicative, based on our knowledge of operational splits in existing DRS.[68]
- Collection, sorting, and treatment payments fall for the rest of the waste system as less material is handled. In a world of full cost recovery via EPR, this change should be cost neutral for municipalities or business consuming packaging in the aggregate though this may vary for individual municipalities. Municipalities may also make efficiency or service savings overall, particularly in relation to litter services, which are not shown here. Some turnover losses for Economic Operators in waste management and recycling and reprocessing may be made up via provision of DRS related services.

Unusually, this flow diagram shows a net gain to consumers from unredeemed deposits. This is because the baseline assumes the SUPD plastic bottle collection target will be substantially achieved via DRS for plastic beverage bottles supplemented by EPR. So while consumers are expected to see an increase in unredeemed deposit costs in relation to metal beverage containers, the optimisation of DRS performance for plastic sees a significant drop in unredeemed deposits for this stream, with the income loss for the SO compensated by an increase in producer fees. This cost transfer is highly sensitive to assumptions on the extent to which this measure optimises existing DRS collection for plastic beverage bottles, but with full cost pass through from producers also assumed, it does not change the final outcome.

country populations in and out of scope of DRS currently). This remains an approximation as it is possible measure Mb expands the scope of existing DRS in some cases (meaning marginal changes for citizens in countries which already have DRS).

[68] We allocate approximately 40% of retailer costs to external expenditure, and around 50% of other SO costs to external services and products in the diagram

Figure 6-2 Summary of Annual Economic Impacts and Revenue Transfers – Core Proposal (Plastic and Cans Only) for measures Ma and Mb



6.1.6 Environmental impacts

For the core design (covering plastic bottles and cans) modelling shows the net annualised impacts as follows. In line with section 6.1.2, environmental benefits in relation to plastic are relatively small as the achievement of the SUPD collection target is already assumed in the baseline. Benefits would be greater than shown if some Member States would in fact miss the SUPD collection in the absence of this DRS measure.

Table 6-4 Core Design (plastic bottles and cans)

Summary of Environmental Impacts, change in 2030 relative to baseline	
Change in GHGs, thousand tonnes CO_2e	-1,136
Change in water use, thousand m^3	-14
Change in GHG/AQ externalities, € million	-353

For the expanded design (covering plastic bottles, cans, and glass) modelling shows the net annualised impacts as follows.

Table 6-5 Expanded Design (plastic bottles, cans, and glass bottles)

Summary of Environmental Impacts, change in 2030 relative to baseline	
Change in GHGs, thousand tonnes CO_2e	-1,525
Change in water use, thousand m^3	-25
Change in GHG/AQ externalities, € million	-710

A DRS for single use containers is not expected to change consumption or return patterns for reusable containers. This was an explicit policy aim of introducing single use DRS in Germany (where deposits for reusable bottles are not mandatory, and are charged at a lower rate than for single use, a choice designed to make single use less appealing), but this has not reversed trends away from reusable containers. Single use DRS should be seen as a pro-recycling intervention as modelled here, rather than a tool to drive wider changes in production and consumption between single use and reusable.

6.1.7 Social impacts

Modelling identified a net annualised employment impact of 15,079 additional FTEs in 2030 relative to the baseline for the core design (plastic and cans) and 28,748 additional FTEs for the expanded design (plastic, cans, and glass). Jobs are created throughout the DRS process, from machine installation and maintenance, through to logistics. There is also additional material available for reprocessing or recycling.

As identified in the section on effectiveness, litter impacts for items in scope should be significant, with falls in littered items similar to the collection rate for the DRS. This may impact wider measures of local environmental quality and wellbeing, as well as contributing to a cleaner environment [69]. A recent study in England (population 56 million) monetised the potential disamenity benefit of a DRS covering plastic, cans, and glass achieving an 85% reduction in litter, as between €877 million and €2,326 million[70].

DRS provides a very visible recycling system that may assist in creating powerful pro-environmental norms. If containers are destined for closed loop recycling, and this is

[69] Zero Waste Scotland, *Scotland's Litter Problem*, https://www.zerowastescotland.org.uk/sites/default/files/Scotland%27s%20Litter%20Problem%20-%20Full%20Final%20Report.pdf, summarises the potential cost areas for society in detail; more recent studies have tended to be assign higher values when quantifying disamenity.

[70] Eftec, 2020, *Amenity Value Benefits of a Deposit Return Scheme for Drinks Containers*, file:///C:/Users/Daniel.Stunell/Downloads/15049_DefraLitterDisamenityImpacts_TechnicalReport_Final_July2020_eftec_b.pdf

clearly communicated to consumers, it may also improve understanding of the circular economy more generally.

The cost of unredeemed deposits to consumers is covered in section 6.1.5. Consumers will also see deposits temporarily held in the system prior to redemption, which might have cash flow implications for those on low incomes. Ensuring convenient redemption opportunities can mitigate this.

6.1.8 Stakeholder views

Eunomia conducted a dedicated survey of selected stakeholders focused on views on minimum requirements. The survey was sent to 25 stakeholders. 17 stakeholders gave responses, ranging from packaging associations and producers to EPR schemes and NGOs (see 2. in the Progress Update Report).

13 out of the 17 stakeholders gave support for a minimum scope to be part of the minimum requirements. The majority agreed with the inclusion of metal cans (10/17) and plastic bottles (12/17) in the minimum scope. A minority felt that glass bottles (7/17) and beverage cartons (5/17) should be included in scope. Between 10 to 12 stakeholders out of 17 supported the inclusion of beer, concentrate/squash/cordial, fruit juice, soft drinks and water in the minimum requirements. Only 6 to 7 stakeholders out of 17 supported the inclusion of milk and dairy, non-dairy alternatives and spirits and wine. Stakeholders did voice concern over items being given a competitive advantage if not included in the DRS.

Lastly, the consideration of the economic impact on lower income consumers was raised, particularly for multi-packs of essentials such as bottled water where the value of the deposit results in a high outlay. These impacts would be exacerbated if there was a delay in low-income consumers receiving back the deposit.

In terms of deposit amount, 9 out of 17 stakeholders disagreed that the deposit amount should be set out in the minimum requirements, with stakeholders suggesting it should be decided at the national level taking into consideration socio-economic criteria of consumers to ensure high return rates. An absolute minimum of €0.10 adjusted for purchasing power parity and inflation over time was suggested. 5 out of 17 of stakeholders surveyed agreed that the minimum requirements should standardise the deposit amount across all in scope containers and 7 out of 17 stakeholders surveyed said that the deposit amount should vary by size, to minimise the risk of market distortion. Stakeholders highlighted that the net cost principle should be applied, and cross-subsidisation of materials should be avoided.

There was strong support amongst stakeholders for the minimum requirements setting out the nature of locations which should accept returns (14/17). 11 out of the 17 stakeholders that responded agreed that large retailers should be obligated to take-back, while 9 and 8 out of 17 agreed that small and online retailers should be obligated to take-back, respectively. Consumer convenience was highlighted by multiple stakeholders as the central consideration for return points.

12 out of the 17 stakeholders who responded supported a specific return rate target being set centrally by the Commission in the minimum requirements. Only 5 out of 17 supported the decision on return rate targets being left to individual Member States.

There was strong support for the minimum requirements covering governance structure (14/17). All stakeholders agreed the System Operator should be industry led and owned in line with Extended Producer Responsibility Principles. 14 out of the 17 stakeholders who responded agreed that the System Operator should be centralised so there is a single operator for any given national market. All stakeholders agreed that the System Operator should be non-profit and funded by material revenues, unredeemed deposits and producer contributions.

11 out of 17 stakeholders supported the introduction of a mandatory requirement for DRS provision for certain packaging (measure Mb), with 13 out of 17 stakeholders suggesting that the minimum requirements for mandatory DRS should align with the views listed above. However, 9 out of 17 stakeholders also supported the consideration of a national exemption option from a mandatory DRS requirement, if the country is already capturing a high rate of targeted containers through alternative means. This was particularly popular with the glass industry due to the existence of existing EPR schemes and kerbside collection and bottle banks for glass. Multiple packaging associations supported an opt-out option for Member States if they can provide evidence detailing their national strategies to meet the high collection target.

Position papers from industry representatives and NGOs were also received as part of the stakeholder engagement for the minimum requirements. Plastic beverage packaging associations were in favour of a mandatory DRS which included all material and beverage types (as long as collection is not impacted by hygiene issues, such as milk and dairy) and sizes (up to 3 litres) in scope of the minimum requirements. They highlighted that most Member States would not be able to meet the 90% collection target of PET bottles without a DRS. Nevertheless, they mentioned that necessary leeway should be given to Member States which can prove they are meeting the collection targets through alternative means such as EPR schemes. This is a higher burden of proof than that identified by packaging associations above (which is based on national strategies, not actual performance).

Two environmental NGOs responded to the survey. They were both in favour of a mandatory DRS with all material and beverage types in scope of the minimum requirements, to achieve an EU-wide return rate of 90%. They also supported the harmonisation of the deposit level and producers obligated to take-back to reduce consumer confusion and prevent market distortions, in case, retailers and consumers turn to packaging not in scope. However, it was pointed out that if refillable packaging were to be included in a mandatory DRS, it makes sense for refillables to have a lower deposit than one-way packaging, to encourage reuse.

One environmental NGO stated their support for a mandatory DRS sharing their view that its implementation has become almost inevitable, to meet the EU Green Deal and Circular Economy goals. They pointed out that a DRS for one-way beverage packaging should be the bare minimum and used as a starting point, but a DRS should be encouraged for refillables as well as the inclusion of other packaging types beyond beverage packaging. This would encourage reuse and a move away from recycling in line with the EU's waste hierarchy.

An EPR scheme highlighted in their position paper that they are not in favour of a generalised and mandatory DRS for all beverage packaging types. This is because some materials, such as glass, already have existing systems in place to reach high recycling rates. They mentioned that instead, they would be in support of Member States being

able to choose to set a DRS for certain types of packaging, if this is the best option. In this case they would be in favour of minimum criteria, including collection targets, set at the EU level that Member States and brand owners will have to follow.

Support for the inclusion of glass and beverage cartons in a DRS was weaker than for plastic bottles and cans. Nevertheless, the beverage carton industry voiced support for a mandatory 90% collection target for beverage cartons, and support for a DRS with beverage cartons in scope of the minimum requirements to achieve this, though they do not necessarily favour mandatory DRS. A packaging association also supported a mandatory 90% collection target for beverage cartons, recommending this target as a more effective way to increase the recycling of beverage cartons than a mandatory DRS.

The glass beverage packaging industry, voiced their support for a 90% collection target for glass packaging (without separating beverage and non-beverage packaging), instead of the inclusion of glass in a mandatory DRS (to which they are opposed for single-use glass). They reasoned that glass is already successfully collected in kerbside and bottle bank collections and the quality of recyclate can be improved through existing systems, such as EPR schemes. The glass packaging industry had concerns that the inclusion of glass in a mandatory DRS could jeopardise the quantity and quality of glass collected through existing systems. Many non-glass stakeholders in contrast favoured inclusion of glass beverage bottles in a mandatory DRS. Reasons given to include glass in a mandatory DRS were that a DRS is the only approach evidenced to reach 90% collection targets, as well as to avoid market distortions and improve recyclate quality.

A packaging association was also not in favour of the minimum requirements including glass bottles and metal cans because of their high collection and recycling rates through EPR and other existing schemes. They highlighted the approach needs to take into account material specificities and that a mandatory 90% collection target for beverage cartons could be a more effective approach to increase beverage carton recycling than its inclusion in a mandatory DRS.

Previous stakeholder feedback provided for the previous PPWD Impact Assessment study was also considered (see Appendix E - Stakeholder Synopsis Report). Stakeholders spoke of the need for harmonisation of collection systems which would increase collection rates and recyclate quality across the EU. Several argued that a DRS was the most effective way to do this, as long as there was guidance to ensure effective implementation, which could be in the form of the minimum requirements.

6.2 Measure Mc: Right to priority access for material collected via DRS

6.2.1 Description of the measure

This measure would be an addition to measure Ma/Mb, if taken forward, and is intended to deliver greater closed loop recycling than measure Ma/Mb alone. It would also better align with EPR principles, by leaving producers more directly in control of their packaging material at end of life.

A DRS collects high quality recyclate with very little contamination. For plastic especially this can provide rPET at high quality much more efficiently than alternative collection routes, and suitable for closed loop bottle-to-bottle recycling into food contact materials,

with associated environmental benefits. **The EU has set a 30% target for recycled content in plastic beverage bottles by 2030, and 25% for PET bottles specifically by 2025,[71] and Member States and economic operators can and have set higher targets. However, rPET is expected to be in increasingly high demand from other packaging and product sectors. This may make rPET too expensive for beverage producers to obtain, or result in a situation where there is too little rPET to meet targets for bottle-to-bottle recycling**. Even within the bottle market, there can already be fierce competition for limited amounts of rPET, potentially disadvantaging smaller producers.

Losing rPET from bottle-to-bottle applications may also see downcycling in material use, whereby material is lost to a circular economy much faster than would otherwise be the case (e.g. by incorporation in products that cannot in turn be recycled).

Many drinks producers therefore want "priority access" to the recyclate collected by a DRS to maximise the level of recycled content in their products, and the extent of closed loop recycling that takes place.

The case for priority access for beverage cans is similar to that for PET from a producer perspective, although less well studied, and currently without widespread recycled content targets as a driver of concern for producers. This case may increase in salience over time, especially with high material prices. **The case for priority access for glass (if single use glass is included in a DRS) is weaker.** Glass for bottle production already commands a premium price, meaning bottle-to-bottle demand is supported without priority access; the suitability of glass from a DRS for use in closed loop recycling also depends on the collection method employed by a DRS.[72] **If beverage cartons were incorporated in a DRS, there would be no benefit currently in a right to priority access**, as this material is not currently suitable for closed loop recycling (beverage cartons use longer virgin fibres, and the board component of recycled cartons is used in other downcycled applications). **However, for glass, beverage cartons, or any other container material, there is no need to specify limitations to the priority access right as set out here. "Priority access" can also be thought of as a "right to first refusal" – a producer is free to exercise this right if it is advantageous, but is under no obligation to do so if it is not.**

A right to first refusal aligns with the original intention of EPR:

> *"a policy principle to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling and final disposal of the product"*[73]

Proposed EPR requirements around net cost recovery for waste management in the EU support this whole life intention, with EPR policy features, such as modulated fees, to

[71] 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

[72] Only systems that preserve bottles for colour separation, or break bottles into a small number of large fragments suitable for optical sorting, will produce glass suitable for closed loop recycling.

[73] Lindhqvist, T (2000) *Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems*, PhD, The International Institute for Industrial Environmental Economics, Lund University.

incentivise eco-design and consideration of impacts across the product lifecycle.[74] A right to first refusal supports the same principle.

The standard drinks containers in scope for a DRS (plastic bottles and cans) are highly recyclable in design, and the industry will be paying, via the DRS, to deliver very high collection rates in practice. If there is an economic or compliance advantage to be obtained from the design and capture of these containers, it is appropriate that the producers that have made this so are the ones to benefit. Conversely, producers of products or packaging that are less recyclable, and less recycled, can currently compete for recycled content at no disadvantage. **A right to first refusal aligns with a potential future where packaging producers generally take more explicit physical or legal "ownership" of their material throughout the lifecycle.**

The mechanism proposed to ensure priority access via a right to first refusal is by an addition to the "minimum requirements" for a DRS.[75] The minimum requirements already specify an independent non-profit and producer-led system operator, and that the system operator should own the material collected by the system. **This measure would add the following additional features:**

- **Decisions on material sales by the system operator are agreed by the producers,** even if other actors (e.g. retailers) are part of governance and ownership for the system operator as a whole
- The system operator must make provision to offer material on a "right to first refusal" basis to economic operators placing containers into scheme scope
- Material offered to individual economic operators on a "right to first refusal" basis must be offered proportionally to the amounts and types of the material they place into the scheme. In the event of a surplus (more material availability than accepted at first pass), the scheme operator, guided by the producers, should continue to allocate material proportionally to satisfy producers that would like a greater allocation, before considering the wider market.
- Material taken by economic operators on a "right to first refusal" basis should only be sold or passed on for closed loop (container-to-container) recycling, though this might be challenging to guarantee
- **Priority access must not be overly burdensome for SMEs.** Specific thought should be given in drafting the legislation to whether SME would need to be defined uniquely for this purpose (e.g. by market share).

The system operator (or the producers within it if non-producers are also part of governance) would be free to decide the appropriate price and precise mechanism by which it provided a right to first refusal within these parameters. If the system operator (controlled by producers) decides to offer material for sale very cheaply in this scenario

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[74] Eunomia 2020, *Study to support preparation of the Commission's guidance for extended producer responsibility scheme*, European Commission

[75] An alternative approach was considered but not progressed. Theoretically, the Commission could alternatively specify in detail the mechanism and process whereby producers could obtain recyclate from the system operator. However there seems little benefit to this approach, which could be overly restrictive and limit opportunities for tailored national solutions. As system operators will remain national in scope, so too will claims for material (with economic operators working in multiple markets having to make multiple claims in any case). This limits the value of a uniform approach - a cross-border economic operator would still be completing multiple claims to different systems.

(advantaging producers), it is the same producers that would have to pick up any financial implications for the system operator (via their producer fees), so this approach should not disadvantage the system operator or impact scheme economics for consumers.

It might be considered desirable that any high-quality food grade material not taken by producers for immediate closed loop recycling is preferentially offered to other food packagers (minimising downcycling). However, this is hard to regulate for, and is therefore not an explicit feature of this measure.[76]

Small producers that export products via a third-party economic operator could potentially be disadvantaged without additional features being added to this measure. Their material could then arise in a national scheme where they were not represented, while the importer (who introduced the material to the market, and is therefore entitled to reclaim it) might have little interest in reclaiming material. There are also some areas (e.g. the Danish/German border), where significant container transfer happens via private consumers.

This material leakage could be balanced out (in a case where all EU countries have a DRS) by giving small exporters a right to claim an equivalent amount of material from their "home" DRS (at a small marginal cost to large producers in the event of a shortfall), but this might become difficult for different national schemes to coordinate. Overall, **interviews with drinks industry representatives suggested both that these problems would be limited, and that SMEs would be better off in a world with the right to first refusal than they are currently in respect to their ability to obtain food grade rPET.** We have therefore not articulated additional detail around treatment of SMEs here but this should be considered further in designing actual right to first refusal mechanisms.

Nothing prevents a scheme operator (who typically legally owns the material in a DRS) choosing to distribute material in a selective way currently. This measure would standardise the approach to be taken; rejecting this measure would not preclude priority access approaches being pursued by national schemes.

6.2.2 Effectiveness

This measure is likely to be highly effective in giving priority access to producers, though some may find it easier than others to take advantage of that right.

This measure supports the DRS objective identified in Ma and Mb to increase closed loop recycling (see environmental impacts below).

This measure may be essential for drinks producers to meet EU recycled content targets if these increase in ambition over time. It may already be essential to meet targets set by specific economic operators for their own operations.

This measure aligns with the original intention of EPR, and a more circular future where producers take more direct physical responsibility for material they put on the market (see measure description above). Currently recycled content

[76] For bottle-to-bottle closed loop recycling the producer pool is defined by inclusion in the DRS, and the beneficiaries of the measure are the producers that have invested in recyclability and collection of the product, in line with EPR principles. This is not the case once an effort is made to preferentially benefit selected third parties.

is available to the highest bidder, irrespective of any investment they have made in ensuring its supply.

Efficiency in allocation and use of material for closed loop systems in this measure would be improved by arrangements between economic operators, including DRS schemes themselves, to facilitate material allocation and collection in more geographically efficient ways.

This measure may however cause tensions around the following areas:

- **It does change market conditions for some economic operators.** Non-priority economic operators are left with fewer choices in rPET supply (especially for food grade applications), and could see higher prices driven either by supply and demand imbalances for rPET, or by tighter market conditions for PET as a whole. **The rationale for allowing this effect is the additional investment made by drinks producers in providing and collecting rPET via a DRS**
- **DRS is national in scope.** Any producer registered in a scheme can act on their right to priority access, regardless of their place of origin, but this may be less efficient for small operators, where the original product producer may not be the "producer" legally registered in the scheme,[77] or where material crosses borders due to consumer purchase. **This may also cause efficiency challenges overall**, with entitlements to recycled content arising in a geographically or temporally distributed way, or with incentives or ability to reclaim material not completely equal at all points in the supply chain. Notwithstanding this challenge drinks producers are still likely to be better placed to access food grade rPET with a right to priority access than they can currently.

6.2.3 Ease of implementation

Implementation will be the responsibility of scheme operators. This may increase scheme costs marginally, but this cost would be borne by the producers that benefit from the measure itself. Scheme operators and producers have a clear interest in optimising implementation as much as possible as they are the beneficiaries, and will pay any associated costs.

Challenges around material traceability are not anticipated to be significant by stakeholders: production of food grade packaging is tightly regulated and highly optimised already, due to the requirements of food safety regulations.[78] Nonetheless, mechanisms to support more efficient allocation and reallocation of material arising in diverse geographical locations would seem highly desirable to overall efficiency of this measure.

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[77] DRS defines importers as "producers" for product from beyond the scheme jurisdiction, and these importers may be a distinct economic operator with no direct interest in product or packaging manufacture in some supply chains.

[78] In discussions with drinks producers (Unesda and NMWE) they emphasised that food and drink regulations mean food grade material is closely tracked at all stages of packaging production, and that in plants filling multiple products for different producers, systems are cleaned and supplied with appropriate source material between product runs. Where preformed bottles are ordered, the specification is also highly detailed.

6.2.4 Administrative burden

There will be an extra administrative cost for **DRS scheme administrators** who would need to provide both a process to enable right to first refusal, and may also need to facilitate this process physically (e.g. providing material from the DRS to multiple economic operators, rather than being able to optimise this for their own operational requirements). This is estimated to be small relative to the cost of running a DRS. Ultimately this would be passed to producers as part of DRS producer fees.

If there is a net cost to **producers** in directly exercising their right to first refusal, they would be highly unlikely to exercise that right. They will only do so if they think the benefits (legal compliance, marketing benefits, differential material costs) exceed the administrative burden.

Costs to **national authorities** should only occur in the event of a legal challenge or non-compliance from a scheme administrator. There is no reason to think this measure offers additional compliance checks to those implied in measure Da or Db.

6.2.5 Economic impacts

This measure will reallocate costs and benefits across economic actors, and this has been qualitatively mapped as part of this project. The resulting effect will be that the costs - and also benefits - of end-of-life management resulting from design and collection choices accrue to the producers that have made those efforts. However, it may disrupt access to rPET for other actors, and change market dynamics in the plastics supply chain.

Trends in PET prices overall are extremely hard to predict, as PET is a global commodity whose price is linked to oil prices. Future plastic or virgin material taxes may also impact vPET prices by 2030. The interplay between vPET and rPET prices is not straightforward; these products can be in direct competition (if both are equally suitable for an application and the economic operator does not care which they use). However, this is not the case for drinks packaging producers, who must have food grade material for their product, and will increasingly need rPET to meet EU, national, and corporate recycled content targets. In contrast, many competitors for this material are not similarly constrained. High demand and limited supply are likely to support food grade rPET prices in future, and they are also limited in a downwards direction by collection and reprocessing costs.

- **Drinks producers** will benefit from an ability to more easily obtain food grade rPET, and may pay a lower price for it (though any resulting reduction in material revenue to the system operator would be compensated for by those same producers via increased DRS producer fees). **Smaller producers** may not be so well positioned to take advantage of the right to first refusal. They will probably have less influence on the precise design of the mechanism by which the right to first refusal is facilitated, and will have smaller volumes of material arising, which may limit efficient logistics options for them. **Bottlers and preform suppliers** are typically well integrated into the supply chain, and already coordinate carefully with product producers on material and packaging flows and requirements, however, the relationship dynamics are likely to change with widespread DRS adoption, and especially with a right to first

refusal. Any downsides may still be less severe than the likely outcomes in a scenario with no right to first refusal.

- **Other food packaging producers** will find access to food grade rPET is harder, and could have to pay higher prices for rPET (due to restricted supply) or purchase vPET (with a possible price differential – this being most likely if PET supply is tight overall).
- **Other packaging producers, and other users of recycled plastic (e.g. textiles)** will find access to rPET is harder, and could have to pay higher prices for rPET (due to restricted supply) or purchase vPET (with a possible price differential – this being most likely if PET supply is tight overall).
- **Waste and recycling plant operators** will be impacted by the introduction of a DRS even without the right to first refusal, which will significantly shift where material arises, and the contracting arrangements for managing it, which could create specific winners and losers. Priority access may additionally give additional control to drinks producers over material flows, though overall there would be more material needing reprocessing.
- **DRS operators** may see an increase in running costs. Any loss in material revenue should be balanced by an increase in producer fees, and material quality may improve further if design for recyclability is further encouraged by this measure.

Any reallocation in costs from differential prices between sectors would be expected to pass through to consumers. No issues were identified for national authorities as management is in the hands of the system operator (though see also administrative costs).

It should be noted that even without this measure, scheme operators will typically "own" the material in the scheme and may choose to dispose of it via some equivalent of right to first refusal. Some of these impacts may therefore arise without this measure.

6.2.6 Environmental impacts

This measure should have positive impacts on closed loop recycling and result in decreased use of vPET in the targeted sector of drinks packaging producers. The material in one PET bottle can, if captured repeatedly for bottle-to-bottle recycling, be recycled multiple times into new bottles before process losses eventually mean the material is lost to the circular economy. At each cycle, vPET demand is displaced. In contrast, if the material is downcycled into a one-way application (such as textile fibres) it will serve only one further use.

There are studies suggesting that in a fully closed-loop system (with no collection losses), PET from PET bottles can be recycled up to 11 times, without compromising quality.[79] This means that a tonne of PET entering closed-loop recycling could theoretically substitute up to 11 tonnes of vPET production.

In a DRS collecting 90% of plastic bottles, and directing all of them to bottle-to-bottle recycling, 1 tonne of PET collected could therefore substitute for 9.9 tonnes of vPET inputs to packaging over repeated collection and recycling cycles. Currently around 31%

[79] Pinter, Elisabeth, Frank Welle, Elisa Mayrhofer, Andreas Pechhacker, Lukas Motloch, Vera Lahme, Andy Grant, and Manfred Tacker. 2021. "Circularity Study on PET Bottle-To-Bottle Recycling" Sustainability 13, no. 13: 7370. https://doi.org/10.3390/su13137370

of PET goes into bottle-to-bottle recycling,[80] and 1 tonne of PET collected and recycled therefore displaces just 3.4 tonnes of vPET inputs to packaging over time.

This shift may not in itself reduce demand for vPET overall, as the impact depends on exactly how other sectors respond, and which applications of rPET are substituted for. The same applies to calculating carbon impacts. Expanding the closed loop recycling of PET bottles will also generate a need for other industries (trays, fibres, other packaging, strapping) to push for enhanced PET collection for their own products and packaging, so there are likely to be significant dynamic effects to this measure.

6.2.7 Social impacts

There are no significant social impacts expected.

6.2.8 Stakeholder views

Views expressed were divided, with drinks industry stakeholders strongly in favour, but other sectors that would be impacted strongly opposed. More time was spent exploring detailed issues with the drinks sector to understand potential differential impacts in that sector and so inform measure design; this focus should not detract from the strength of the high-level objections of stakeholders opposed to the measure.

Drinks producers using PET are strongly in favour of this measure[81] [82], which they see as critical to their ability to reach recycled content targets, and a fair reflection of the investments they have made in recyclability of their packaging and in collecting that packaging via a DRS.[83] This measure was also mentioned as desirable – without prompting – from these sector stakeholders as part of responses to measure Ma/Mb. Feedback focused overwhelmingly on PET, but stakeholders supported this being a general measure for all material collected by a DRS.

Potential differential impacts within the drinks sector were tested in stakeholder conversations and are summarised under economic impacts. Stakeholders suggested small producers (of both products and packaging) would be better off than under the status quo, where they have to compete both with larger drinks producers and other sectors. Concerns were specifically expressed about "island solutions" where a single rPET user could sign long term or exclusive contracts to access material from a DRS, ensuring their own targets are met, but closing out other players. SMEs do not necessarily have the market power to compete on either price or access priority in such

[80] Zero Waste Europe/Eunomia, 2022, *How Circular is PET*, https://zerowasteeurope.eu/wp-content/uploads/2022/02/HCIP_V13-1.pdf

[81] Unesda, NMWE, Zero Waste Europe, *It's time to acknowledge the role of Deposit Refund Systems (DRS) in achieving a Circular Economy for beverage packaging in the EU*, https://www.unesda.eu/its-time-to-acknowledge-the-role-of-deposit-refund-systems-drs-in-achieving-a-circular-economy-for-beverage-packaging-in-the-eu/

[82] Unesda, NMWE, AIJN, *Beverage industry needs priority access to its recycled plastic material to close the bottle loop and accelerate the transition to a more circular economy*, https://www.unesda.eu/wp-content/uploads/2021/07/PRESS-RELEASE-Beverage-industry-needs-priority-access-to-its-recycled-plastic-material.pdf

[83] Stakeholder submissions, and email follow up.

a market. These stakeholders were also explicitly asked about impacts on bottling plants and preform suppliers, with similar rationales given in response on the likely effects. It was stressed that the already highly regulated nature of the food packaging chain for product and packaging means traceability and manageability of different sources of PET should be easy for different economic operators to track.

It was further highlighted in this conversation that the right to priority access could and should be extended beyond DRS to other EPR schemes in future. The idea that an economic operator should be directly responsible for their product or packaging material at end of life – for better or worse – was expressed. There was concern that sectors that were not seen as having invested in recyclability or collection to the same extent were free-riding by being able to then compete for recycled content from PET bottles. The desirability of keeping food grade rPET material for other food packaging applications was also highlighted as a desirable feature of a priority access measure.

In sharp contrast, stakeholders who would not have a right to first refusal are extremely concerned at the potential loss of access to rPET derived from drinks bottles, and believe that this measure would be anti-competitive[84]. They believe it will jeopardise single market rules and damage their ability to innovate. A wide range of actors expressed concern, including: non-food products industry associations; plastic recyclers industry associations; and recycling and waste management industry associations.

6.3 Measure Mcc: Container specific collection targets

6.3.1 Description of the measure

High levels of recycling for single use drinks containers are achievable, and can provide significant environmental benefits. Collection targets are one way to focus Member States and economic operators on achieving high recycling performance. This approach has already been pursued in the case of the Single Use Plastics directive which sets a 90% collection rate for single use plastic bottles (Article 9/Annex F). **This measure would set high collection targets for single use beverage containers made from selected materials other than plastic.**

This measure could cover the following container types in various combinations, and **the extent of desirable coverage would also be dependent on the scope of measure Ma/Mb**. In 2018, the beverage market contained materials in the following proportions:

- Beverage cans (18.8% of market by container count, 4% by weight)[85]
- Glass beverage bottles (24.7% of market by container count, 77% by weight)
- Beverage cartons (8.5% of market by container count, ~2-4% by weight)[86]

Plastic bottles (already subject to a target in the Single Use Plastics directive) are 48% of the market by container count and 17% by weight.

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[84] Letter to the Commission 21/03/2022, from AISE, CIRFS, Cosmetics Europe, EuPC, EuRIC, FEAD, PRE

[85] Estimate includes aluminium and steel cans.

[86] Estimate from Eunomia's modelling and the beverage carton industry's impact assessment studies

A 90% collection rate for beverage cans is achievable via a DRS, and a DRS is likely to be the quickest and most cost-effective way to reach this (see discussion of effectiveness in measure Ma/Mb), though under this measure, Member States might also seek alternative solutions. A 90% collection rate for all drinks cans might require a higher than 90% collection from DRS eligible containers to offset lower performance from any products that were exempt from DRS inclusion; this has already been assumed in modelling measure Ma/Mb to ensure alignment with 90% collection targets overall for items like plastic bottles. A 90% collection rate for cans via a DRS will see minimal process losses, and facilitate can-to-can closed loop recycling.

A 90% collection rate for glass beverage bottles is achievable via a DRS, but glass may see relatively high levels of capture through other EPR provision too, with the glass industry believing an overall collection rate of 90% for all glass containers (not just drinks bottles) is achievable by 2030 without a DRS. If glass is collected without a DRS, a broader target makes sense, as accurately accounting for drinks bottles alone in a mixed containers glass collection would be very difficult.

A 90% collection rate for beverage cartons is very challenging, but has been set by the sector as a 2030 goal, and is therefore used as the basis of assessing this measure.

A 90% collection target for all beverage containers of a given material (e.g. "all beverage cartons") is likely to be more demanding to achieve than a mandatory DRS with a 90% target for *DRS-eligible containers only* (where some containers made from a targeted material might still be exempt from a DRS due to restricted product coverage – e.g. milk is frequently exempted from DRS). If the wider collection target is set at 90%, then any DRS introduced to help deliver it would need to achieve a performance of over 90% to compensate for lower collection rates for any DRS-exempted items. However, this broader approach would align with the 90% collection target for plastics in the SUP directive. Unlike the SUPD there is no interim target for 2025 proposed in this measure, given the short timelines between the revision and 2025.

A somewhat similar measure was rejected in earlier assessments for PPWD revision (as measure 26c). This has now been split into two distinct proposals in this impact assessment: measures Ma/Mb and Mcc. The collection target proposed here for re-examination is also narrowed specifically to beverage containers (previously it also considered films). Reasons for rejection of 26c included doubts about the added value of collection targets (as opposed to direct recycling targets), especially in light of Implementing Decision (EU) 2019/665, on how recycling rates should be calculated. However, collection rates for cans will match recycling rates closely, and the same is likely to be true for glass, depending on collection approach.

6.3.2 Effectiveness

It is highly likely that DRS will prove the most cost-effective way to reach this target for cans. EU recycling rates for beverage cans was at an average of 76% in 2019 which ranged from 99% in countries such as Germany (which has a DRS) to 30% in countries such as Cyprus.[87] DRS are proven to achieve capture rates of 90% and over

[87] Metal Packaging Europe, and European Aluminium (2021) Aluminium beverage can recycling remains at a high 76% in 2019

when well-designed. Beverage cans are included in almost all DRS schemes around the world, due to their high recyclability, ease of transportation and significant market share (although not as large as glass and plastic). Beverage cans collected via a DRS provide high quality recyclate that can be easily put into closed loop recycling (see also measure Mc). **The improvement in recycling will match that shown for measure Ma/Mb.**

A 90% capture rate for glass bottles is achievable via a DRS, and glass may see relatively high levels of capture through other EPR provision too. The industry has already set a 90% capture target by 2030 through the multi-stakeholder partnership, Close the Glass Loop.[88] EU capture rates for glass was at an average of 78% in 2019 which ranged from over 90% in Scandinavian countries to below 50% in countries such as Greece, Cyprus and Malta.[89] Glass has a significant market share of packaging waste in the EU by weight, of which a significant proportion is bottles.[90]

Despite some concerns over the inclusion of glass in a DRS, previous Eunomia studies have concluded that there is insufficient evidence to suggest non-DRS systems could achieve a 90% collection rate. The Belgian waste collection system is often cited as a positive example of a system that achieves high capture rates without a DRS[91]. **The improvement in recycling will match that shown for measure Ma/Mb.**

A 90% capture rate for beverage cartons is very challenging but has been set by the sector as a 2030 goal.[92] Beverage cartons are not 100% recyclable and are not suitable for closed-loop recycling, due to the multi-layered material. Even the industry's ambitious 90% collection target for 2030 assumes only 70% of material will actually be recycled.

Currently significant material losses occur during the recycling process: ~75% of beverage cartons are board, and are recyclable with existing technology, though specialised facilities to do this are limited, meaning current disposal routes can be sub-optimal. ~20% plastic and ~5% aluminium makes up the rest of the beverage carton. Because of this, beverage cartons are not always recycled when collected (through stakeholder consultations it is has been mentioned that in New South Wales, where beverage cartons are subject to a DRS, most collected beverage cartons get exported overseas and incinerated).

Infrastructure in the EU is not currently capable of efficiently sorting and recycling beverage cartons in their entirety. The industry estimates up to €350m investment in polymer and aluminium (PolyAl) recycling capabilities will be needed by 2027 to efficiently recycle the beverage cartons collected at a 90% capture rate. Additionally capture rates quoted for beverage cartons based on weight estimates tend to overstate performance, due to residual product increasing capture weights relative to on-market

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[88] (2022) Close the Glass Loop, accessed 17 March 2022,

[89] Close the Glass Loop (2021) Record collection of glass containers for recycling hits 78% in the EU

[90]

[91] Eunomia et al. (2011) *Options and Feasibility of a European Refund System for Metal Beverage Cans*. Final Report for the European Commission, DG Environment. 16th November 2011.

[92] ACE (2021), *The Beverage Carton Routemap to 2030 and beyond*, https://www.beveragecarton.eu/wp-content/uploads/2021/03/The-Beverage-Carton-Roadmap-to-2030-and-Beyond.pdf

weights.[93,94] In DRS', beverage cartons have a worse return rate than other beverage containers where they are included. Beverage containers are included in DRS systems in parts of Australia and parts of Canada, but achieve much lower return rates than aluminium, plastic, or glass containers.[95] This is a container type that has not achieved 90% collection rates in a DRS system to date (though it has also not been included in the highest performing schemes).

Germany collects an estimated 87.5% of cartons (not just beverage cartons) based on weight via predominantly kerbside collection as part of a wider packaging EPR scheme, though research indicates a significant amount of this reported weight (estimated to be 15 percentage points) is product and moisture contamination.[96] Further process losses can occur thereafter, but even for a collection (rather than recycling) target alone, this example suggests 90% collection is an extremely challenging target for EPR schemes too.

It is therefore not clear that setting a 90% target for beverage containers would see 90% collection rates actually achieved once contamination is accounted for, and the eventual recycling rate would be significantly less than 90%.[97] Currently it is estimated that paper cartons used for beverages only make up ~2-4% of the EU packaging waste market share.[98]

6.3.3 Ease of implementation

Setting a target of this nature will require ambitious policy action at Member State level, without specifying how this can be achieved in practice. As highlighted above, for either cans or glass, a DRS is a way this could certainly be achieved (and would have impacts in common with measure Ma/Mb). Such provision for cans could be aligned relatively

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[93] Eunomia (2020) *Recycling of Multilayer Composite Packaging: the Beverage Carton. A Report on the Recycling Rates of Beverage Cartons in Germany, Spain, Sweden and the UK*. Report for Zero Waste Europe. December 2020, https://zerowasteeurope.eu/wp-content/uploads/2020/12/zero_waste_europe_report_-beverage-carton_en.pdf,

[94] ReturnIt (2021), *Annual Report 2020*, Encorp Pacific, shows collection rates by weight and by container differ little for aluminium, plastic and glass (<2 percentage points), but between 5 and 8 percentage points for cartons. This will be a relatively clean collection method as they are accepted by DRS in British Colombia, and contamination may be higher in other collection formats. The gap is wider is New South Wales (which also has a DRS that accepts all drinks containers), see Return and Earn (2021), *Annual Statutory Report 2019-20,* https://www.parliament.nsw.gov.au/tp/files/79418/Return%20and%20Earn%20Annual%20Statutory%20Report%202019-20.PDF

[95] ReturnIt (2021), *Annual Report 2020*, Encorp Pacific, https://ar.return-it.ca/ar2020/pdf/Return-It_2020_Annual_Report.pdf, shows container collection rates for British Columbia's DRS of 86% for glass, 83% for aluminium, 70% for plastic and 56% and 53% for different carton formats.

[96] Eunomia (2020) *Recycling of Multilayer Composite Packaging: the Beverage Carton. A Report on the Recycling Rates of Beverage Cartons in Germany, Spain, Sweden and the UK*. Report for Zero Waste Europe. December 2020

[97] The Eunomia/Zero Waste Europe report suggests the German collection figure could translate into less than 50% of material actually being recycled.

[98] Estimates from Eunomia's modelling and the beverage carton industry's impact assessment studies

easily with likely provision for plastic bottles (see measure Ma/Mb), whilst provision for glass might require more adjustments and investment.

There is far less evidence alternative collection methods to DRS would work to reach a 90% target, though Member States might choose an alternative EPR route for glass in particular if they were convinced it could be cost-competitive. Even where recycling rates under existing schemes are relatively high however (78% for glass across the EU as a whole as highlighted above), the marginal cost of closing the gap to 90% through existing EPR schemes may be significant.

Beverage cartons can pose technical challenges to incorporation in a DRS if this route was chosen to pursue a 90% target, and this is not a proven way to high collection levels currently for these containers as discussed above.

A DRS provides a very clear mechanism for EPR principles to be applied to specific products (i.e. beverage containers). A more generic target that was pursued by other means may ask more of national and local public authorities in terms of direct service provision and regulation, and of public authorities and EPR administrators in terms of accurately measuring performance (see below).

6.3.4 Administrative burden

The administrative burden will depend on the implementation route chosen.

If DRS' are implemented because of Mcc, the administrative burden will be very similar to Ma/Mb.

If other routes are chosen to deliver a collection target for these containers, this might pose an additional reporting burden on PROs or Member States, who typically monitor and report material (not container type) collection currently. As material recycled, rather than material collected, becomes the basis of calculating recycling rates, collection reporting would become an additional ask in any case. For glass and cartons specifically, it would also be necessary to ascertain how much of the collected packaging stream was in fact *beverage* containers (rather than packaging for other products) if the target is framed narrowly. The mixed materials in cartons might further complicate target monitoring and reporting. A "container glass" target would be easier to monitor than a "glass beverage bottle" target in the absence of a DRS.

6.3.5 Economic impacts

As a DRS is the only approach which has been evidenced to get to a 90% collection rate (see section 6.3.2), the economic impacts would be the same as section 7.1.5 (Ma/Mb) for cans and glass.

The costs for glass in line with Ma/Mb are arguably a "ceiling" cost for this measure; this route would deliver this outcome, but Member States might decide that the costs of putting glass in a DRS were not proportionate (current practice varies by Member State). It is not clear however that alternative EPR provision would deliver the desired outcome (see section 6.3.2).

Beverage cartons have not been fully costed for inclusion in a DRS, but there would be additional investment to include beverage cartons in DRS. For reverse vending machines

(RVMs) to accept beverage cartons they need to have 360° reading.[99] Despite the most sophisticated RVMs having this feature, older and cheaper RVM models may not, imposing an upgrade cost for some existing schemes, and requiring high-end machines are preferred for all new scheme procurements. Material value for cartons is much lower than that for plastic and cans, meaning costs passed to producers (and potentially consumers) from a DRS for these materials are higher.

6.3.6 Environmental impacts

The environmental impacts of Mcc depend on implementation.

If a Member State decides to implement DRS, the environmental impacts would be the same as described in section 7.1.6 (Ma/Mb) for cans and glass. This seems the most likely approach for these materials, as a DRS is the only approach which has been evidenced to get to a 90% collection rate (see section 6.3.2.). Alternative approaches for glass might deliver broadly similar environmental benefits if successful in achieving 90% collection, though for both DRS and non-DRS routes, the extent to which bottle-to-bottle recycling was facilitated would be a consideration.

However, beverage cartons are significantly more difficult to recycle. Their recycling rates are significantly lower than collection rates[100] and this material can often get incinerated or landfilled after collection (see section 3.1.2.). These factors would reduce the environmental benefits of a collection measure alone for these items, even if the target was achieved.

6.3.7 Social impacts

As a DRS is the only approach which has been evidenced to get to a 90% collection rate (see section 6.3.2.), the social impacts would be similar to section 7.1.7 (Ma & Mb) for selected material if the collection target was delivered via a DRS. If glass targets were reached by alternative means this would not be expected to deliver the litter impacts associated with a DRS.

6.3.8 Stakeholder views

A short survey was conducted amongst targeted stakeholders, as discussed in section 7.1.8. Additionally, position papers from packaging industry representatives were considered.

There was strong support amongst stakeholders to include plastic bottles and metal cans in a DRS (see measure Ma/Mb).

Views on glass bottles and beverage cartons were more mixed in relation to DRS (see measure Ma/Mb), but both sectors favour a collection target.

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[99] An ability to scan the specific container type from all sides

[100] Eunomia (2020) *Recycling of Multilayer Composite Packaging: the Beverage Carton. A Report on the Recycling Rates of Beverage Cartons in Germany, Spain, Sweden and the UK*. Report for Zero Waste Europe. December 2020, https://zerowasteeurope.eu/wp-content/uploads/2020/12/zero_waste_europe_report_-beverage-carton_en.pdf,

Position papers from industry representatives, NGOs and EPR schemes were also considered. An EPR scheme highlighted in their position paper that a material-specific collection target of 90% would not be possible for all materials, such as metal cans and glass bottles without a DRS, without requiring significant financial investment. Nevertheless, they were in support of harmonised collection targets at European level for consistency and fairness; considering the recycled content targets that would be included in this revision; while leaving Member States the choice of the tools to be used to achieve these targets, including DRS. Glass was mentioned as a material which already has high collection rates.

6.4 Impact Assessment Update with combined measures

The following DRS measures were modelled in the CBA:

- Measure 'Ma': Minimum requirements for Deposit Return Systems
- Measure 'Mb': Mandatory Deposit Return Systems for certain packaging types

Measure 'Mb' includes plastic bottles and metal cans (steel and aluminium), and is modelled both with and without glass bottles in scope. As both measures are included in policy options 3 and 4, the impacts of these measures are modelled in conjunction.

6.4.1 Mass Flows

Generally, a DRS will require a set-up time of around 2-3 years, and potentially longer if Member States were to procure Reverse Vending Machines (RVM) collectively. Therefore, the measure assumes that DRSs are implemented by 2027, reaching optimal return rates by 2030.

Measure 'Ma' is assumed to recommend that mandatory return rate targets are legislated for when introducing a DRS. This modelling therefore assumes a return rate of 90% will be reached, based on a review of 'best practice' rates achieved by DRSs in Europe. For the purposes of modelling, an initial return rate of 80% is assumed[101]. In addition to 'new' DRSs being implemented by Member States, it is further assumed that Measure 'Ma' will drive existing schemes to include the full scope of potential containers. Thus, schemes with a currently reduced scope (e.g. excluding wine and spirits or smaller containers) are assumed to include these containers from 2027 onwards.

Existing municipal collection schemes (e.g. kerbside collection of recyclables) will continue after the introduction of a DRS. Assumed collection rates for the fraction of in-scope beverage containers not returned to the DRS (e.g. with a 90% return rate, the 10% of containers placed on the market not returned to the DRS) are shown in Table 6-6. These rates are not an assumed recycling rate for a country without a DRS, they are the assumed recycling rate for the small fraction of material that consumers have chosen not to return to the DRS. These unredeemed containers are the "hardest to reach" in terms of recycling behaviour, arising either in highly inconvenient locations (e.g. on-the-go, where consumers do not wish to carry the container to a return location), or in contexts where undesirable disposal behaviours (e.g. littering, residual

[101] This means we model a return rate of 80% in year one of operation, rising to 90% in year three. Actual launch profiles may vary slightly (e.g. Lithuania achieved 74.3% in year one and 91.9% in year two).

disposal) are most likely. Rates are higher for aluminium / steel due to the relatively common practice of separating some of these materials from residual waste, either pre or post disposal (i.e. from incinerator bottom ash).

Table 6-6 Non DRS Municipal Collection Rate Assumptions for Beverage Containers

Packaging material	Collection rate
Plastic	25.0%
Aluminium	35.0%
Steel	35.0%
Glass	25.0%

Loss rates are also assumed for material returned through DRS and non DRS municipal collections. "Loss rates" relates to material that is collected, but does not make it all the way through the recycling process to be turned into new products, and the figures here include all losses in waste management from collection/return to final recycling.

These loss rates are based on rates sourced from the European Reference Model on Municipal Waste Management, and are applied to the tonnage of material collected to calculate 'final' recycling rates.[102]

Table 6-7 Loss rates

Packaging material	Returned to DRS	Other municipal collections
Plastic	88.5%	75%
Aluminium	100%	92%
Steel	100%	92%
Glass	100%	90%

6.4.2 Financial Costs

6.4.2.1 Overview

Modelling of the costs of DRS was conducted by considering the net annualised costs for the implementation and ongoing operation of a DRS. These costs include all *centralised* capital and operational costs of running a DRS scheme, including the following:[103]

- **Scheme administration costs** – the costs of ongoing management the scheme, including reporting

[102] Eunomia Research and Consulting Ltd (2016) *Support to the Waste Targets Review*, Report for DG Environment, 22nd July 2016

[103] Note that these costs do not include the (minor) costs of the set-up phase prior to the introduction of the scheme (but do include all capital costs associated with the introduction of the scheme).

- **Handling Fees** –paid to retailers to reimburse them for costs related to purchase and operation of return infrastructure (RVMs), space costs, labour costs etc.
- **Transport Costs** – for collection of containers from return locations, and onward transport
- **Counting Centre Costs** – for counting of uncompacted containers and final sorting/bulking
- **Materials income** – sale of secondary materials
- **Unclaimed Deposits –** 'revenue' from deposits not claimed by consumers

These costs are broadly equivalent to the 'producer fee' i.e. a contribution paid by producers to fund the net costs of a DRS once unredeemed deposits and material revenues have been deducted. Producer fees are often set based on budgeted costs for the year, and therefore, the actual fees paid may not be precisely equivalent to the net costs of the scheme, creating a surplus or deficit.

To model these costs, we applied a methodology to estimate the average cost of a DRS per container placed on the market (within the scope of the scheme. These costs were estimated in two stages, firstly a review of existing schemes to understand costs, then modelling to estimate how this cost varies for different return rates. These are described in the sections below.

Not that some administrative costs for producers are not covered in this approach; please see section 6.1.4 for these, the majority of which are one-off related to changes to product lines or labelling at launch.

6.4.2.2 Review of Producer Fees in Existing Schemes

Future DRS schemes implemented under this measure could encompass a range of possible scheme designs, and furthermore will be implemented in countries with different economic conditions (e.g. wage rates), geographies (e.g. the proportion of urban vs. rural population), and other factors, all of which have a significant impact on the cost of a DRS scheme. Therefore, it was reasoned that modelling of future DRS schemes would be best based on the average costs of existing schemes, as, these costs already broadly reflect these considerations. As discussed, as producer fees provide a good proxy for the 'actual' net costs of a DRS, average costs were therefore based on a review of producer fees in existing DRSs.

Producer fees by material were obtained from seven existing schemes: Denmark, Estonia, Finland, Lithuania, Netherlands, Norway and Sweden. For schemes with variable producer fees (for different container sizes and/or material colours), the average fee was estimated by applying size breakdown data from placed on market data sourced from specific DRS schemes. Data on the level of deposit and return rates was also obtained (an additional two countries – Germany and Iceland – were included it the deposit level data).

For modelling, as described further in the following section, the average producer fee calculated from this review was converted to a 'base' fee which does not include revenue from unredeemed deposits. This was done so that the level of revenue from unredeemed deposits (which is the main determinant of how producer fees vary with return rate) could be varied in the model. This calculation was done on the basis of the average return rates and deposit levels calculated from this same review process. The final outputs are presented in Table 6-8.

Table 6-8 'Average' DRS Producer Fees, Return Rates Deposit Levels and Calculated 'Base' Fee for Modelling, € Cents per container placed on market

Material	Average fee	Of which unredeemed deposit revenue	'Base' fee calculation 'Base' fee (not incl. unredeemed deposit revenue)	Average return rate, %	Average deposit level
Plastic	2.3	1.5	3.8	91.9%	18.3
Glass	5.9	1.1	7.0	91.6%	13.2
Aluminium	0.5	1.3	1.8	90.8%	13.9
Steel	3.0	1.3	4.2	90.8%	13.9

6.4.2.3 Variance of Producer Fee with Return Rate

DRS costs in this impact assessment are calculated at a range of different return rates, thus requiring an understanding of how unit costs change with respect to return rate.

As discussed above, the variance in 'revenue' from unredeemed deposits is the main determinant of the level of producer fee at different return rates – as return rates increase, more revenue is obtained leading to an increase in net costs. The net costs of the scheme are also impacted, although less significantly, by material revenues (which increase as return rates increase), and the costs of running the scheme (infrastructure, collections etc.) which generally increase with greater return rates (although commonly schemes are set up to handle target return rates of e.g. 90%, with associated capital infrastructure requirements, so this mainly relates to increases in operational costs).

The 'base' producer fees (not including unredeemed deposits, see Table 6-8) were converted to final unit costs for modelling by adding the following:

- Unit revenues from unredeemed deposits calculated based on the 'average' deposit level (see Table 6-8) and the live return rate from the model; and
- An additional unit factor to account for the change all other cost components (scheme administration costs, handling fees, transport costs, counting costs and material revenues) with respect to return rate.

This additional unit factor was calculated using an internal DRS model, which has been used for numerous feasibility studies of DRSs in Europe, which includes all components of a DRS. Results were compiled from modelling of three European countries to calculate the average change in producer fee (excl. unredeemed deposits) relative to return rate. The results of this modelling are shown in Table 6-9, in terms of the modelled change in producer fee for a 1% increase in return rate.

Table 6-9 Modelled Change in Producer Fee (excl. Unredeemed Deposits) per 1% Change in Return Rate, € Cents per Container Placed on Market

Material	Change in Producer Fee (excl. Unredeemed Deposits) per 1% Increase in Return Rate
Plastic	0.021
Glass	0.020
Aluminium	0.007

Steel[1]	0.007
Note: Specific cost model was not conducted for steel as this is a minor component of the overall metal stream	

Based on the approach above, the model dynamically calculates the unit DRS cost to apply, based on the live return rate in the model. Final unit cost assumptions used in modelling for example return rates are provided in Table 6-10. Note that 'negative' costs are possible, where the income from unredeemed deposits and material revenues are greater than the costs of the scheme. These are generally observed only for aluminium, which has extremely high material revenues. However, whether this negative cost is reflected in a 'negative' producer fee is subject to the design of the schemes finances (as discussed above).

Table 6-10 Example Final Unit DRS Cost Assumptions, € Cents per Container Placed on Market

	95%	90%	85%	80%
	2.96	1.94	0.93	-0.08
Glass	6.41	5.65	4.88	4.12
Aluminium	1.12	0.39	-0.34	-1.07
Steel[1]	3.58	2.85	2.12	1.39

The costs in this table are then applied to the material flows and return rates assumed in the model.

6.4.3 Environmental Modelling

Environmental modelling of these measures was conducted using the same methodology as described in Appendix D of the previous PPWD Impact Assessment study.

No additional categories of environmental impacts were included for the DRS measures. This is because the vast bulk of environmental benefits from implementing a DRS are due to increased recycling (i.e. the avoided emissions through reduced use of raw materials). DRSs do lead to additional emissions, primarily from the collection and transportation of returned containers from retailers to counting centres and reprocessors. However, these emissions are both relatively minor compared to the major benefit of increased recycling, and as the DRS scheme diverts material away from existing (municipal) collections, there will be a corresponding decrease in emissions from these collections. Therefore, these additional emissions are not included in the modelling.

6.4.4 Employment

Employment assumptions were based on an internal review of DRS feasibility studies conducted by Eunomia, in which the number of direct jobs resulting from the introduction of a DRS are calculated. A total of five feasibility studies each for European countries were considered.

From this review, unit assumptions for the average number of jobs per container placed on the market in scope of a DRS were calculated. These assumptions are divided into four broad categories:

- Retailer jobs (for time spent in manual collections, RVM tasks, and assisting with collections)
- Transportation of collected beverage containers
- Counting centres
- Central system administrations

The calculated unit assumptions are provided in Table 6-11.

Table 6-11 Unit Employment Assumptions for DRS, FTEs per Million Containers Placed on Market in Scope of DRS

Employment type	FTEs per million containers
Retailers	0.29
DRS Collections	0.07
Counting Centres	0.04
Central System Administration	0.01
Total	0.40

6.5 Aspects related to legal drafting

Wording in plain text sets out the content the Regulation may need to cover, to provide support for the legislative drafting. Some elements are dependent on final policy choices, or the relationship between these measures and other Regulation content. We have therefore used square brackets and blue text to show where choices may be required. Additionally we have used green text to provide commentary. This explains why content may be required, or clarifies the intent. We have also used green text to indicate where certain terms may need legal definition, and suggestions for definitions that could be used.

6.5.1 Ma: Requirement to have a Deposit Return Scheme (DRS) for single use plastic and metal beverage containers

Commentary on structure: *If Ma is pursued without Mb, then it is only really an obligation on Member States – who would be free to determine most other elements of design, and the Regulation is relatively minimalist. However, a "DRS for single use beverage containers" would still need to be described / defined, and we propose such a description in this section also. If Mb is added then the definition / description of a DRS for single use beverage containers could be made better by combining elements of Mb with that overall definition.*

Definitions: *We have used "DRS for single use beverage containers" to describe the scope of these measures. We have proposed a description/definition of such a scheme in the main text.*

This is to distinguish from either "DRS for reusable beverage containers" or "deposit or other return schemes for packaging or products other than beverage containers" both of

which might constitute a DRS in a generic sense, especially as more sustainable packaging and product models become more common in future.

Member States

1. Shall make provision for a mandatory DRS for single-use plastic and metal beverage containers to go live by [date] and reach a return rate of [percentage] by 2030.

Commentary: *We suggest March 2028 for a launch deadline - to avoid a rush of countries trying to launch schemes at Christmas/New Year (operationally a bad idea) we avoid a December 2027 deadline. Ideally schemes would launch earlier in 2027 and have three whole years to become established before 2030 targets are due. We recommend a 90% target rate is set. We have not defined how this rate shall be calculated, but the proportion of Deposit Bearing Beverage Containers (DBBCs) placed on the market and returned to the scheme is the most straightforward approach and will be more accurate than weight-based measurement. Allowing for containers returned via other routes to be included in the calculation is allowed in some national legislation.*

The coverage of the DRS is defined further in our suggested DRS for single use beverage containers description below

2. [May/shall determine aspects of scheme design not set out in this Regulation on a national basis, including but not limited to x, y, z.]

Commentary: *This may not be necessary but could avoid confusion in the absence of Minimum Requirements or if reduced Minimum Requirements are selected, by identifying key elements Member States would need to decide on*

Describing a Deposit Return Scheme (DRS) for single use beverage containers in legislation:

Commentary / Definitions: *This section will be needed if only Ma is pursued. If both Ma and Mb are pursued, elements of this description and Mb could be defined, and this would potentially be clearer and more effective.*

1. Regulation applies to both the sale of product packaged in Deposit Bearing Beverage Containers (DBBCs), and the return of empty DBBCs by consumers

Commentary: *note that Scottish legislation refers to these two different states of items covered by the scheme as "scheme articles" (product and packaging up to point of consumption) and "scheme packaging" (empty containers post-consumption). This terminology is very country specific, but making a legal distinction of this type may facilitate clear wording throughout the measures here.*

2. "DBBCs" for the purpose of this Regulation are those items of primary packaging:

Commentary: *better definition possible if matched to Minimum Requirements re product range and container size*

a. Containing beverages which are sealed in a watertight and airtight state at point of sale

b. Made wholly or mainly from [plastic, metal], or any other materials Member States choose to place in scope

Commentary: *again, scope might be set out in conjunction with Minimum Requirements instead; final clause is important either way to ensure that Member States*

choosing to place glass or beverage cartons in scope follow the same rules for all materials

Definitions: It may be appropriate to define "plastic" coverage more narrowly. *The intention of this measure is centred on "PET plastic" bottles, and it may be economically beneficial to restrict required scope solely to these items (e.g. Norwegian model). PET only is high value and operationally simple, but limits other benefits. HDPE might also be specified (though a lot of this is used for milk, which is exempt in the Minimum Requirements anyway) if subgroups of plastic are preferred.*

All *plastic will maximise collection but reduce material quality and value. If the regulation is left framed this way, "wholly or mainly" might need to be clarified to exclude beverage cartons from an overbroad interpretation of this rule.*

We note the SUPD target for recycled content covers PET only in 2025 and all plastic beverage containers by 2030. However including "all" plastic beverage containers here will mean a greater material mix in the collected material, potentially increasing costs and lowering material value.

"Plastic" is already defined in PPWD and SUPD

"Metal" matches wording on non-inclusion in the SUPD. Specifying "steel or aluminium" would be an alternative approach (and is taken in for example Scottish legislation)

c. Which are single-use

Definitions: *"Single-use plastic products" are defined in SUPD, Article 3 (2), and this can be adapted to define single use generally if desired, e.g. "packaging that is not conceived, designed or placed on the market to accomplish, within its life span, multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived"*

d. Which are made available for sale within a jurisdiction and after a date by which a DRS is mandated to come into force by a Member State

e. Which are not subject to any specific exemptions in Member State legislation

Commentary: *the extent of choice here will depend on Minimum Requirements - if scope of products and exemptions is fully defined, this may not be necessary*

f. Where DBBCs are sold in secondary packaging (e.g. multipacks), the DRS regulation applies to the individual DBBCs.

3. "A deposit" is a redeemable sum that does not form part of the price charged for the product/packaging sale itself

   a. Anyone selling a DBBC to a consumer must charge a deposit, payable by the consumer, and clearly communicate the value and redemption opportunity in relation to the deposit.

   b. Consumers returning empty DBBCs are entitled to redeem their deposit in full

4. "A DRS for single use beverage containers" is a system that enables the effective and efficient charging and refund of deposits for consumers on DBBCs, including but not limited to provision of the means to:

   a. track DBBC sales and returns

   b. manage financial flows associated with deposits

c. return DBBCs and redeem the associated deposit easily and conveniently as a consumer

d. collect returned containers centrally for recycling

Commentary: *this is overall a minimalist description, and it is assumed the inclusion of Mb will fill out this description*

5 [Any DRS for single use beverage containers shall also satisfy additional Minimum Requirements as follows:]

Commentary: *some elements of Mb may be integrated into this description of DRS in any case in Mb is pursued, so this line may be redundant.*

6.5.2 Mb: Additional minimum requirements

For all new DRS,

Definitions and scope:

We would suggest defining "new" in relation to launch date, which is clear and unambiguous e.g. "for all DRS for single use beverage containers launching after X".

If defined in relation to legislation dates, a Member State could potentially rush legislation / partial legislation with a much delayed launch date.

However, the cut-off date should be 12-24 months after entry into force of the Regulation, so as not to derail schemes near launch at the date the Regulation starts (several Member States may have "near-ready" schemes based on current plans)

the Member State

1. Shall set a minimum deposit level. They may additionally determine the actual deposit level, or pass that responsibility to the System Operator. There shall be provision to vary the deposit level over time. The deposit levied shall be sufficient to deliver the target return rate in conjunction with overall scheme design.
2. Shall ensure the deposit is exempt from sales taxes

Commentary: *Commission may not have powers in this regard; but this is highly desirable as a design feature, so desirable to express a preference if legally possible.*

3. Shall set national launch dates for obligations on retailers and producers to come into force, and for the establishment of the System Operator.

Definitions: *Retailer and Producer definitions are discussed below.*

4. Shall set country specific obligations and exemptions in relation to how and where retailers must accept the return of DBBCs and provide consumers with redeemed deposits

    a. Member States may provide for exemptions to the obligation to take back DBBCs and return containers in whole or in part in relation to

        i. The minimum size of a retail site or retail operation that must accept returns; this may also be a partial exemption relating to the maximum size of a return transaction or the range of containers accepted

        ii. Proximity to other return locations

iii. Food safety

iv. Health and safety

v. Other environmental protection

vi. Public health

These exemptions may vary by urban/rural location and physical/online sales

Retailer sites that are not obligated to participate as return locations shall be free to choose to participate as return locations if allowed by the System Operator

Commentary: *Some other exemptions encountered in law include sales on trains or at airports; e.g. for producers if they sell products "in scope of the DRS to the managers or operators of air, aquatic, road or railway transport subject to the jurisdiction of the Member State and engaged in passenger transportation on international routes, and these drinks are intended for sale to and (or) consumption by the passengers of these means of transport." This exemption usually relates to the fact consumers may be unable to return the container to the scheme, though operational factors may also play a part*

b. Member states may provide an exemption on the obligation to charge the consumer a deposit in the context of retail in hospitality premises where the DBBC is opened, the product is consumed, and the empty DBBC is returned within the premises. Member States shall ensure that other obligations for Economic Operators in relation to DRS are not affected in this case.

5. [Shall require producers to implement a DRS]

Commentary: *Various scheme elements will have to be defined at national level, but this is arguably redundant in a Regulation as this obligation will sit directly with producers*

6. Shall recognise and license a single Scheme Operator (SO). The SO must meet and be able to comply with the requirements of a SO set out below.

Definitions*: the requirements of the SO are set out below*

Commentary: *This requirement and the one below are fairly general. An alternative and more itemised approach is taken in Directive 2008/98/EC, article 8a (3) for extended producer responsibility schemes. This could be adapted here (or in relation to the SO requirements) if more detail is wanted. Generally, an SO in relation to these measures is a specific type of PRO, so the Waste Framework directive may also provide useful text for drafting if more detail is wanted*

7. Shall specify control procedures and reporting requirements for the SO to ensure the requirements of this Regulation are met, and Member States are responsible for enforcement measures in the event they are not.

8. Shall consider how national legislation can maintain incentives for producers and the SO to achieve continued high return rates, including the prospects for return rates in excess of the performance target.

9. Shall ensure that provision of a DRS for single-use beverage containers does not harm existing provision or future development of DRS or other return schemes for reusable beverage containers

a. Where DRS for reusable containers is well established, Member States shall ensure

i. provision of return locations and opportunities for reusable beverage containers with [a comparable purpose and format] is not less convenient for consumers than opportunities to return single use containers to a DRS

Commentary: *"and format" would mean that reusable glass bottles did not have to be accepted at a single use DRS return point for a scheme that excluded glass, though this might discourage use of reusable glass formats.*

Dropping this requirement might mean that glass reusable bottles were accepted in additional locations – good for the consumer but perhaps imposing additional logistics costs on the DRS for reusable beverage containers.

It would be best to allow Member States to translate this to their local market conditions

ii. the consumer experience is standardised to the fullest extent possible so that both reusable and single use beverage containers with a comparable purpose and format can be returned to the same locations

iii. introduction of a DRS for single use beverage containers does not adversely impact the cost or performance of operations for DRS for reusable beverage containers already in place

Commentary: *Currently most reusable beverage container systems are for glass, while the single-use DRS is not going to be mandatory for glass; this may impact the "comparability" of take-back under parallel systems. However, reusable glass formats are in competition with single-use non-glass, so the provisions here seem appropriate. In future reusable formats in other materials may become more prevalent*

b. Where such return systems for reusable beverage containers are not well established, Member States shall ensure that provision of a DRS for single use beverage containers does not impose additional or disproportionate costs, burdens, or barriers on the development and growth of reusable beverage systems.

c. Member States shall keep the extent of reusable beverage container provision under review, to ensure they remain aligned with this requirement

Member States may place obligations on other Economic Operators (producers, retailers, or the SO) to achieve these ends

10. May set additional objectives for DRS for single use beverage containers in addition to the Commission mandated return rate, for example goals relating to litter reduction, material quality, or the promotion of circular recycling systems

11. May include additional beverage containers or beverage products in scope for a national DRS; if this is done, these containers and products shall be subject to the same treatment as items included in the minimum requirements.

Commentary: *note the scheme scope is defined under producer obligations in these Minimum Requirements rather than in relation to member states*

the Scheme Operator (SO)

1. Shall be a non-profit legal entity independent of government

Commentary: *If non-profit needs to be defined, then Directive 2008/98/EC, article 8a 4c on necessary costs might be a useful model*

2. Shall be producer led, and representative of the range of producers in scope for the scheme. It may also include representation from other key interested parties, such as retailers.
3. An entity aiming to act as a SO shall have
   a. financial capacity to perform the functions of an SO; and
   b. the ability to perform the functions of an SO.
4. Shall commence its activities only upon possession of an organisation plan, a funding system, a public awareness and information programme and implementation plan proving its compliance with the requirements set out by this Regulation and Member States.
5. Shall perform the following functions:
   a. administration of the deposit, participation in organising reception of DBBC's;
   b. organisation of management of DBBC's [by selecting through public tenders waste managers to process DBBC's collected through the] DRS for single use beverage containers, thus ensuring that objectives for collection and processing of waste of packaging subject to a deposit are met;

Commentary: *bracketed text is based on Lithuanian legislation and may be too explicit for inclusion in a Regulation; however, without it, as a private sector body, there may be nothing to prevent less competitive routes being chosen. On the other hand, the SO might legitimately choose to deliver services in house.*

   c. performance of public awareness and information activities on the matters related to the DRS for single use beverage containers;
   d. compensation of costs, incurred by the retailers of DBBC's to collect DBBC's meeting standards established by the SO.
6. Shall organise sorted collection, transportation, preparation for use and use of all packaging waste originating from used single use, deposit bearing beverage containers returned to the DRS for single use beverage containers of each Member State, and have the right to sell the material collected
7. [shall appropriate at least 1 percent of its annual turnover (excluding deposits)] for public awareness and information on management of packaging waste.

Commentary: *This is based on the Lithuanian model, and may be overly prescriptive, however this is one of the ways high performance can be maintained and incentivised.*

8. Shall provide regular transparent reports on performance and financial accounts to Member States, Retailers, Producers and the public.
9. Shall set producer fees and payments in a way that is open, fair, and transparent to all producers participating in the DRS for single use beverage containers
10. Shall avoid disproportionately high one-off costs for registration of producers or products, to avoid indirect discrimination against smaller producers
11. May vary producer fees to:

a. Reflect the different operational costs to the SO of different packaging materials and formats in line with EPR principles

b. Cover the risks of fraud

Commentary: *schemes usually charge a higher producer fee for containers that do not have anti-fraud features, such as country specific bar codes or specific labelling, but the cost/benefit calculation here is made by producers via the SO based on local market risks*

Commentary: *Some schemes allow the SO to set standards for recyclability/design and/or vary fees on this basis. We propose the legislation is silent on this. We also have not put in any requirements specific to treatment of SMEs/micro producers at this stage. In both cases we think this is probably for the national government/SO to determine, and this should be allowed.*

Producers

Definitions: *"Producers" are defined in SUPD art 3 (11) but we need a narrower scope than SUPD and have added "that first places a DBBC containing product on the market" – the traditional point of entry into a DRS. Producer and Retailer have very distinct responsibilities in a DRS. We therefore focused on article 3 (11) a only in defining the below (article 3 (11) b is significantly adapted for the definition of "retailer") and amended the "any Member State.." wording here too. We have also made it broader by removing reference to plastic.*

For the purpose of this measure producers can be defined as "any natural or legal person established in any Member State or third country that professionally manufactures, fills, sells or imports, irrespective of the selling technique used, including by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU of the European Parliament and of the Council (21), and places on the market of a Member State for the first time any DBBC containing product"

1. Shall be obligated to implement a DRS for single use cans and plastic beverage containers for all single use beverage container types excluding wines, spirits and milk for all containers between 150ml and 3000ml inclusive.
2. In order to jointly organise the management of waste packaging in scope of the DRS, Producers may establish a System Operator (SO) and / or become participants in an established SO to perform all or part of the duties set forth by this Regulation.
3. Shall pay the remaining costs of the DRS after material income and income from unredeemed deposits has been accounted, to the SO. This shall cover the cost of DBBCs collection, transportation, preparation for use, administration of the DRS, as well as the costs of organising and implementing public awareness measures.
4. Shall collect a deposit from their sales of DBBC's, and shall refund it to retailers of DBBCs, via the SO, upon return of DBBCs to the retailer
5. Shall cooperate to ensure the establishment and maintenance of an SO to meet the requirements of this Regulation and to assist producers in the delivery of their obligations.

Retailers

Definitions: *See discussion of producers above. For the purpose of this measure retailers can be defined as "any natural or legal person established in any Member State or in a third country that professionally sells directly to private households or to users other than private households, including by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU, any DBBC containing product"*

This is significantly adapted in intent from SUPD 3 (11) b and reworded accordingly. Here our intent is to focus on the final business-to-consumer transaction.

We use "retailer" as "seller" could describe what happens at several stages in the supply chain, and this term is used in food regulation already. The General Food Law (EC) No 178/2002 defines "retail" (for food) as (art 3 (7)): "'retail' means the handling and/or processing of food and its storage at the point of sale or delivery to the final consumer, and includes distribution terminals, catering operations, factory canteens, institutional catering, restaurants and other similar food service operations, shops, supermarket distribution centres and wholesale outlets;"

"Final consumer" is also defined in that article of the General Food Law.

1. Retailers of DBBCs shall charge a deposit at point of sale
2. Retailers of DBBCs shall organise collection of DBBCs and refunding of the deposits.
3. Retailers of DBBCs shall provide return points for the scheme for that purpose.
    a. Provision of a return point means that
        i. return by consumers shall take place at the trading point or in its territory, or in close proximity (to be defined by the SO) to the trading point, ensuring as a minimum the same working hours as those of the main trading point.

Commentary: *online retail poses a problem, depending how point of sale is defined. Most legislation does not ask specific measures are taken by online retailers in relation to return, however, clearly, regardless of sales volumes, it is unlikely they will have items returned by consumers to their premises. Unusually Scotland does legislate directly on this point, defining the point of sale as the address of the consumer, and requiring a collection service is available in those cases; well it is likely many consumers will not want this, it is expected to cause significant operational, cost, and efficiency difficulties if they do.*

Online retailers must charge a deposit; the only issue is around provision of return points. We recommend the Regulation does not seek to rule on this, but leaves it to the discretion of either Member States or SOs.

        ii. retailers of DBBCs shall accept all packaging subject to a deposit and refund the deposit regardless whether they trade in products with the identical packaging or not.

    b. This requirement may be subject to exemptions set by Member States, or delegated by Member States to SOs, on the requirement to provide a return point
        i. In such a case retailers must clearly communicate to consumers where alternative return points are located
    c. Non-retailers and non-obligated retailers may also provide return locations where approved by the SO
4. Deposits shall be refunded to the users of DBBCs in cash or, by request of packaging users, they shall be given the right to purchase goods or services for the sum, or to

make donations to the beneficiaries listed by the SO in the amount equal to the value of the deposit.

5. DBBCs may be rejected by Retailers without refund of the deposit, if it:
   a. does not bear a label indicating its coverage by the DRS, or if such label is poorly visible and thus unidentifiable and
   b. is damaged or contaminated to the extent rendering it not suitable for recycling
6. DBBCs shall be accepted by Retailers but refunding of the deposit may be refused, if it:
   a. does not bear a label indicating its coverage by the DRS, or if such label is poorly visible and thus unidentifiable and/or,
   b. is not completely emptied and/or,
   c. is distorted beyond technical possibilities of identification.
7. Retailers may refuse to accept returned DBBCs if they are presented in a quantity that exceeds that usually represented in a sales transaction at that site.

Commentary: *this prevents smaller stores having to process large transactions they may not have capacity for.*

Other Economic Operators involved in the manufacture, filling, selling, importing, or exporting of DBBCs containing product

1. Shall charge a deposit on DBBCs and facilitate reasonable requests from producers, retailers, or the SO required to facilitate the functioning of DRS for single use beverage containers

Commentary: *This is designed to ensure participation by intermediaries in the supply chain. The first part is necessary; the second part is fairly broad but will aid system functionality (e.g. reporting back to producers where product ends up if it destined for different markets).*

For all existing DRS,

Definitions: *"existing" will be the mirror of the definition chosen for "new" above.*
Commentary: *the three options here are all in blue as the way in which they are applied to the above clauses may vary. The approaches could be used individually or in combination.*
[The requirements in relation x, y, z above are the same]
Commentary: *This might be appropriate for some requirements, but we do not recommend this approach unless very rapid harmonisation is desired and there is minimal concern about cost or performance implications for existing schemes.*
[The requirements for x, y, z above do not have to be met until 2035]
Commentary: *This approach focuses on the Commission's desire for long term alignment while minimising disruption to established schemes. This may be most appropriate for the scheme coverage (specifically product scope) provisions, where harmonisation of the consumer experience is perhaps most desirable. In discussions with Commission on the Impact Assessment this has also been considered as "until the next major scheme revision" but this seems challenging to define, and we have proposed a fixed date here as a simpler approach*

[The requirements for x, y, z above do not have to be met unless the collection rate for either metal or plastic beverage containers falls below 90% in any two consecutive years after 2028, in which case the Member State and Scheme Operator have three years in which to revise their scheme to align with these requirements in full.]
Commentary: *This approach avoids disrupting high performing established schemes while ensuring the performance objectives are met. This approach may make this measure more acceptable to Member States that already have DRS. This would be our recommended approach for the current Regulation.*

6.5.3 Mc: Additions to minimum requirements to accommodate "right of first refusal"

Commentary: *Slovakia is introducing this approach currently – the DRS launched in January but the right to first refusal will only be introduced in the second half of this year. The right to first refusal in that case is not required in legislation, it was part of the SO's application, so it is a feature of the licensing of the SO and the SO founding documents. We have therefore proposed that the Commission make this primarily an additional SO minimum requirement if incorporated; this will also make it easier to adapt operation of this right to local market conditions.*

The SO

1. Shall offer a "right to first refusal" on material collected by the scheme, whereby any individual producers registered to the scheme are entitled to purchase, on an equal basis, material collected by the scheme in proportion to the amount of material they initially placed into the scheme. Any material claimed in this way must be used [for the same market application as that of its previous life cycle (i.e. back into beverage bottles)]. This offer should be made for all material categories included in the scheme.

Definitions: *This follows a definition identified by JRC in its work on high-quality recycling in relation to closed loop. The most recent draft of the Food Contact Materials legislation we have seen defines closed loop as "materials and articles remoulded into the same materials and articles as those originating from the recycling scheme from which the plastic input was obtained".*

An alternative (which would better match the Slovakian approach) would be to add "for the same or similar market application" and explicitly allow for <u>any</u> FCM application. (Slovakia requires EFSA certification as evidence this is being achieved – that certification relates to FCM not bottles specifically).

We have not invented a new definition of "closed loop" recycling – but this does make the wording in blue in the subsequent sections longer.

2. To protect smaller producers and maximise economic efficiency
    a. Claims may be transferred by one registered producer to another registered producer in the scheme
    b. Material may be passed by a registered producer to a third-party Economic Operator for the purpose of enabling recycling of the material for [the same purposes as the original product].

3. The method for claiming or transferring material shall not be unduly burdensome for producers wishing to claim material but System Operators:
    a. shall require guarantees from economic operators accessing this right that material will be diverted [for recycling into the same purposes as the original product].
    b. may request evidence of associated material and financial transactions
4. Producers are under no obligation to exercise their right to first refusal. If more material is collected by the SO than is claimed under the right to first refusal, the SO may then:
    a. sell that material on the open market; or
    b. offer additional privileged access to registered producers that want additional material, provided this is done in a way that is transparent and equitable to all; or
    c. offer additional access to other purchasers of material for [for recycling into the same purposes as the original product] provided this is done in a way that is transparent and equitable to all economic operators for a given material use additionally
5. The System Operator may set the price of material offered under the right of first refusal as appropriate for local circumstances, provided this is transparent and equitable to all registered producers

Comments for context:

*This measure should not disrupt the single market or competition **if**:*

- *No national preference is allowed – any registered producer in the scheme has an equal right to claim from the scheme*
- *Other potential purchasers of the material are not in direct competition for the product in question (e.g. problems only arise if one drinks producer is disadvantaged relative to another; textiles producers are not in "competition" with drinks producers when it comes to consumer sales). However:*
    - *Recyclers and reprocessors feel adversely impacted – but a DRS will significantly change the market for them in any case with large quantities of high value material now occurring in the DRS, at a central sales point.*
    - *Drinks producers for DRS exempt products might feel they are in competition with producers of DRS eligible products depending on the scope of the DRS*

It is not clear either of these two groups are worse off under a "right to first refusal" than without it. SO's can choose to sell material any way they wish currently, with at least one – Slovakia – embracing right to first refusal. SOs could equally commit to exclusive contracts, for example favouring larger drinks producers and rendering it very challenging for drinks producers shut out from such deals to compete on factors like recycled content, or comply with mandatory recycled content targets. On this basis, setting down rules for who can access material may be fairer than leaving it up to individual SOs.

This measure aligns with polluter pays and EPR principles – the producers in the scheme have paid fees to cover the collection of this material, and may have taken steps to

maximise the recyclability of their products; essentially any market advantage they receive from right to first refusal recognises their previous investments and disadvantages free riders.

This measure may be necessary to enable achievement of the SUPD targets for recycled content for drinks bottles. It may also further the Commission's objectives in the Textiles Strategy to see greater closed loop recycling from the textiles sector.

7 Task 5 - Labelling

Measures considered around labelling were a mixture of new measures, reconsidered measures, and continued measures. Measures were as follows:

- **Measure 27c-y:** Labelling criteria for provision of packaging material information to consumers to facilitate consumer sorting of waste
- **Measure K:** Restrictions on labelling options used to communicate particular packaging information, to reduce consumer confusion and facilitate the single market
- **Measure 38j:** Labelling criteria for provision of packaging recycled content information to consumers
- **Measure 12u:** Labelling criteria for packaging information to show reusability to consumers
- **Measure Mx:** Update current material-based labelling requirements

Measure 12u was originally described and assessed as a voluntary measure (i.e. use of labelling would be at the discretion of Economic Operators for eligible packaging). For final submission a mandatory variant was preferred by the Commission, and a summary of this variation was provided.

7.1 M27c-y "Labelling criteria to facilitate consumers´ sorting": Harmonised Labelling of packaging to facilitate consumer sorting

7.1.1 Description of the measure

Article 6 of the PPWD states that a minimum of 65% (by weight) of packaging waste will be recycled no later than 31 December 2025 and a minimum of 70% (by weight) no later than 31 December 2030.[104] **These increases will require significant improvements in sorting, collection, and recycling systems, and a key contributing factor will be high levels of consumer participation in sorting packaging waste for recycling. As part of this, consumers will need clear and accurate information to facilitate correct sorting of packaging waste.** However, consumer confusion regarding the recycling of packaging (particularly plastic packaging) is currently widespread, and can result in increased contamination in the recycling stream and a poorer resulting quality of outputs.[105]

Preserving the integrity of the single market is also a key reason for considering this measure (see also other labelling measures and Measure Mk in particular). National governments are acting on a perceived need for labelling for sorting, but in doing so are fragmenting the regulatory environment for packaging. Provision of a common system might reduce this trend but active restrictions on alternative system are discussed as measure Mk, and would be needed to maintain the single market. Note that if measure Mk is not progressed, there

[104] European Commission, *Consolidated text: European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01994L0062-20180704

[105] Amir Kavei, F. and Savoldi, L., 2021. *Recycling Behaviour of Italian Citizens in Connection with the Clarity of On-Pack Labels. A Bottom-Up Survey*. Sustainability, 13(19), p.10846.

is a case for including elements of that measure (i.e. restricting mandatory alternative labelling of sorting or recyclability instructions) here.

There is some provision for labelling and communications in the PPWD already, but this does not deliver sufficiently against the requirements for consumer labelling now identified.

- Article 8 of the PPWD states that "To facilitate collection, reuse and recovery including recycling, packaging shall indicate for the purposes of its identification and classification by the industry concerned the nature of the packaging material(s) used on the basis of Commission Decision 97/129/EC". The relevant Commission Implementing Decision 129/97[106] on marking sets out a system for uniform numbering and abbreviations to be used on packaging made of different materials, but application is voluntary, and there is little evidence this has been used extensively by consumers.
- Article 13 in the PPWD requires Member States to provide packaging users with various information relating to the return, collection, and recovery systems available to them, though the specific type and format for information to be provided in this regard is not harmonised. This reflects the current lack of harmonisation of separate waste collection systems across Member States as well.

"Facilitating consumer sorting" via labelling and labelling "recyclability" for consumers are two different approaches to the same end – informing consumers how and where to dispose of their packaging. This can be done directly (with sorting instructions telling consumers where something should go) or less directly with recyclability labels prompting consumers to choose a collection route for recyclable content. Although this measure pursues the former route, national legislation using either method poses an equal threat to the integrity of the single market.

There is an increasing trend for mandatory labelling requirements for "recyclability" at Member State level, but this poses significant challenge to the integrity of the single market, irrespective of the value of such labels to consumers. Some Member States, such as Italy and Bulgaria are proposing to introduce their own mandatory requirements for the marking of packaging materials, which includes requiring use of the classification system set out in Decision 129/97[107]. France has instituted mandatory on pack labelling of recyclable packaging with its 'Triman' logo. Divergent approaches to this labelling problem across the EU risks undermining the single market, and imposes significant barriers and costs on economic operators. A fragmented approach may improve consumer understanding in specific national or local settings but does not facilitate clear communication and understanding across the EU.

This measure will therefore require all packaging to have labelling indicating its material composition in a manner accessible to the consumer, to facilitate end of life sorting and disposal decisions by the consumer. This on-pack label would match with harmonised labels on waste and recycling collection infrastructure, being developed as part of the Waste Framework Directive. In conjunction with measure Mk it will also prevent Member States from mandating their own labelling systems for packaging for either material composition, sorting or recyclability, to preserve the integrity of the single market.

This system of approved symbols will be an on-pack requirement, and so visible as a direct prompt to the consumer at point of disposal. It will be far clearer and more consumer-friendly than

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[106] European Commission, *Commission Decision of 28 January 1997 establishing the identification system for packaging materials pursuant to European Parliament and Council Directive 94/62/EC on packaging and packaging waste,* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31997D0129

[107] Ibid.

labelling via alphanumeric codes (see Measure Mx). The labelling would be similar in approach to the current "Nordic pictogram" system (see example below), but would avoid the use of written words, and the measure has been costed on this basis. The labelling requirement will cover primary and secondary packaging (i.e. all packaging that might come into contact with a consumer). To realise the benefits of this measure, and to match the Nordic approach, the labelling system would also need to match with proposals for harmonised labelling on waste and recycling collection infrastructure, so consumers are prompted both on-pack and on-bin.

Figure 7-1: Examples of the Nordic Pictogram System[108]

Selected Nordic pictogram icons for packaging materials, an approach to labelling that can be matched to local recycling provision

Exemptions to the use of the symbols on-pack will be allowed where this requirement would have adverse environmental consequences (e.g. labelling of material composition should not increase overall packaging size,[109] nor the complexity of material composition), with provision of information digitally as a possible alternative in these cases.

Economic operators may wish to provide identical or additional information on packaging or product sustainability digitally even if there are no restrictions imposed by packaging size in any case. This measure would not restrict this, and would therefore be compatible with medium-term trends for greater provision of harmonised sustainability information online. At this stage it is not recommended the Commission specify the form that this digital labelling should take.[110] A fully digital approach is not recommended due to the very direct value of the behavioural "nudge" a visible on-pack label can provide at the precise moment of disposal without the need for additional consumer action, and also concerns over digital access.[111]

Three other cases for exemption to material labelling could be considered during implementation:

- for items also labelled as part of a DRS (with the DRS instruction being the critical consumer prompt);

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[108] Dansk Affaldsforening. 2022. *User Guide: Danish Pictogram System for Waste Sorting Collection Services & Recycling Centres.* Available at: https://danskaffaldsforening.dk/sites/danskaffaldsforening.dk/files/media/document/UserManual-DanishWastePictograms-Jan2022-english.pdf Accessed: 18 March 2022

[109] In this respect, food labelling regulations might be a useful guide to align with e.g. the EU Regulation on Food Information to Consumers 1169/2011

[110] There is a long-term trend towards providing much more sustainability and supply chain information than can be displayed on pack across a wide range of issues areas, and discussions are ongoing about "product passports" at EU level. Even without this, more consistent consumer facing information in digital format seems likely. By not specifying formats for transmitting or presenting digital information in this directive, the measure can be future-proofed to be easily harmonised with future developments for online provision of information.

[111] 92% of households in the EU had internet access in 2021 (Eurostat, *Digital Economy and Society Statistics*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals#Internet_access) but there are differences between Member States and also urban and rural areas. A bigger barrier is likely to be extent of internet use (somewhat lower in the Eurostat data), and familiarity with use of QR codes or similar.

- in items with reuse scheme information (with return to the reuse scheme being the critical consumer prompt); and
- for items whose material type is self-evident and where labelling is challenging (e.g. unlabelled glass bottles).

In the former two cases, it is true that material type information would only relate to a suboptimal disposal choice (though it might still be relevant); the latter case might be covered by the requirement to avoid adverse environmental consequences from a label adding material complexity. These potential exemptions will not materially change the scale of cost estimates presented for this measure, and should be tested directly for consumer-friendliness during formal development of the labelling and symbol system.

Material composition (rather than "recyclability") will be shown, as material composition is universal, and collection options are not. The Waste Framework Directive revision in 2023[112] will take steps towards harmonised collections and can mandate communications and signage that will enable consumers to match material information to local disposal options. Alignment of implementation of this measure and the WFD will be critical to realising desired changes. The extent to which harmonisation of collection occurs may also reduce the range of material labels needed for consumers (e.g. the relative value of specifically labelling "plastic" or labelling "plastic bottles" or labelling "PET", "HDPE" etc), with fewer labels highly desirable from a consumer understanding point of view.

The Waste Framework Directive revision may additionally propose material composition labelling for non-packaging items (a feature of the pictogram system in Denmark), and it will be highly desirable that any product and packaging labelling is aligned. **We therefore propose this measure would require an implementing act, and that this is done in 2024, after the Waste Framework Directive revision, to ensure policy coherence.** Developing the exact design for the labelling will also require the Commission to undertake work with consumers to design and test labelling symbols.

This measure could replace or amend article 8 in the PPWD, depending on decisions on measure Mx.

This is an enabling measure for consumers. It will make it easier for them to do the right thing, in conjunction with other EU, national, and local measures, some of which are expected to be driven by the Waste Framework Directive revision. It is not expected to have a behavioural and thus environmental impact as a standalone measure, and has therefore not been assessed on that basis.

7.1.2 Effectiveness

The effectiveness of this measure is dependent on other measures in this proposal and more widely, especially its alignment with the 2023 revision of the Waste Framework Directive, and resulting steps taken towards harmonised collections, communications and signage which will co-ordinate to produce a choice environment for consumers which supports and encourages widespread consumer participation in sorting of packaging waste and aids correct sorting.

This is an enabling measure for consumers that supports the other labelling measures proposed here. Collectively they will make it easier for consumers to do the right thing, in

[112] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en

conjunction with other EU, national, and local measures, some of which are expected to be driven by the Waste Framework Directive revision. **It is not expected to have a significant behavioural and thus environmental impact as a standalone measure and has therefore not been assessed on that basis.** This measure will support the implementation of all measures under the theme of recyclability, by enabling consumers to match packaging items to local recycling collections.

A simplification of "recyclability" labelling will help address consumer confusion and enable packaging to send clear and consistent signals on the material composition of packaging to prompt consumer behaviour. Harmonisation across the Member States will enable packaging to communicate clear and consistent information, rather than designing packaging that complies with labelling requirements across members states and may therefore contain additional symbols of limited relevance to all consumers. Overall, a positive impact associated with the provision of consistent, transparent information regarding packaging materials and components is anticipated.

To realise the potential benefits from this measure in terms of preserving the single market, it would need to be introduced in conjunction with measure Mk.

7.1.3 Ease of implementation

From a Commission perspective this measure can implemented through the revision of the PPWD, and all the labelling measures adopted should be taken forward via a single implementing act, scheduled for 2024, after completion of the Waste Framework Directive. This will enable alignment with decisions on harmonised collections, and any decisions on wider product (rather than simply packaging) labels concerning material composition or sorting, recycled content, or reuse. This will also mean that Member States, economic operators, and other public authorities responsible for waste and recycling collections only have to make one set of coordinated changes.

Implementation will also involve developing a clear, consistent labelling system for consumers, inclusive of all commonly used packaging materials and that is not confused with other environmental symbols. Thought will need to be given to the integration of this labelling system with the revision of the WFD and measures that may be taken to label non-packaging waste and to provide signposting and communication for a harmonised collections system across the EU.

The effective design and consultation to develop a clear, comprehensive labelling system that has the support of stakeholders is a significant undertaking. At the Member State level implementing a harmonised labelling system may pose specific challenges (including to consumer understanding) where alternative mandatory labelling currently exists.

Another factor that would smooth implementation would be ensuring an appropriate transition period, so that packaging producers and labellers are able to make changes to packaging alongside regular design updates. This is discussed in more detail under economic impacts below.

An appropriately timed and coordinated introduction with other labelling measures adopted, should mean that the challenges of implementation of all labelling measures are minimised for economic operators.

7.1.4 Administrative burden

There will be a one-off **cost to the Commission** of developing a new labelling system (design, testing, and provision of approved symbols and guidance on use). Based on the cost of the Danish

pictogram development, and allowing for the different scale of the task at EU level, this cost might be in the region of €675,000 - €810,000 to cover external development and testing alone[113]. The Commission would also need to manage this process, or might contract a larger proportion of the workload than was the case in Denmark, which would increase costs.

There will also be a one-off impact on **stakeholder time** as part of consultation and development of the system, as their views and expertise will be important.

We do not consider that the ongoing **enforcement burden for Member States** will be greater than for current packaging compliance; indeed it could be less if harmonisation means higher levels of compliance.

There may be one-off **familiarisation costs for economic operators** at the point the publication or resulting national legislation is introduced, but we do not separate this out for this measure alone.

We have classified the costs of introducing new labelling through pack redesign as an economic cost. While information provision is often framed as an administrative cost, the intention here is to help shape consumer behaviour not simply to provide compliance information – i.e. it is the cost of intervention, not the cost of administration, and is covered below.

7.1.5 Economic impacts

The primary potential cost of this measure is the redesign of impacted labels. However**, the proposal for a single implementing act across all labelling measures, carried out after conclusion of the Waste Framework Directive revision, means that cost implication is borne by *all labelling measure*s**. This does not affect costs here, but it does for all subsequent labelling measures. This is a one-off cost.

There will be significant ongoing cost savings if this measure is introduced in conjunction with measure Mk, meaning producers can realise the benefits of regulatory harmonisation. These ongoing savings (discussed under measure Mk) are likely to exceed the one-off costs identified here over time.

We recommend at least two years are allowed for economic producers to change labelling, while three or four years for implementation might be considered more cost-effective. Less than two years risks incurring disproportionate costs as pre-existing packaging (and in extreme cases product that cannot be repackaged) may have to be amended or disposed of. Requiring economic operators to change all labels in a very short period may also unduly overburden their design and packaging teams.

Beyond the minimum requirement, longer transition periods reduce costs by allowing economic operators to incorporate design changes on labels in scheduled redesigns, which are a regular occurrence with or without changing regulation. A Commission working document from 2008 summarised available information and indicated that over a three-year period 80% of companies in the food and drink sector would introduce labelling changes as a normal part of their business

[113] This figure is based on the implementation costs of the Nordic Pictograms System in Denmark, and we have doubled the cost to arrive at this estimate. While the pictogram development covered a wider range of materials, not just packaging, the requirement to create a system that will work in all 27 Member States and commands stakeholder consensus means developing an EU system will pose unique challenges. The estimated costs include fees paid to outside consultants for design, stakeholder consultation and consumer research.

activities[114], though research for this project suggests this is likely to be slower for other sectors.[115]

Costs of transition are based on the number of consumer-facing stock-keeping units (SKUs) in the EU, multiplied by the redesign costs per SKU. A more detailed method is provided as a separate annex, and only a summary is presented here.

There is no central record of SKUs at EU level, however based on data from multiple sources we estimate the figure is likely to be in the region of 51.6 million, albeit with a high level of uncertainty. A range of costs for redesign were obtained from stakeholders and the literature, with the preferred estimate for this analysis towards the lower end of the range (around €1000).[116] As discussed above, many of the labelling changes required will be incorporated in regular labelling updates, an efficiency that can be increased by providing for a longer transition period. Assumptions about savings over time are more pessimistic than previous studies which focused solely on the food and drink sector, where the background redesign rate for packaging is relatively fast compared to some other sectors.

With three years allowed for implementation, and a cautious approach taken to assumed regular labelling redesign frequency, the cost of this measure would be €18.1 billion. The cost burden of this measure for the sector would be spread over the entire implementation period rather than falling in a single year (so €6.0 billion per year for three years). The value of the European retail sector was estimated at €2.6 trillion in 2011,[117] and will have grown since.

Costs could be significantly reduced by allowing four years for transition (cost falls to €10.3 billion in total, equivalent to €2.6 billion per year for four years).

If there are relabelling economies of scale to be gained from changing a large number of labels at the same time, costs for economic operators would fall further. **The lowest estimate obtained for labelling changes for this project were €500 per SKU; if achieved at large scale this could halve the cost estimates above.**

This measure only considers costs linked to changing packaging itself. Costs for consumer communications and alignment of collection systems are assumed to be covered in the Waste Framework Directive revision on harmonised collections, but the additional costs of changes will, as with labelling of packaging, be significantly impacted by the timescales allowed for change. In the case of the Danish pictograms changes to signage on waste and recycling infrastructure was an important cost, but was frequently aligned with planned changes in provision, reducing the additional cost burden. Public communication around the pictograms was aligned with regular pro-recycling communications as local systems changed, and did not therefore represent a net cost.

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[114] Commission. 2008. *IMPACT ASSESSMENT REPORT ON GENERAL FOOD LABELLING ISSUES*. Available at: https://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2008/sec_2008_0092_en.pdf Accessed on: 21 March 2022
ISSUES. Available at: https://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2008/sec_2008_0092_en.pdf Accessed on: 21 March 2022

[115] One trade association interviewed in the course of this research implied the rate might be around 15% change per annum

[116] This low end estimate is in common with Commission. 2008. IMPACT ASSESSMENT REPORT ON GENERAL FOOD LABELLING ISSUES.

[117] Institute of retail management and Said Business School, RETAIL & WHOLESALE: KEY SECTORS FOR THE EUROPEAN ECONOMY, https://www.eurocommerce.eu/media/87967/eurocommerce_study_v2_hd.pdf

7.1.6 Environmental impacts

The benefits resulting from *this measure alone* are likely to be small, and effectively unmeasurable against a background of other policy changes targeting the same results. All should however combine to enable a transition to a world where consistent and accurate consumer sorting of packaging reuse is widespread and normalised.

This measure should contribute to environmental outcomes as follows:

- Clearer information on the material composition of packaging, particularly when aligned with measures to improve labelling consistency and clarity, should facilitate consumer sorting of packaging and lead to positive environmental benefits from additional material being recycled and improved sorting leading to less contamination of recycling streams.
- The labelling requirement may prompt packaging redesign from some producers, who will not want their product perceived as less recyclable[118].
- Interviews and evidence submissions also identified that harmonised labelling could reduce instances of repackaging for different markets and simplify transport between markets, if aligned with measure Mk. In this way, the measure will contribute to prevention of packaging waste.

7.1.7 Social impacts

Greater clarity and consistency in on-pack labelling should contribute to consumer confidence and reinforce pro-environmental citizen messages, and social norms around recycling (see measure description). Higher levels of recycling might have greater social impacts, but this measure supports rather than causes such a transition.

7.1.8 Stakeholder views

Many respondents in the previous PPWD Impact Assessment study (Appendix E - Stakeholder synopsis report) highlighted the need for accurate and harmonised labelling cross the EU. One major retailer highlighted that improved recyclability of packaging only matters if consumers are aware of what can be recycled, a view echoed by several industry associations, one of whom adding that mandatory labelling could help increase collection and sorting. Respondents also raised the point that the efficiency of national and local waste management differs across Member States and that although harmonisation of labelling might increase the efficiency of sorting and collection, recycling may not increase alongside this.

Industry and consumer stakeholders noted the desirability of providing consumers with sorting instructions, and the challenge that this posed with locally available collection and sorting infrastructure differing across the EU. Industry and consumer stakeholders suggested that development of harmonised labelling alongside the harmonisation of sorting and collection across the EU was desirable. Consumer organisations suggested that material composition information should be accompanied by information on separation and sorting and the presence of any recycling disruptors in the packaging (which was also supported by an industry stakeholder in the previous consultation). One environmental NGO stakeholder did not support labelling of material

[118] The Danish Waste Association, who originated the Nordic Pictogram scheme said during interview that this is one of the queries they receive from producers; see also comments from media reports in Sweden (WEKA Industrie Medien, 10/02/2022, *Harmonised Waste Symbols*, https://waste-management-world.com/collection-and-handling/law-and-order-at-the-waste-collection-point/)

composition or harmonisation throughout the EU as they felt it was important for labelling to reflect local sorting and collection infrastructure.

Industry stakeholders also highlighted the need for additional communication efforts around new labelling. Some stakeholders suggested that sorting instructions could be provided alongside EU harmonised collections or through a digital label linking to local instructions. Consumer organisations also raised the issue of composite materials that may not be easily assigned a single material composition, and that different collection and recycling systems have different tolerances for how much of a package must consist of the primary material to be successfully recycled. Digital solutions were mentioned by a number of stakeholders, in regard to providing locally relevant information, and to ensure that all relevant information could be available on smaller packaging.

There was relative stakeholder consensus among industry that suggested that symbols would be preferable to words due the translation requirements. Reliance on written words was not favoured by almost all industry stakeholders for an EU-wide system, some also suggested colour might be problematic (or at least labels would need black and white versions for some packaging).

Stakeholders also requested that any new labelling be subject to consumer testing. Stakeholders were keen industry was actively involved in symbol and labelling development, given their customer experience. It was emphasised by many stakeholders that labels should be minimalist and as simple as possible to reduce the cognitive burden for consumers.

Harmonised labelling was viewed as supportive of the single market, as it reduced the burden on producers designing packaging for multiple markets and addressed the perceived risk of proliferating national standards on packaging among Member States, with the example of Member States that have already mandated packaging requirements that are penalised in other Member States. Overall, stakeholders were concerned that in the absence of a harmonised EU approach there will be more and more unique national approaches, ultimately requiring up to 27 different labelling approaches (see also measure Mk)

Separate packaging requirements in different Member States were also discussed in terms of negative environmental impacts. One stakeholder noted the environmental and economic costs of relabelling packaging and additional shipping costs as products cannot always be directly transported to the desired territory but need to be shipped to a facility for relabelling first (again, greater detail is provided in measure Mk).

7.2 Mk Restrictions on use of particular confusing labels

7.2.1 Description of the measure

A necessary condition for consumers to be able to practice pro-environmental behaviours is that they understand what the correct thing to do is, and how to do it as described for measure M27c-y. Overall there is significant divergence in practice across Member States, with some countries having legislated already on national labelling systems for different aspects of packaging labelling and others considering action.[119] Non-national PRO symbols may also cause confusion for consumers.

[119] The following Member States have introduced or are considering the introduction of specific labelling measures: Bulgaria, mandatory use of alphanumerical codes (as set out in Decision 97/129/EC) within the three arrows mobius loop symbol and requirement to use the 'tidyman' symbol; France, obligation to use the

This measure would reduce confusion for consumers by simplifying information on packaging, to facilitate end of life sorting, recycling, and disposal decisions by the consumer, in conjunction with other consumer-facing labelling measures proposed. **Simplifying packaging labelling removes a potential barrier to action for consumers. However, large scale behaviour change is dependent on other developments** as described for Measure M27c-y, and we thus classify this measure too as a supporting or enabling measure for wider policy changes in terms of consumer behaviour.

As importantly, divergent national labelling requirements can constitute a barrier to the single market, by requiring different packaging (and thus product lines) in different Member States. Not only is there significant divergence in national requirements, but some elements of national requirements are directly contradictory with other Members States. Economic operators need to be informed on and comply with multiple requirements in different markets, imposing costs and disrupting the workings of the single market. This was a primary concern from industry across all the labelling measures. Non-national PRO symbols are not a barrier to the working of the single market in themselves (though they may be relevant to consideration of consumer confusion), but these do constitute a barrier to the single market if they are mandated (or banned) by Member States.

This measure will therefore:

- Restrict the ways in which information on the subjects covered by associated labelling measures in this proposal (material composition and sorting information; reusability; recycled content) can be communicated, to reduce consumer confusion and remove barriers to the internal market. Restrictions in relation to reusability for economic operators (both producers and reuse scheme operators) are proposed to be less restrictive (see also measure M38j[120]). Economic operators could additionally be required to only use approved labelling and symbols covered in this proposal to communicate on these subjects, and not create or use bespoke symbols for this purpose, though they would be free to provide additional detail on-pack or digitally (where this aligned with wider requirements on Green Claims, see below).
- Prevent Member States from mandating their own labelling systems in the areas covered by this proposal, to maintain the integrity of the single market. One exception to this might be the case of DRS labelling for beverage containers. If this measure is selected there is a strong case in advancing this element of the labelling measures rapidly, to prevent further fragmentation of labelling requirements between adoption of the legislation and harmonisation and the introduction of new labelling requirements (measure M27c-y, M38j, M12) via an Implementing Act and transition period. This would both

'Triman' logo and include waste sorting instructions, use of the 'green dot' logo is penalised; Italy, mandatory use of alphanumerical codes (as set out in Decision 97/129/EC), mandatory waste sorting instructions for consumer packaging, though measures suspended until January 2023; Portugal, mandatory use of alphanumerical codes (as set out in Decision 97/129/EC), mandatory waste sorting instructions for consumer packaging including colour of bin, ban on the use of 'tidyman' symbol for recyclable and reusable packaging, though legislation currently paused; Spain, mandatory use of the 'green dot' logo.

[120] Reuse schemes need to communicate additional information on how and where to reuse, and as a nascent sector we wish to encourage, we do not wish to overly constrain their options; however information like this should be functional (i.e. of direct value to the consumer) not regulatory. More detail on considerations is in measure M38j.

reduce prevent fragmentation of the market in the interim, and also avoid repeated shifts in labelling for consumers, which is likely to harm understanding and habit formation.

- Limit packaging EPR schemes and PROs from proposing their own labelling systems in the areas covered by this proposal, to reduce consumer confusion and maintain the integrity of the single market. As EPR schemes for packaging become universal, such labelling has little value. Caution would be needed in the framing of this requirement around DRS and reuse schemes, where bespoke iconography is important to scheme operations and consumer understanding.

These elements may be either incorporated in articles relating to the other labelling measures proposed, or presented as a standalone article in the legislation; this decision will not change the impacts. It is also the case that those other labelling measures help the objective of this measure: increasing consistency in labelling of material composition for example, should reduce the risks other symbols are misinterpreted.

This measure is complementary to wider Commission policy on false and misleading Green Claims. It is focused on reducing "confusion" on specific issue areas over and above the safeguards being put in place elsewhere.

The proposed directive to tackle unfair commercial practices in relation to Green Claims[121] may ban "displaying a sustainability label which is not based on a certification scheme or not established by public authorities". However, this current measure goes further, to account for the fact that some of the confusion arising around packaging is a result of a multiplicity of schemes, some of which are in fact mandated by Member States, and that this divergent approach additionally threatens the single market.

This measure also complements the proposed regulation of Green Claims by the Commission.[122] All the wording related to validating green claims would still apply.[123] This current measure would though additionally constrain the way in which specific claims (on material composition and sorting instructions, reusability, and recycled content) could be communicated in the context of packaging, by restricting the symbols that can be used. Additionally, the proposed Green Claims regulation should reduce confusion resulting from wider environmental labelling or brand and design choices (factors beyond the scope of PPWD). For example, the draft text (article 3, 3i) states:

> *"The wording, imagery and overall product presentation, including the layout, choice of colours, images, pictures, sounds, symbols or labels, shall provide a truthful and accurate representation of the scale of the environmental benefit, and shall not overstate the environmental benefit achieved"*

[121] Directive of the European Parliament and of the Council amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better information and protection against unfair practices

[122] Regulation of the European Parliament and of the Council on substantiation of green claims

[123] E.g. proposed text in Article 3, 3a "*The environmental claims shall be truthful, not contain false information and be presented in a clear, specific, accurate and unambiguous manner*" and 3c "*Where environmental claims are made on the product, on the packaging of products and/or other communication channels which have limited space for specifications, the location of the environmental claim, and supplementary information about the claim, including the link to the information to which the substantiation of the claim is based, shall enable an average consumer or recipient of the information to understand the link between them. In all cases, the link to the substantiation of the claims shall be placed close to the claim itself*" directly target misleading claims, and will also help reduce confusion.

This measure will not restrict the use of labelling beyond the remit of the Packaging and Packaging Waste Directive topics covered by the labelling measures collectively proposed here (e.g. other environmental labelling, or unrelated branding decisions) even if these may confuse some consumers. This is both due to the scope of PPWD, and the parallel development of the Green Claims regulations described above. This lack of restriction would extend to labelling of "composite" environmental labels[124], where packaging is part of the scoring criteria, though again, such initiatives could be held to account on accuracy by other regulation.

Biodegradability, compostability, bioplastics, and labelling for eligibility in national deposit return systems or other reuse schemes, are out of scope of this measure.

This measure was rejected in earlier assessments for PPWD revision (as measure 27d). The reasons for rejection were difficulties of defining "confusing" in general terms and the potential need for ongoing regulatory attention to police new symbols on this basis. It was also felt that provision of consistent labelling, which was taken forward, might naturally reduce the use of unnecessary alternatives over time without additional restriction. The reasons for reconsideration are the evident desirability of simplification from the perspective of both consumers and (especially) economic operators (who face additional operating costs if alternative mandatory labels proliferate across Member States), if the challenges identified in previous assessments can be overcome. This reconsidered measure has therefore focused on a narrower and more specific remit.

7.2.2 Effectiveness

This measure would contribute to preserving the integrity of the single market by removing barriers imposed by national mandatory labelling systems in the areas of PPWD coverage. These barriers are particularly acute in cases where different Member States impose directly contradictory requirements. This will also have significant economic benefits for economic operators.

This is an enabling measure for consumers that supports the other labelling measures proposed here, with a similar rationale to measure M27c-y.

7.2.3 Ease of implementation

It is proposed that all labelling measures in this proposal are taken forward are subject to a single implementing act, scheduled for 2024, after completion of the Waste Framework Directive, as described for measure M27c-y.

However, **for this measure specifically, it would be desirable to restrict the proliferation of national labels in advance of the introduction of harmonised labelling, to prevent further fragmentation of the single market.** This might have specific implications for Member States that have or are developing divergent requirements already.

The scope of this measure has been kept relatively narrow, to avoid ambiguity and interpretation challenges in implementation.

[124] E.g., see Foundation Earth, which is piloting integrated sustainability metrics in conjunction with a number of large producers: https://www.foundation-earth.org/pilot-launch/

7.2.4 Administrative burden

If this measure is introduced alongside other labelling measures, the additional costs of this measure alone would be minimal, with all packaging being redesigned over the course of the transition period for M27c-y in any case.

Enforcement costs for Member States would be minimally affected, in line with measure M27c-y.

There are no design or development costs for the Commission for this measure.

Economic operators may see significant savings from the removal of divergent national requirements. All stakeholders spoken to in this research believe long term savings from avoiding divergent regulatory requirements across the EU will outweigh the costs of new labelling discussed in M27c-y. This implies savings greater than €18 billion over time if the higher cost estimate for measure M27c-y is used as a reference. Example costs[125] of a non-harmonized approach include:

- **Labelling changes to meet divergent market requirements**; labelling costs per SKU will be comparable to those in M27c-y at SKU level, but could be repeated across multiple Member States, on less efficient and conflicting timelines. This could easily meet and would very likely exceed the costs of measure M27c-y if all Member States acted independently on labelling measures between now and 2030.
- **More complex stock control and management to ensure otherwise identical packaging is legally compliant for the end market**. This would be most common in non-food sectors, where distribution is more centralised, and national product lines are rarer. Costs can include placing specific stickers on to products manually to ensure compliance in diverse destination markets (with costs of €1–€2 for smaller items and as much as €5 for larger items)[126]. A single (non-food) company with around 1,000 SKUs in total estimated compliance with one Member State's unique requirements via the use of market-specific stickers would cost them around €1.5 million per year. Challenges were felt to be particularly acute for items despatched via third party retailers.
- Contracting legal support to remain informed of compliance requirements across all Member States, and the risk of large enforcement penalties if mistakes are made
- **There is an opportunity cost to packaging experts** focusing on divergent labelling requirements and compliance, rather than more strategic challenges around sustainability.

7.2.5 Economic impacts

Most of the benefits of this measure have been identified as administrative savings as above.

There will also be a significant but unquantified benefit from the smoother functioning of the single market.

Some specific economic operators may be adversely affected if elements of their business model depend directly or indirectly on activity that makes use of labels that would now be restricted. However, several symbols that might be affected are free-to-use (e.g. Mobius loop, Tidyman) and thus no one loses out if they are impacted. EPR schemes using symbols may have commercial IP

[125] These examples come from stakeholder interviews and email communications. Firms were reluctant or unable to give overall costs in many cases

[126] Interviews and evidence submissions from non-food producers

invested in specific symbols (e.g. Greendot),[127] likewise economic operators using symbols as part of their business model might be impacted by this legislation if applied broadly (e.g. Terracycle).[128]

7.2.6 Environmental impacts

Consumer behavioural benefits from this measure alone will be minimal, and as described in measure M27c-y.

Greater efficiency in labelling and logistics resulting from smoother functioning of the single market may also provide some marginal benefits but these are not quantifiable.[129]

7.2.7 Social impacts

Social benefits will be similar to those discussed in measure M27c-y.

7.2.8 Stakeholder views

There is extremely broad support for both harmonisation and the elimination of confusing labels.[130] All industry representativeness consulted would prefer to accept the one-off costs of harmonisation than to pay ongoing and potentially increasing costs resulting from regulatory divergence. These stakeholders were keen to see fragmentation ended as soon as possible due to the costs incurred (summarised in the administrative costs section above), and the risk of further divergence if additional Member States choose to act unilaterally.

During stakeholder interviews for this measure, and as email correspondence, there was very little divergence in views. Non-food and drink sectors were even more concerned by the status quo as longer product shelf lives, greater prevalence of cross-border sales, distribution and reliance on third party distributors, and slower label replacement cycles, all make it harder to respond to divergent national changes.

Stakeholders were also keen to see strong alignment between PPWD, the revision of the Waste Framework Directive, and other legislation of relevance including Green Claims and REACH.

Stakeholders emphasised the importance of simplicity for consumers and the potential for more complex information to be provided digitally if wanted. Stakeholders were keen legislation was future-proofed for longer term trends such as digital product passports.

Consumer orientated stakeholder groups supported limiting packaging labels that made misleading claims. Examples of this included labels that only communicated compliance with legal obligations, general claims such as 'climate friendly' and confusing symbols such as the 'green dot' which were

[127] The Greendot logo demonstrates an EPR fee has been paid; however it does not represent that a product is recyclable, and is potentially set to become subject to directly contradictory legislation between members states (it is mandatory in Spain, and potentially will be banned in France). Stakeholders in the packaging industry are neutral on Greendot, but do not want a world on opposed regulation, which imposes a cost burden.

[128] Terracycle collect hard-to-recycle items, but also have a logo that can be used to communicate support for the scheme on packaging.

[129] Several stakeholders confirmed in consultation or via evidence submission specific examples of process changes, but these are not quantifiable.

[130] Industry Position Paper, December 2021, *Establishing an EU harmonised system to provide consumers with understandable and clear sorting instructions for packaging waste*

felt to give a false impression of recyclability. One stakeholder held the view that enforced minimum environmental standards for packaging would reduce the burden of evaluating environmental claims from the consumer.

7.3 M38j "Labelling criteria for Recycled Content": Harmonised labelling of recycled content (voluntary scheme)

7.3.1 Description of the measure

This measure will **prevent Member States setting unique national labelling requirements**, and so preserve the integrity of the single market. Standardising provision of this information may additionally inform consumer purchasing preferences, or encourage competition between economic operators against this sustainability metric, if demonstrating "recycled content" provides them with a marketing or reputational advantage.

ISO14021[131] does set a standard for recycled content claims and presentation, though it is notable this includes use of the Mobius symbol, which is also sometimes cited as confusing for consumers (see measure Mk). However this should be considered, as should EU standards on recycled content in other PPWD measures, in designing the final labelling symbol for this measure.

Whether to communicate recycled content on packaging would be a choice for the economic operator, but **if economic operators choose to communicate this information, then they must use the standardised symbol, rather than producing their own**. This would not restrict providing additional detail on-pack, or online. This measure would be compatible with medium-term trends for greater provision of harmonised sustainability information online.

The considerations around the design of this symbol on pack are similar to those for measure M27c-y. Formal exemptions may be redundant (as this symbol is voluntary) but it would still be appropriate to mandate against unwanted consequences from labelling (e.g. growth in package size or material complexity that hinders recyclability).

Developing the exact design for the labelling will also require the Commission to undertake work with consumers to design and test precise labelling symbols. **We recommend that the timeline for this measure is aligned with the implementing act required for measure M27c-y, and thus scheduled for 2024.** This will also ensure development work can test that material composition and recycled content labels do not confuse consumers when placed together on pack.

This is not a certification scheme *for* recycled content, it is regulating how recycled content claims can be shared with consumers, and that is the basis of impact assessment for this measure (certification schemes do not *require* consumer communication to work, so this reflects the additionality requirement of this measure alone). However, economic operators will find it easier if this aligns with any certification, or distinct reporting requirements (e.g. Greece has set a higher recycled content target for 2030 than the EU as a whole). Facilitating this alignment could be considered further as part of implementation.

As a voluntary label, costs for economic operators would only be incurred where existing labels must have symbols removed, as we anticipate economic operators will only choose the new symbols if they believe it is worth it. **However, we note that economic operators are keen to**

[131] ISO14021:2016, https://www.iso.org/obp/ui#iso:std:iso:14021:ed-2:v1:en

see this measure aligned with measure Mk, to avoid fragmentation of the market in relation to how recycled content is labelled.

Labelling recycled content was considered in previous impact assessments (as measure 38) but was not progressed at that time. Reasons for not progressing it were primarily concerns about applicability across multiple sectors, a desire not to overburden packaging and consumers with labels, and the risk recycled content and recyclability may always be potentially confused by consumers, no matter how well designed different symbols are. The reason for reconsideration is that there is high producer demand in some sectors, and it is possible multiple industry or national schemes evolve in the absence of a harmonised approach. It is presented as a voluntary measure for economic operators on this occasion.

7.3.2 Effectiveness

This label does not serve a purpose at point of disposal. However, some economic actors wish to present this information (specifically drinks producers using plastic bottles), and clearly believe it may influence purchase behaviour. There is also a possibility Member States might wish to legislate in future, and so **a harmonised EU approach would minimise any confusion for consumers or fragmentation of the single market**. Effectiveness in preserving the single market would rely on alignment with measure Mk.

There is a risk that recycled content symbols may confuse consumers in relation to recyclability, and this would need careful testing during any label development.

7.3.3 Ease of implementation

This measure would be dependent on clear recycled content standards being defined, to ensure that the symbol was not misused.

It is proposed that all labelling measures in this proposal are taken forward are subject to a single implementing act, scheduled for 2024, after completion of the Waste Framework Directive, as described in measure M27c-y.

This alignment should mean that the *additional* challenges of implementation of this measure specifically are minimal for economic operators, but does not reduce the challenge of developing a clear, consistent system for consumers that is not confused with other environmental symbols.

7.3.4 Administrative burden

If this measure is introduced alongside other labelling measures, the additional costs of this measure alone would be minimal, with all packaging being redesigned over the course of the transition period for M27c-y in any case.

Enforcement costs for Member States would be minimally affected, in line with measure M27c-y.

There could be some small increased costs for the Commission compared to progressing measure M27c-y alone. This measure may make relabelling requirements overall marginally more complex to develop and test than measure M27c-y alone, but if delivered together, the additional cost burden might be an additional 5-10% on the costs for developing and testing symbols for M27c-y.

Information provision on labels is treated as an economic cost for similar reasons to measure M27c-y.

7.3.5 Economic impacts

The primary potential cost of this measure is the redesign of impacted labels. However, the proposal for a single implementing act across all labelling measures, carried out after conclusion of the Waste Framework Directive revision means **that cost implication of *this measure alone* should be extremely small**. This cost is also a one-off.

Additionally, as a voluntary measure, actors who thought it was not beneficial could choose not to act, and it is likely changes to include any symbol would be made as part of natural labelling change cycles as a result, in contrast to measure M27c-y, which would have an external deadline.

The cost benefits from greater market harmonisation from restricting nationally mandated alternatives are discussed under measure Mk, but might be relevant here if parts of that measure are incorporated.

7.3.6 Environmental impacts

This measure does not have an impact on recycling or disposal behaviour. It may have a marginal impact on purchase behaviour. Otherwise the considerations of impact are similar to measures M27c-y and Mk, and this should be seen as e measure enabling wider change rather than generating change directly.

7.3.7 Social impacts

Considerations are similar to those for M27c-y and Mk. In terms of consumer signalling, showing recycled content may aid consumer understanding of the circular economy and help show that material collected for recycling does in fact get recycled.

7.3.8 Stakeholder views

Most packaging industry stakeholders spoken to were more concerned about divergent labelling than a need for a recycled content label in interviews conducted for this study, but are supportive of a harmonised recycled content label if it supports this end.

The main stakeholder group specifically in favour of the recycled content label is users of PET and plastic packaging (particularly in the drinks industry) who wish to demonstrate environmental credentials and potentially compete on the levels of recycled content in their packaging. They believe this information is of interest to at least some of their consumers. For this group of stakeholders, the ability to show the proportion of recycled content is very important.

Some stakeholders were keen that alignment with ISO14021 was carefully considered, and there was also a desire for clear alignment with the Green Claims regulations, and recycled content standards in PPWD.

Some stakeholders in industry expressed concern recycled content symbols could be easily confused with recyclability symbols, and cause consumer confusion. Designing effective symbols will be very challenging in their view.

Consumer orientated stakeholders supported harmonisation of labelling for recycled content, if a clear and consistent methodology were used to calculate levels of content, with some stakeholders suggesting that third party certification would be required for the label to be credible. This was seen as combatting ‘greenwashing’ or ambiguous claims regarding the amount of recycled content. Groups also suggested that labels should only indicate recycled content when this was in excess of

the legal requirement for recycled content or, where no legal requirement exists, the recycled content exceeds the average amount of recycled material in that packaging type. One group emphasised that consumer pressure was not sufficient to drive increases in recycled content, and mandatory targets were also required.

7.4 M12u "labelling criteria for reusable packaging": Harmonised labelling of reusable packaging (mandatory scheme)

7.4.1 Description of the measure

A necessary condition for consumers to be able to practice pro-environmental behaviours is that they understand what the correct thing to do is, and how to do it. Clear and consistent information provision is one way in which this can be facilitated, and is also frequently identified as a barrier.[132] Reuse is mentioned but labelling for reuse is not addressed in detail in articles 8 and 13 of the PPWD currently, beyond the high level expectations to communicate to consumers in article 13. Labelling for reuse would probably be best aligned with other labelling measures via amendments to either or both of these articles (though it could also be an addition to article 5, which is specifically on reuse).

There are some consumer-facing reuse labelling options used in Europe already but no universal scheme. A trademark-protected sign for reusable packaging and a certification process was developed in Germany and is used in the beverage sector, and recently was approved for use on other reusable packaging in the FMCG sector, as well as outside Germany – in Austria and France. In response to the French Anti-Waste Law (AGEC, Article 17), labelling for reusables is being developed in France in conjunction with Citeo, a PRO. National DRS schemes for refillable bottles may also have specific symbols.

This measure will support consumers to choose to reuse at end-of-use. Consumers need two pieces of information to reuse packaging. They need to know it is potentially reusable (which is unlikely to be their behavioural default currently), and they need to know what to do to ensure that happens. The latter may be complex to communicate on pack, or to standardise across both packaging types and the EU as a whole.

The greatest value of a reuse label or symbol is expected to be for packaging that is part of a formal return for reuse system, rather than packaging consumers might choose to reuse for themselves at home, and that is the basis of this assessment.

Economic operators are keen to see this measure aligned with measure Mk, to avoid fragmentation of the market in relation to how reusability is labelled.

The key features of this measure are:

- Provides for an EU-wide visible-on-pack symbol suitable for consumer-facing packaging, identifying that an item can and should be returned to the retailer or producer for reuse, as a direct prompt to the consumer at the end-of-use stage. This narrow definition of reusability – i.e. to match to packaging takeback schemes only – will need careful

[132] UN Environment Programme 2020, https://consumersinternational.org/media/352255/canirecyclethis-finalreport.pdf

definition in the legislation. This link to a formal producer take-back scheme safeguards this measure against misuse to some extent: the producer will have to deal with the returned packaging, and so have a clear interest in ensuring it is truly reusable. This will also clearly show that items were returned and reused, rather than relying on assumptions about subsequent personal consumer reuse behaviour.

- All packaging being presented to the consumer as reusable via a reusable packaging takeback scheme would need to display this symbol. There is a risk that this may complicate life for economic operators seeking to adopt new reuse models, or running successful established schemes, as they will have to adhere to an additional labelling requirement that single use operators do not, regardless of how well their reusable packaging model is already working or understood by their customers. With some exceptions (e.g. DRS for reusable beverage bottles in a number of Member States) the reuse market is very small and often localised, and experimentation is still needed in optimising system approaches. Labelling requirements should seek to mitigate this with features like: long transition periods; exemptions for legacy packaging that is still in (re)use; and de minimis thresholds or similar for smaller more experimental takeback systems, especially at local level.
- Additional detail on how and where to return containers for reuse could be provided on-pack, or digitally, at the discretion of the economic operator. As reuse becomes more widespread, it is likely digital information will increasingly be preferred as it can be more easily tailored to multiple national or local contexts. This measure does not restrict economic operators from providing additional information or symbols specific to their unique return arrangements within a reuse system for specific packaging, either on-pack or digitally, as these may be key to making such a system work at a variety of geographic scales. It is important not to disrupt existing reuse schemes, or stifle innovation in a sector that needs to grow rapidly to meet wider policy objectives.
- **This measure would still specifically restrict Member States from mandating their own labelling systems for reuse** with the exception of national reuse systems where the information is required to make the system work e.g. labelling containers in a national DRS for refillable containers. It would however be possible to frame the requirement so that Member States still do not have this power, with the scheme administrator for the reuse system holding this discretion as an economic operator.

The consumer does not *need* to know the number of times a piece of packaging is or should be reused, and the standardised symbol does not therefore need to communicate this, to retain simplicity. Such information might be valuable to prove packaging was genuinely and beneficially reusable, but consumers only need confidence this is the case to be encouraged to do the right thing. Additional numbers (e.g. average number of reuses), which may not be directly comparable across different product classes, are unlikely to be of general consumer interest and will not inform choices at end-of-first use (though they might at purchase point). In the worst case they could be directly confusing.[133]

This is not a certification scheme for reusability, it is specifying how reuse information can be shared with consumers, a similar distinction to measure M38j. It will however need to align with definitions for reusability elsewhere in the PPWD.

[133] From a behaviour change point of view, optimising the information for consumers to leverage behavioural outcomes should be the key design driver, a view shared by some stakeholders. Several interviewees emphasised that value to the consumer should be the test for inclusion or exclusion of information directly on the packaging label, with additional information optional and/or provided digitally.

The considerations around the design of this symbol on-pack are similar to those for measure M27c-y.

We recommend timelines for testing and development are aligned with measure M27c-y to maximise efficiency and compatibility.

As with measure M38j, a key interest for economic operators in this measure is alignment with Mk, and preserving the integrity of the single market by preventing divergence in mandatory labelling requirements.

7.4.2 Effectiveness

This is an enabling measure for consumers, similarly to measure M27c-y.

There are unlikely to be significant behavioural improvements from an EU-wide reuse label in the absence of other measures. As reusable packaging is not currently the norm, and as the label is voluntary, consumer exposure to the label will be relatively low at first (in sharp contrast to symbols related to measure M27c-y in particular). The most widespread reusable packaging schemes in the EU currently are DRS for refillable bottles in specific Member States. A new reuse symbol would gain exposure in these contexts, but as these schemes typically perform very highly already, it would be unlikely this symbol improved performance significantly.

However, reusable packaging is intended to grow significantly by 2030. As schemes multiply, the case for a common symbol indicating reuse is the preferred end-of-first-use choice (rather than disposal), over and above the specific symbols and information for a given reuse scheme, may become much more important in facilitating consumer behaviour and understanding. There is also a case for establishing a symbol now, to both ensure compatibility with other labelling changes proposed, and to prevent divergence in national requirements as reuse grows in popularity.

As a mandatory, rather than voluntary, measure this proposal could add a barrier to new reusable packaging pilots, local initiatives, and experimentation that single use packaging does not face, and for a packaging type where innovation is still frequently required. High-performing reuse schemes may be concerned new symbols could disrupt established consumer habits.[134]

7.4.3 Ease of implementation

This measure would be dependent on clear reusability standards being defined, to ensure that the symbol was not misused.

Considerations on timing and design compatibility are largely the same as for measures M27c-y and M38j.

The transition period will need to be significantly longer than for other measures. This would matter less for a voluntary measure, but exemptions to a mandatory rule for legacy packaging is highly desirable. It might even make sense to allow for indefinite reuse of reusable packaging produced pre-implementation, as removing it from circulation prematurely would be illogical.

There may also be specific issues in gaining high levels of familiarity for this symbol with consumers, as it is likely to be relatively rarely used initially, simply because reusable packaging is relatively rare.

[134] Interview with drinks producer in a Member State with a DRS scheme for reusable glass bottles.

7.4.4 Administrative burden

If this measure is introduced alongside other labelling measures, notably measure M27c-y, the additional costs of this measure alone would be minimal, as previously described for measure M38j. Currently reusable packaging is also a very small part of the overall packaging market.

However, it should be noted this measure imposes a marginal burden on reusable packaging economic operators that their single-use counterparts do not have. Given the desire to encourage innovation and growth in reusable packaging, some de-minimis style flexibility should therefore be considered.

As with measure M38j, this measure would add to the overall complexity of developing and testing labelling and symbols across the labelling measures in PPWD, and the additional cost burden might be an additional 5-10% on the costs for developing and testing symbols for M27c-y alone (this would also be additional to the cost increase implied by measure M38j).This measure would be dependent on clear reusability standards being defined, to ensure that the symbol was not misused.

7.4.5 Economic impacts

As with measure M38j, this measure should add very little in costs to economic operators for labelling alone if delivered in conjunction with measure M27c-y. Additionally relatively little current packaging is in scope for a reuse label, even if economic operators choose to use it immediately, while any new reusable packaging could incorporate the label from the start.

To the extent that the symbol facilitates more reuse behaviour – and thus the efficiency and effectiveness of reuse systems overall – it would have a positive benefit to economic operators. However, this is entirely dependent on the extent of take-up of reusable packaging solutions in future. Current schemes are either very small, or very high performing already.

It is critical this measure does not disrupt practice for existing reuse schemes, or restrict innovation in an area that needs to grow rapidly. This risk will need careful consideration if adopted as a mandatory rather than voluntary scheme, and mitigations are proposed in the measure description.

7.4.6 Environmental impacts

Ultimately clearer information on reuse should result in fewer cognitive and behavioural barriers to pro-environmental behaviours, with positive behavioural (and thus environmental) benefits arising from greater reuse.

However, the benefits resulting from *this measure alone* are likely to be very small until we see widespread adoption of reusable packaging, and high levels of consumer awareness of the label.

It is essential that this measure aligns with wider measures in PPWD to encourage the introduction and testing of reusable packaging systems overall.

7.4.7 Social impacts

The primary benefit would be from the contribution to the wider effort to normalise reuse, reinforcing pro-environmental citizen messages, and social norms around recycling. Widespread

adoption of reusable packaging might have greater impacts, but this measure supports rather than causes such a transition.

7.4.8 Stakeholder views

Stakeholders spoken to were more concerned about preventing the multiplication of divergent national requirements on reuse labelling (with associated barriers to the smooth functioning of the single market) than they are about creating a harmonised standard for reuse. The former is a feature of measure Mk. However, defining an EU label was acknowledged as one way to bypass the perceived need or desire for fragmentation in reuse labelling at the level of national legislation.

Several interviewees stressed the limited nature of reuse provision to date and were keen that this measure did not confuse or complicate existing reuse schemes unnecessarily. In particular, one interviewee (a Danish drinks producer) was concerned that changing labels on the existing DRS for refillables was undesirable, given the very high levels of performance and engrained pro-environmental habits already seen. Similarly, some stakeholders in the packaging industry were keen not to restrict innovation in a sector that needs to grow, and where the best systemic solutions may not yet be known, and emphasised restrictive rules for economic operators should be avoided.

One stakeholder group emphasised the need to define the scope of this measure in relation to sectors and product types very carefully: they sell products (power tools) where the case is an integral part of the product offer and is expected to be reused by the customer for the lifetime of the product in many cases; they did not believe that items like that should be captured by this measure.

Two consumer-oriented groups stated that a reuse label should be reserved for packaging where an industrial reuse system supported by a DRS system exists that can be accessed by the consumer. It was also suggested that applying reuse labelling to packaging outside of DRS systems could confuse or discourage consumers from reusing this packaging. Concerns were also raised that the development of a label system should take care not to negatively impact local and small-scale reuse systems that already exist. A consumer-oriented group suggested that all single use packaging should be clearly labelled as single use. There was also concern that too open a definition of what constituted reusable packaging could lead to companies exploiting loopholes. The example offered was of describing single use items, or items with no take-back provision from the producer, as reusable simply because a consumer might be able to reuse it for another purpose themselves.

Consumer-oriented groups had mixed views on the likely impacts of labelling reuse. One group emphasised labelling alone was insufficient, and regulation was necessary to increase consumer packaging reuse. In contrast another suggested that reducing greenwashing and ensuring clearly visible labelling of single use and reusable packaging could increase the market share of reusable packaging as consumers choose the more sustainable option.

Views also diverged on the value of providing consumers with additional performance information (such as the number of reuses an item can serve). One consumer-oriented group took the view that this was useful information for the consumer, whereas another thought this could be confusing as it is not readily comparable across packaging, and environmental impacts. It was further suggested that this is outside of the individual consumer's control and that it may even encourage them to retire an item of reusable packaging earlier than it other would have been. The value of digital provision of information was acknowledged, but concerns were also raised about

accessibility for all, and whether consumers would be willing to take additional steps to get this information.

7.5 Mx "Update of current material-based labelling": Removal of alphanumeric codes for waste sorters

7.5.1 Description of the measure

Article 8 of Directive 94/62/EC on packaging and packaging waste **provides a marking system for packaging and an identification system for packaging materials**. Article 8 (2) of this Directive provides that "[...] packaging shall indicate [...] the nature of the packaging material(s) used on the basis of Commission Decision 97/129/EC". The material identification system pursuant to Article 8 paragraph 2 of Directive 94/62/EC has a fully harmonizing nature.

The identification system itself is established in Commission Decision 97/129/EC and contains numbers and abbreviations. **Article 3 stipulates that the use of the numbering and abbreviations of the identification system shall be voluntary for the packaging materials mentioned**. It is further stipulated that "a decision whether to introduce on a binding basis the identification system for any material or materials may be adopted in accordance with the procedure laid down in Article 21 of Directive 94/ 62/ EC", but no such decision has been made at EU level.

However, in recent years some EU Member States have included in their **national legislation an obligation to use the EU packaging material symbols**, which is not in line with the PPWD[135].

A common EU approach to packaging waste labelling is needed to **avoid confusion among consumers and to enhance the internal market**. This measure would consist of changes to the existing PPWD requirements, in support of the changes proposed in measures M27c-y, Mk, M38j, and M12.

Two distinct elements are considered as part of this measure:

1. **Removal of the current alphanumeric labelling system**

There is no evidence alphanumeric coding was ever significantly used by consumers and measure M27c-y will make such coding wholly redundant from a consumer perspective in any case. Alphanumeric coding also has limited use to the waste management industry for sorting purposes, with the vast majority of material now sorted using automated optical processes that do not require packaging labelling. Where manual sorting is still used, it is done by visual recognition of the material via physical characteristics other than use of alphanumeric labelling. **There is therefore no evidence alphanumeric coding will serve a useful purpose in the revised PPWD.**

Alphanumeric categorisation of material may still have uses,[136] as it does provide a common way to categorise material types. Example use cases may include classification of material as part of management of waste and recycling operations, or use in some manufacturing applications. It has

[135] *REFIT Platform Opinion on the EU Packaging material by a Member of the Stakeholder Group (Mr Loosen),* 19/03/2018

[136] For this project we spoke directly to manual sorting operations in Greece, and also received an evidence submission in relation to use in manufacturing. A project team member has past experience using the system for citizen education.

also been used at times for more intensive forms of citizen engagement around material types and uses, including recycling education (including young people in schools, community groups). However, **none of these identified use cases of alphanumeric codes benefit from these codes being used as a labelling system on individual packaging items.**

Commission Decision 97/129/EC, Article 3 makes use of alphanumeric labelling voluntary in any case, but the trend to incorrectly incorporate it as mandatory in national legislation is creating problems for packaging labelling in the single market (see measure Mk).

This measure would therefore significantly amend the current article 8 (perhaps by introducing text related to the other labelling measures) and remove the associated Annex I – Annex VII from the Commission Decision 97/129/EC so that alphanumeric labelling was neither mandated nor encouraged. Under the assumption that producers and waste sorters, do not use alphanumeric labelling, Article 8 of Directive 94/62/EC and Commission Decision 97/129/EC, should be revised accordingly.

Measure Mk on controlling confusing labels would additionally remove the option for national legislation to mandate alphanumeric labelling, and might additionally constrain economic operators from choosing to continue to use alphanumeric labelling voluntarily also. To minimise disruption, any requirement to remove alphanumeric labels from packaging should be aligned with the introduction of measure M27c-y.

There still be merit in the Commission retaining the alphanumeric codes as common guidance to support use cases beyond the remit of PPWD.

2. **Mandating future packaging labelling requirements to facilitate smarter sorting in the waste management industry**

There are now better ways to sort waste and recycling within the waste management industry than can be provided by visual codes or labels. Requirements to improve sorting further (to reduce contamination, improve quality, or to facilitate differentiation of different sector or producer contributions to a material stream) will not rely on human-readable labelling changes.

In the medium-term there is likely to be a requirement to use labelling to facilitate and harmonise the next generation of sorting technologies at EU level. At least two labelling technologies (digital watermarking[137] and serialisation[138]) have demonstrated technical viability, but not yet their ability to deliver at scale, or the likely costs of doing so. Other alternative future sorting technologies, such as use of artificial intelligence in sorting[139] are also considered potentially viable.

However, the potential roles of these technologies within the wider system remains unclear at this time. The nature of harmonised collection systems proposed under the Waste Framework Directive revision, and the level of material or even economic operator specific cost granularity desired under EPR schemes, will be key factors in determining the costs and benefits of this much wider labelling and technological shift, which may also have implications for the costs of EPR schemes in turn. By 2025 there is likely to be a need to harmonise sorter-facing labelling

[137] See https://www.digitalwatermarks.eu/

[138] World Economic Forum, 2019, *Here's how digitization can boost recycling rates,* https://www.weforum.org/agenda/2019/01/here-s-how-digitization-can-boost-recycling-rates/

[139] European Commission, 05/03/2021, *Zenrobotics: applying artificial intelligence to waste sorting,* https://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/zenrobotics-applying-artificial-intelligence-waste-sorting_en

requirements for packaging, but it is too early to specify what the best solution would look like, or what it would cost.

We therefore **recommend that the Commission integrates consideration of this question into the Waste Framework Directive**, targeting 2025 as the point by which to have determined the detailed requirements for harmonised smart sorting across the EU, including any label requirements, to support long term strategic objectives for both WFD and PPWD. Only part one of this measure is assessed in detail for the remainder of this measure.

7.5.2 Effectiveness

Most consumers are unlikely to be influenced by removal of the current alphanumeric labelling system at point of purchase. In addition, sorters, even during extensive manual sorting, do not find any use or added value of the alphanumerical labelling system.

Removing references to the alphanumeric codes will have no ill effects, and would allow article 8 to be revised to reflect measure M27c-y.

Some economic operators do present this information on labelling, and some Member States have already identified in their national legislation an obligation to use the existing alphanumeric codes. There are challenges posed to the operation of the single market by Member State practice in this regard. There is less harm in economic operators using these codes on packaging (though they may add to consumer confusion). Both Member State and economic operator use of these codes could be controlled by the adoption of measure Mk.

7.5.3 Ease of implementation

In relation removal of alphanumeric labelling:

- It is proposed that all labelling measures in this proposal are taken forward are subject to a single implementing act, scheduled for 2024, after completion of the Waste Framework Directive, as described for measure M27c-y.
- In common with measure Mk, the change proposed here is a removal not an addition, but may cause specific issues for Member States that have mandated the system. Additionally, while other labelling measures are focused heavily on consumer-facing packaging, it would be necessary to ensure that changes cover business-to-business tertiary packaging too (an explicit feature of Italian Legislative Decree No. 116/2020 mandating use of alphanumeric codes)
- Unintended impacts on non-labelling applications of the alphanumeric code could be avoided by continuing to provide the classification as guidance for other applications.

7.5.4 Administrative burden

If this measure is introduced alongside other labelling measures, the additional costs of this measure alone would be minimal, with all packaging being redesigned over the course of the transition period for M27c-y in any case.

Enforcement costs for Member States would be minimally affected, in line with measure M27c-y.

There are no design or development costs for the Commission for this measure.

There might be significant cost savings to economic operators if this measure is introduced in conjunction with measure Mk. These impacts are discussed under that measure.

7.5.5 Economic impacts

There are no additional costs or benefits identified relative to measure M27c-y and Mk, though the inclusion of tertiary packaging might extend the scope of redesign requirements relative to measure M27c-y in markets where alphanumeric is currently required and might in future be banned.

7.5.6 Environmental impacts

There are no additional costs or benefits identified relative to measure M27c-y and Mk.

7.5.7 Social impacts

There are no social impacts identified, given the lack of evidence of current use for this coding system.

7.5.8 Stakeholder views

A key objective in relation to this measure was exploring if use cases for alphanumeric labelling identified in earlier PPWD consultations (specifically the potential use by manual waste sorting operations) were in fact reasons to retain the system.

Following a series of questions raised with key stakeholders, including sorters , it became evident, that even during extensive manual sorting (the case of Greece), alphanumeric labelling, does not add value to the work they carry out (i.e. speed or identification to place within the right container in the MRF). Alphanumeric labelling is included during the waste sorters training for the identification of material, however if it was to be removed (and provided it was replaced by material component labelling), it would make minimal difference to manual sorters.

According to other stakeholders, the alphanumerical labelling system is sometimes also in production processes, for example for marking cavities in injection moulding. (The mould maker indicates the material the mould is designed for in the cavity, so it can be checked before using).

Overall, the removal of alphanumerical labelling was viewed as supportive of the single market by stakeholders, as it helps reduce the perceived risk of proliferating national standards on packaging among Member States, in line with comments on other labelling measures (especially Mk).

7.6 Labelling Change Costs Analysis

7.6.1 Total number of labels/stock-keeping units (SKUs) in the EU

As a starting point, the total number of stock-keeping units (SKUs) subject to this measure had to be estimated. Unfortunately, there is no central record of SKUs in the EU, and there were limited available data from the stakeholder engagement and the research conducted.

In a previous Impact Assessment report relating to food labels,[140] the total number of SKUs for the food industry in the EU-27 was estimated at about 26,894,250 SKUs in 2008, an estimate reached

[140] European Commission, 2008, *Working Document: Impact Assessment Report on Nutrition Labelling Issues* https://ec.europa.eu/food/system/files/2016-10/labelling_legislation_nutrition-labelling_ia_en.pdf

by combining data on the food and drink business population and data on SKUs per business unit (with division into four types of companies distinguished with respect to the employment size).

This early estimate was updated by controlling for sector growth based on the 2021 Food Drink Europe (FDE) report,[141] and changes in EU membership since 2008. The total number of SKUs for the food industry in the EU-27 was therefore estimated at about 25,128,550 SKUs (in 2018). This is slightly lower that the respective 2008 figure, which is explained by the fact that UK is not included in the EU figures. Stakeholder interviews suggested that assuming growth in SKU numbers in line with sector growth was a valid approach, but there are clearly uncertainties associated with it.

This was then scaled to the wider market, with an assumption made that SKU numbers for retail activity were normalised to sector turnover. A near doubling in SKUs was therefore expected based on UK food and non-food retail spend (after excluding automotive fuel).[142] Comparable data for the EU was not directly obtainable, but we have seen indications that support the case that food and non-food retail splits by value are relatively equal beyond the UK alone.

However, in the absence of direct EU data on the retail split, an alternative approach was pursued, and as a result it is estimated that the share of food and drink retailing turnover in the EU accounts for about 49% out of the EU retail market. This is calculated based on the turnover shares of each sector in the EU manufacturing industry (table below)[143] after excluding the automotive, machinery and equipment, chemicals, and fabricated metal products sectors (which are not primarily creating consumer-facing packaging). The "other" sector was then divided further to separate an assumed retail and wholesale split[144] leaving around 30% of this category by value. Consequently, the total number of SKUs in the EU was approximately estimated as 51,681,321 SKUs.

Table 7-1 Turnover in the EU manufacturing industry

	2018
Food and drink industry	14.4%
Machinery and equipment	9.1%
Chemicals	7.8%
Fabricated metal products	6.6%
Others	47.9%

Source: 2021 Food Drink Europe (FDE) report

[141] Food Drink Europe, *Data and Trends 2021*, https://www.fooddrinkeurope.eu/wp-content/uploads/2021/11/FoodDrinkEurope-Data-Trends-2021-digital.pdf

[142] Office for National Statistics, Retail Spend Data, https://www.ons.gov.uk/businessindustryandtrade/retailindustry/datasets/retailsalesindexreferencetables

[143] Food Drink Europe, *Data and Trends 2021*

[144] Considering that the Retail & Wholesale sectors generate a combined turnover of €8.3 trillion, of which €2.6 trillion is generated by retail and €5.7 trillion by wholesale in the EU, it is estimated that wholesale accounts for the 2/3 out the total. (Said Business School Institute of Retail Management, 2014, *Retail and Wholesale: Key Sector for the European Economy*, https://www.eurocommerce.eu/media/87967/eurocommerce_study_v2_hd.pdf)

7.6.2 Cost per label/stock-keeping unit (SKU)

Based on stakeholder engagement for this project, and previous studies, the key cost element identified is the design and production cost of the labelling (including the cost of the evaluation by a regulatory specialist to ensure veracity of all the mandatory requirements). Our research indicated a design and production cost varying from €500–€5,000 per stock-keeping unit (SKU) across different sectors and products (table below). Previous research on redesign costs of food labelling[145] also indicated similar cost ranges. For the purposes of this analysis, we have assumed that the change of labelling would cost on average €500–€1,000 per SKU; this lower-in-the-range choice was informed by the earlier impact assessment on food labelling, which used significantly lower figures.[146]

Table 7-2 Design and production costs for changing a label per stock-keeping unit (SKU) provided by industry associations

Industry association	Cost estimation per SKU
European Organization for Packaging and the Environment (EUROPEN)	€1,000 – 2,000
Natural Mineral Waters Europe (NMWE)	€500 – 3,500
UNESDA - European Soft Drinks Industry	€500 – 3,500
Food Drink Europe (FDE)	€500 – 4,000
AIM - European Brands Association	€500 – 5,000
Association of the Greek Manufacturers of Packaging & Materials (AGMPM)	€500 – 5,000
Toy Industries of Europe	€1,500

Source: Data provided by industry associations (2022)

7.6.3 Estimating additional costs

However, the potential impact of labelling changes on economic operators could be reduced significantly if the changes are incorporated into the usual lifecycle of a label. Previous EU studies on labelling[147] estimated that over a 2 year period 55-63% of companies would introduce labelling changes as a normal part of their business operation. This percentage raises to 80% of companies over a 3 year period. This broadly matched the findings of a detailed UK study from the same period.[148] Therefore the additional costs of labelling changes brought on by regulatory requirements are significantly reduced if there is time to incorporate them in updates that would have happened anyway.

If this approach is applied to the current SKU and cost data it is assumed that the majority of the costs would be avoided if an adequate period is granted for businesses to adapt to the new requirements and synchronise these changes with other scheduled labelling changes. Over three years total re-design costs could be reduced by 90% (the study on food labelling assumed a 94%

[145] European Commission, 2008, *Working Document: Impact Assessment Report on Nutrition Labelling Issues*
[146] European Commission, 2008, *Working Document: Impact Assessment Report on Nutrition Labelling Issues*
[147] European Commission, 2008, Working Document: Impact Assessment Report on Nutrition Labelling Issues
[148] Campden BRI, *Developing a Framework for Assessing the Costs of Labelling Changes in the UK,* https://webarchive.nationalarchives.gov.uk/ukgwa/20130402151656/http:/archive.defra.gov.uk/evidence/economics/foodfarm/reports/documents/labelling-changes.pdf

reduction). Thus, based on the above analysis, the total costs in the EU are estimated at 2,584m € to 5,168m € (table below).

Table 7-3 Cost elements and total costs estimation

Cost Range (€/SKU)	€500	€1,000
Total estimated number of SKUs in the EU	51,681,321	51,681,321
Total re-design Costs (assuming 90% reduction) (in mil €)	€ 2,584 m	€ 5,168 m

However stakeholder feedback also suggested turnover times for labels in non-food and drink sectors could be much slower, with, at least for some products, less upfront change and slower lifecycles. There is no sure way to account for this, but a more cautious assumption is presented below and in the main impact assessment.

Table 7-4 Costs to economic operators, depending on speed of implementation

Years allowed to implement	1	2	3	4
Potential saving	25%	45%	65%	80%
Additional cost of implementation (€ millions)	38,760	28,424	18,088	10,336

7.7 Restatement of combined costs for labelling changes from measures M27c-y, M38, M12u, Mk, Mx

Dividing analysis across the five proposed labelling measures can obscure some of the overriding messages about costs and benefits. This briefing note therefore combines discussion of the five labelling measures to bring out costs and benefits in relation to this clarification request more clearly.

It is important to state that costs and benefits analysed have focused on packaging labelling changes only. No consumer behaviour change and associated environmental benefits are assumed from this change *alone*, however this change will enable wider changes. As an example M27c-y, Mk, and Mx all support alignment of collection infrastructure labelling with packaging labelling. Labelling of collection infrastructure can be mandated at EU, national, or local level, whereas mandating packaging labelling at anything except EU level challenges the single market.[149]

The calculation of €10.3 billion in costs for one-off labelling changes rests on key assumptions. Although assigned to measure M27c-y in this report (as this is the most universal labelling measure, potentially affecting all items of packaging) the additional costs of making other labelling changes *at the same time* are minimal, so this can be treated as the single implementation cost of all these changes.

To restate some key assumptions:

- Approximately 52 million product and packaging lines are expected to be impacted - industry usually describes each unique product and packaging combination as an SKU ("stock keeping unit")
- The typical cost of a relabelling change per SKU is approximately €1,000 from a design point of view. This may vary significantly depending several factors, such as packaging

[149] M38j on recycled content is more aimed at minimising confusion, or unilateral Member State regulation on this point which in turns threatens the single market. M12u on reuse labelling has a similar rationale, though reuse systems will require system specific information in any case.

type, similarity between labelling of comparable products, change of number of colours (from black and white to multi-colour), and whether the country has set standardised mandatory information.

- Some packaging would undergo redesign during the transition period in any case (with changes more frequent in the food and drink sectors), and does not represent an additional cost. The length of the transition period is a significant cost variable and this costing is based on a transition period of 4 years, giving an average cost per year of €2.6 billion for that time period. Note that a longer transition period both lowers absolute costs, and also spreads costs over a longer period. In contrast a shorter transition can raise costs – especially if less than two years is allowed as existing product may need to be repackaged, producing packaging and potentially product waste. Once the transition is complete, there are no additional costs. Overall, taking into account regular periodical re-design of labels, when the introduction of the rule is equipped with transition period rules, the final cost can be largely decreased.

7.8 Expected costs of a counterfactual scenario where the Commission does not act to harmonise labelling

The view that the administrative efficiency savings from the Commission measures will outweigh the costs is informed by industry stakeholders, all of whom favoured harmonisation. This benefit was assigned to measure Mk, and the steps taken to prevent fragmentation of the internal market via divergent packaging requirements, but in practice all proposed labelling measures collectively contribute to this outcome.

The stakeholder preference for the harmonised approach led by the Commission was based on their assessment that the "baseline" (where the Commission do not harmonise labelling requirements) will see Member States increasingly legislate labelling requirements on these issues in divergent ways. This approach was considered certain to exceed the costs of the harmonised Commission measures, and the harmonised Commission measures were seen as essential to remove the growing demand for national labelling requirements on these topics.[150] Several Member States have already legislated national labelling requirements, or are actively proposing to legislate, despite the questionable legality of steps in this direction under the existing Packaging and Packaging Waste Directive. **Cost savings from the labelling measures are therefore presented against a counterfactual scenario where trends in divergent labelling requirements at national level continue.**

In this context measure Mk (explicitly restricting Member State action in this policy space) is of particular significance. If the Commission regulates and Member States nonetheless act additionally in these areas, then any costs of the Commission measure proposed are not offset by the counterfactual costs avoided – indeed Economic Operators could find themselves bearing the downside costs of both scenarios.

The counterfactual scenario of an increasingly divergent labelling landscape between Member States is expected to impose costs in two ways: via direct relabelling costs (similar in type to those implied by the Commission measures, but potentially more numerous and less efficiently imposed); and via indirect costs resulting from the fragmentation of the single market. Specifically, economic operators would need to be informed on and comply with multiple requirements in different markets, imposing costs and disrupting the workings of the single market.

[150] Some Member States, such as Italy, Portugal and Slovenia, are introducing their own mandatory requirements for the marking of packaging materials, which includes requiring use of the classification system set out in Decision 129/97.

7.8.1 Direct costs of relabelling in a counterfactual non-harmonised scenario

In the absence of Commission action, administrative costs associated with labelling requirements for comparable information are expected to increasingly occur at national level, with economic operators bearing the downside costs. The number of SKUs impacted in such a scenario cannot be estimated with precision. There is no data on the number of SKUs by unique national market[151], nor can we be certain which Member States will act unilaterally, or to what extent (e.g. they could legislate in relation to some or all of the subjects covered).

Assumptions made on costs for the counterfactual scenario are therefore, if anything, cautious. However:

- It is almost certain that the number of SKUs affected in the counterfactual would meet or exceed the number affected in the proposed measures for the Regulation - i.e. at least 52 million SKUs cumulatively need relabelling across all national markets taking some action. Reaching this total is rendered much more likely by the fact that the total number of SKUs in the EU will increase significantly if the same products start to need additional multiple SKUs to account for different national packaging requirements.
- The same costs per labelling change are used as for the Commission measures, though this may understate counterfactual costs[152], it is also likely more ad hoc measures than packaging redesign would be adopted temporarily or for smaller markets, as discussed in section 7.8.2 below.
- A shorter transition period of three years (relative to the assumed timeframe for the Commission measures of four years) is assumed. Some national legislation has proposed shorter transitions than this.

These assumptions give a relabelling cost burden alone of around €18 billion in a counterfactual fragmented scenario, more than cancelling the costs of the Commission measures even before other costs of the counterfactual scenario are considered. This cost should therefore be seen as a low-end estimate. Other costs of market fragmentation are addressed in section 7.8.2 below.

It is worth noting that the costs of the Commission measures and the counterfactual scenario might be distributed differently.

- **An Economic Operator selling a SKU across borders.[153]** An operator selling the same product as a single SKU across the Union, could, in the worst case, have to pay relabelling costs twenty-seven times over, if all Member States regulated independently. This worst case is unlikely both in terms of SKU distribution for a given product, and the number of Member States that will act independently. However, for any given SKU to be sold in at least two markets with labelling requirements that diverge is highly likely for a cross-border business, and even that very limited case would equal the costs imposed by EU measures for simple relabelling costs alone.

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[151] While not every SKU in the EU will be available everywhere, the number per national market will be consistently higher than a per capita distribution, as the range of products on market is not proportional to population or GDP.

[152] The non-standardised nature of changes required might in fact mean design changes ended it up with a higher per SKU cost; we modelled the cost of the Commission measures towards the lower end of the ranges (at 1000 EUR) quoted for relabelling costs per SKU.

[153] After speaking to some large producers and retailers, it appears that the standard practice is for monitoring on labelling requirements to be done at central level (HQ level), even for divergent labelling requirements. Therefore the HQ team issues common guidelines for all its economic operators in the MS they operate and may issue more specific national labelling requirements, depending on the market share, volumes sold in that market, etc.

- **An Economic Operator working solely within a national market.** Impacts for this operator depend on the actions taken in their specific Member State. If there are no regulatory labelling changes at national level in the counterfactual scenario, then this operator would be better off than with the proposed measures at EU level. If there is national legislation imposing a single change, the costs are comparable. If national legislation introduced successive changes, or shorter transition times, or extended to tertiary packaging, the costs of the counterfactual scenario would exceed those of the proposed measures at EU level for this actor.
    - It is worth noting that there is the need for better monitoring and reporting when the national legislation introduces successive changes. There are cases where by, due to almost 'zero control/monitoring' national economic operators can delay the transition period (for redesign) and/or pass on the additional costs to their suppliers.

7.8.2 Indirect costs from fragmentation of the Single Market in a counterfactual non-harmonised scenario

For an economic operator selling what is currently a single SKU across borders, the costs of divergent (re)labelling requirements will be greater than simply the direct costs above. These extra costs are unique in type to the counterfactual non-harmonised scenario.

7.8.2.1 Manual relabelling (or "stickering") for significant volumes of products on a temporary or ongoing basis would be expected and is highly inefficient.

In this case nationally mandated information is separately affixed to packaging destined for that market. This process is typically performed manually, and can involve unpacking and repacking product consignments within the storage or logistics chain. This approach will be taken by some large producers (who have specific common guidelines) to comply with national legislation initially; longer term, large producers are likely to invest in separate SKUs for specific markets as a less worse option. Smaller producers may not reach the production runs for a given national market to justify such a switch and simply remain with inefficient manual relabelling indefinitely.

These concerns are highest for non-food and drink packaging – sectors where product shelf-life is longer, national SKUs are less common, and sales in a given national market can be relatively small.

Where costs relate to temporary practice, a well-designed and longer transition period can reduce or wholly remove purely transitional costs[154] – this is proposed in the Commission measures but is not guaranteed in any alterative national measures.

Example costs obtained from stakeholders include:

- A (non-food) industry association suggested stickering could cost €1-€2 per item (€5 per item was suggested for large products)
- A large (non-food) retailer suggested a one-off relabelling cost for a single large EU Member State would cost them €34 million (for around 180 million items, so €0.19 per item, perhaps reflecting efficiency savings at large scale in a centralised logistics chain compared to the above). They additionally estimated that the additional handling and repackaging would impose an increase in product loss and damage worth €5 million
- A producer selling largely through third parties estimated a one-off relabelling cost for a single large EU Member State would cost them €1.5 million, they also highlighted they expected a 1% failure rate with stickering (where misapplication would necessitate new

[154] As discussed in section 1.0, regular periodical redesign of labels can reduce the associated costs

packaging), as well as potentially having to repackage tertiary packaging after a relabelling operation.

- Packaging and product loss, plus stickers that may reduce recyclability, run counter to the wider waste policy objectives of both the Commission and Member States.
- When the design marking for packaging needs to be amended more than once or twice a year, due to national mandated information, **the costs of divergent (re)labelling requirements is expected to increase.**

7.8.2.2 Even if divergent packaging is created for the same product sold into markets with divergent labelling requirements, eliminating the issues above over time, maintaining these additional SKUs is highly inefficient.

- Running multiple SKUs in place of one SKU imposes process costs throughout the supply chain, from changes to product and packaging production runs, to ordering systems, to warehouse space, to logistics.[155] Companies that sell to consumers through third party suppliers or distributors need to be able to control where the product ends up, complicating supplier relationships. All these impose both set up and ongoing costs.
- Stakeholders also emphasised the environmental costs from inefficient production processes and logistics.
- Product availability may also be constrained. At each stage there is an increased risk of "stock-outs" (i.e. a localised shortage) from a customer perspective if the right SKU format is not in the right place at the right time in sufficient quantity.
- Conversely, it will be harder to sell excess product from one location to another, increasing packaging waste (if repackaging is required) or simply seeing product and packaging disposed of, both actions that could increase waste generation.
- Industry has also highlighted packaging volume could increase if the option of displaying multiple national labelling requirements on the same item is pursued. This would go against the wider waste policy objectives of both the Commission and Member States. This option may well not exist however, as Member State requirements could be directly contradictory.

No business or industry body we spoke to was able to put a cost on these factors as they are currently hidden among wider operational costs (or considered commercially confidential), but all considered them to be real and significant. Many of these costs are also ongoing and will accumulate over time. The support shown for the Commission measures was in several cases explicitly based on a judgement that this harmonised approach would be less expensive in the long run, even though stakeholders could not or would not quantify the counterfactual case.

7.8.2.3 Divergent labelling requirements impose significant legal compliance costs and risks of penalties for non-compliance

- Economic operators would have to **monitor packaging labelling requirements in all markets** where they do business, a process that requires both nationally specific legal and language expertise, rather than a single set of requirements at EU level. One large multinational business indicated they had taken on a legal firm to provide exactly this kind of advice service across the EU on an ongoing basis (no cost for this was shared). In a scenario with Member States regulating independently, action or inaction in one year does not mean businesses do not have to be equally vigilant of changes the next year, so this cost burden is potentially ongoing.

[155] There are multiple ways this can be done, such as grouping product for markets with identical requirements, but this is only relatively less inefficient.

- Smaller SMEs may be especially vulnerable as they are unlikely to have the capacity to track packaging requirements in every Member State.

- **If Economic Operators make errors**, legal penalties and reputational damage may impose further costs (with significant financial penalties for non-compliance proposed in some Member States already). Stakeholders are highly concerned errors could occur – even in the above case where specialist legal advice had been sought and was being maintained. Many producers distribute their goods through third parties – i.e. they do not know where the packaging is going to end up when it leaves their control, and would be entirely dependent on the third party for elements of their legal compliance.
- To detect both errors and fraud, **better monitoring and reporting** is needed (which would result in additional costs for the Member States), especially when the national legislation introduces successive changes.

These factors create barriers to trade of precisely the kind the Single Market is designed to prevent. It is quite possible smaller suppliers making marginal sales in a given national market might choose to exit that market rather than incur the costs and risks imposed by divergent labelling requirements – or that their distributor may shut them out for the same reason. Consumer choice could also be reduced via local shortages, as described above.
While the extent of these problems in the counterfactual non-harmonised scenario is not known as they are dependent on future decisions at national level, these challenges and costs are not hypothetical, and are already familiar to businesses that sell into markets with different packaging regulations. Some stakeholders additionally expected that a clear EU standard could facilitate export outside the EU if third countries copy standards in due course.

7.8.3 Conclusion

The efficiency case for these measures is that the cost of inaction is higher than the cost of action – almost certainly by a far greater amount than formally quantified here
While the full extent of costs in the counterfactual are not known they are highly likely to equal or exceed the costs of the measures even if *only* relabelling costs are accounted for.
In addition, while the burden of complying with regulations that fragment the single market will not apply to every business or SKU, where products are impacted the per unit costs will be an ongoing burden. The barriers to trade presented by divergent packaging labelling may also disrupt the Single Market more fundamentally, if product availability or choice is restricted.
As these are treated as enabling measures, the assessment of costs and benefits described here understates the economic and social benefits of labelling once combined with wider policy changes.
Labelling changes to improve information provision and align with wider systems will be increasingly pursued whether at EU, national, or sub-national levels in pursuit of the wider benefits of consumer behaviour change and the improved environmental outcomes resulting from this. The argument for these specific labelling measures is that they will be the most efficient way to facilitate this change (compared to unilateral action by Member States) as described above. However, in cases where these measures *also* mark an improvement in consumer labelling practice to the alternative, then behaviour change may be more likely (especially where collection authorities align their own messages and labels) and environmental benefits would follow from this.
This is especially the case for measures M27c-y, Mk, and Mx in combination in countries that have no labelling of this type, or currently have less consumer-friendly labelling. Even in the absence of further Commission action local or national authorities could choose to align collections with an EU-wide labelling system – in contrast they cannot compel producers to align labelling with local collection arrangements without threatening the single market.

The behavioural logic around M38j and M12u is less certain. The impact of recycled content information on consumer choices is unclear; and specific information and labelling relating to specific reuse systems may be more important than a generic reuse symbol. If either symbol increased consumer confusion about what to do with packaging overall then they might even have negative impacts, and is a key reason why testing with consumers is recommended before final implementation. The efficiency argument relative to unilateral Member State action remains however for both these measures (and is a key reason for their inclusion in the scope of measure Mk).

7.9 Assessment of who pays for any costs or savings over time

These administrative costs are initially borne by producers. In a perfectly efficient market these costs would theoretically be largely passed through to consumers. In the unlikely event this was the case, then if €10.3 billion in costs were accrued, as identified for M27c-y, but with no offsetting savings, it would equate to €6 per EU citizen for four years, or €23 per citizen in total.[156]
In practice it is unlikely that producers will be able to pass on costs so directly. Packaging costs are typically a small fraction of product price and labelling costs will be a small fraction of packaging costs. Additionally, passing costs through the supply chain can be subject to complex negotiations. Labelling costs are unlikely to be a determining factor in changes to prices charged and paid in most supply chains, and it is likely supply chain actors will ultimately absorb some or all of these costs, especially as they are one-off. The same assessment applies to assessment of the counterfactual non-harmonised scenario in relation to comparable one-off costs, though the overall cost burden might be greater, and more randomly distributed.[157] Cost pass through is more likely the higher overall costs are. However, in the non-harmonised scenario, some costs are ongoing and over time they are likely to be passed through to consumers.

7.10 Briefing on alternative labelling technologies to facilitate packaging waste sorting by waste management operations

During work on the revision of the PPWD, the fact that alphanumeric codes were not used by either consumers or waste sorting operations to separate packaging was identified, and this labelling approach will be removed from the revised Regulation (measure Mx), as will the option for Member States to require the use of alphanumeric codes for packaging in national legislation (measure Mk). A new consumer friendly and consumer facing labelling approach, modelled on the Scandinavian pictograms approach is proposed (measure M27c-y) to support consumer side sorting behaviours.

However, there is as yet no clarity on the desirability, costs, and benefits of emerging new technologies that might facilitate sorting operations for packaging waste in the waste management industry. Two technologies exist that would require changes to packaging labelling to work: digital watermarking and serialisation. It also highlights an approach to improved sorting (better recognition through the use of AI) that would not require labelling changes.

156

Population data from Eurostat for January 2021: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_and_population_change_statistics#:~:text=Highlights&text=On%201%20January%202021%2C%20the,less%20than%20the%20previous%20year.

157 For example, it would fall only on Member States that took action

Below these approaches and progress to date are briefly described, alongside the potential pros and cons, and the likely timelines to achieving greater understanding of their operational and policy potential. While it is too soon to decide on the merits of regulating a packaging labelling approach in light of these technologies, this section does highlight how current regulation might be future-proofed.

7.10.1 Digital Watermarking

This approach places a digitally readable pattern (similar in function to a barcode or QR code) but which is invisible to the naked eye, and can therefore be overlain on existing labelling; unlike a barcode it can also be repeated multiple times across the packaging item surface, making it more easily machine readable in the context of a waste sorting plant. This technology has so far been focused on enabling plastic sorting, where it can be applied in two ways: via printing, where it "subtly modulates" existing pixels and requires no special inks; or on to the product itself via moulding, where it adds "micro-topological variation". The former print-based approach would probably be applicable to other packaging materials, though may cause specific issues for some surfaces.

This technology provides additional advantages over and above its potential to facilitate waste sorting. It can aid supply chain management, and information can be accessed by consumers using a mobile device (similar to existing QR codes) even though the information is invisible to the naked eye[158].

This technology is being championed and actively developed by the Holy Grail 2.0 project[159], led by AIM and Alliance to End Plastics, with an extensive array of partners signed up to the project.

The readability of digital watermarks by appropriate scanners has been proven to work, and in early 2022 two prototype "optical sorting modules" from two selected manufacturers (Pellenc and Tomra) were tested in a "semi-industrial" setting in Copenhagen to sort sample packaging, achieving high rates of accuracy in discriminating between packaging at first sort. A third phase of "industrial" testing is expected later in 2022:

> *"The industrial test phase will focus on deploying the functional prototypes on large-scale in commercial sorting and recycling facilities under normal operating conditions. The aim is that brand owners and retailers will bring their enhanced products commercially to the market in three EU countries Denmark, France and Germany. Consumers will buy these on-shelf products with digitally watermarked packaging, which after consumption will enter the waste stream and end up for sorting in different material recovery facilities that will run the industrial trials for different packaging material."*[160]

This phase, if successful, would demonstrate the system works in an actual operational environment. The final report from this project will provide both a technical and economic analysis

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[158] Note that this consumer functionality is valuable when the consumer wants more information than is provided on pack, but does not replace the desirability of visible on pack consumer labelling which provides an immediate nudge to desired consumer behaviour. Scanning packaging requires an extra proactive stage of consumer engagement, and access to a suitable mobile device at the precise moment of engagement with the packaging/recycling process, which many consumers will not do.

[159] See https://www.digitalwatermarks.eu/. Note that Holy Grail 1.0 was an earlier collaboration, supported by Ellen Macarthur Foundation, which considered alternative ways to tag plastic packaging to support a Circular Economy. That project also considered chemical tracing, but digital watermarking has been pursued as the most promising option. For more on Holy Grail 1.0, see

[160] https://www.digitalwatermarks.eu/

of digital watermarking and how it might be deployed at scale. The project partners expect increased take-up of this technology by both producers and waste sorters if the Holy Grail 2.0 trials are successful. The project documentation explicitly refers to the potential emergence of a "de facto standard".

If the technology works at scale, there would still be important discussions around the nature and granularity of information to be encoded, and the underlying database(s) required to support it, and the number of categories waste sorters were in fact able and willing to divide and report against in a constrained operational setting[161]. The technical and economic case might also need to inform consideration of de minimis exemptions (for both packaging producers and waste sorters), and that, in turn, might impact economics and quality for waste sorting overall. The project documentation also seeks to ensure that none of the intellectual property can be withheld at a later date[162], but this would be an area it would be critical to understand before regulating in this area. Finally, a decision would be needed on the range of packaging that any regulation should apply to.

This is a promising technology, and much more likely to be of relevance to packaging waste than product waste in waste management terms. However, the technical feasibility and costs have yet to be determined at scale, though this should become clearer when the Holy Grail 2.0 project reports have been finalised. Given the potential application of this technology to other elements of supply chain management, alignment of any Commission work in this area across teams and directorates would also be an important precursor to regulation. The most the current Packaging and Packaging Waste Regulation can do is give a mandate to decide and act on this at some point in the future.

7.10.2 Serialisation

Serialisation assigns a unique serial number to each packaging item. This information is most likely to be communicated on pack via a barcode or QR code (the serial number might also be displayed).

This approach is already pursued in pharmaceuticals, driven both by regulation and a desire to combat counterfeiting and reassure users on provenance and quality[163]. Requirements for pharmaceuticals are likely more stringent than those needed for tracking packaging in the context of Packaging Waste, but as with Digital Watermarking, advanced coding of packaging items in this way might be combined with other functions, from demonstrating product provenance and safety,

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[161] Each actual physical separation may have time and space implications and simply because a wide diversity of packaging could be better sorted with digital watermarking, it does not mean that it would be economic to do so. Digital watermarking would still ideally work alongside packaging standardisation.

[162] The project Charter states: *"The participants in the Initiative recognise that the proposed watermarking and sortation solutions may, by virtue of broad industry adoption, result in the emergence of a de facto industry standard. With this in mind, it is recognised by all parties that any patents reading on such de facto standard, technology, software and/or hardware essential to the implementation of such de facto standard, shall be made available at fair, reasonable and non-discriminatory (FRAND) terms. All technology providers participating in the Initiative will commit in writing to these principles."*

[163] See the EU's Falsified Medicines Directive, which came into effect in 2019 and requires all products to be "activated" in a central database, and "decommissioned" when dispensed. The US goes further and will require products to be logged at all supply chain stages from 2023. https://www.alloga.co.uk/node/2291#:~:text=The%20Falsified%20Medicines%20Directive%20(FMD,is%20linked%20to%20national%20databases).

to compliance with tax requirements (e.g. spirits), and these other reasons have been the main drivers of discussion in this area to date for food and drink[164].

An exception to this is in consideration of Digital Deposit Return Schemes (DDRS)[165] for drinks containers. In such a scheme consumers can self-verify their own returns, potentially including returns into existing recycling collections (for example using their mobile device when placing an item into a household packaging waste collection). Serialisation would be an important feature of such a scheme to prevent the same container being "returned" multiple times.

Some of the implications of applying serialisation to all EU packaging are similar to those identified for Digital Watermarking, but there is not currently a comparable collaboration to Holy Grail 2.0 working on this technology.

Serialisation also poses some additional challenges. The requirements on packaging production and labelling lines are also likely to be more demanding than those needed for *print based* digital watermarking (which potentially requires no change), and digital watermarking would still have one label for an entire production run; and quite possibly beyond that (e.g. mould-based digital watermarking would be inflexible across different uses of the same mould). The extent to which printing serialisation can be integrated cost-effectively into food and drink production lines is unknown, and may cause issues on some material surfaces. Serial numbers might prove harder to identify and separate in a real world sorting facility than digital watermarking (which replicates the watermark across a larger surface area) – not perhaps a problem for a DDRS where containers are already separated at the point of validation, but a potential issue with more general waste sorting.

Serialisation also produces far more data points (one for each item) with associated issues for supply chain management and integration[166]. This degree of data might prove beneficial to some producers – for example allowing individual producers to know exactly how much of their packaging is collected, to inform discussion of EPR fees, or priority access to material (beyond the bounds of a DRS).

The pre-requisites to Commission regulation in this area are similar to digital watermarking (though there is less of an intellectual property concern), but the answers to the questions are probably further away. It may prove to be the case that serialisation might make sense in some settings (e.g. a DDRS from a packaging perspective) or for high value products (from a provenance and standards perspective) but that it is unlikely to be proportionate as a universal requirement for packaging labelling.

7.10.3 Enhanced use of artificial intelligence (AI) in waste sorting

This approach is not unique to packaging waste and would not require regulation of packaging or packaging labels. However, a third route to better sorting of waste packaging is the continued evolution of existing automated sorting technology with the greater addition of computer learning algorithms to improve sorting.

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[164] https://blog.vision33.co.uk/food-package-serialisation-how-it-benefits-food-beverage-manufacturers

[165] Advocates of DDRS tend to present it as much more technologically ready than it is, including perhaps the example here from Recyclever, but their case for DDRS does highlight the expected importance of serialisation to this approach.

[166] https://www.profoodworld.com/home/blog/13279114/serialization-in-the-food-industry-lessons-to-be-learned-from-pharma

A number of companies[167] and pilots[168] already exist in this space working on both recognition technologies and associated sorting processes. Current initiatives include a producer consortium, titled the Perfect Sorting Consortium (smaller than, but with some similar members to the Holy Grail 2.0 project on digital watermarking) which is working with the universities of Ghent and Radbound on an AI decision tool that can classify packaging into more sorting streams than is currently possible[169]. This project does not currently include provision to additionally sort the packaging waste, merely to better identify and audit it.

There is no need for the Commission to regulate in this space, but improvements in these sorting approaches might make regulatory harmonisation of packaging labelling to assist waste sorting less necessary. In practice it is most likely that smarter waste sorting technologies of this type would sit alongside and complement an approach like digital watermarking, enabling improved sorting of the overall waste stream, not simply packaging.

7.11 Aspects related to legal drafting

Wording in plain text sets out the content the Regulation may need to cover, to provide support for the legislative drafting. Some elements are dependent on final policy choices, or the relationship between these measures and other Regulation content. We have therefore used square brackets and blue text to show where choices may be required. Additionally we have used green text to provide commentary. This explains why content may be required, or clarifies the intent. We have also used green text to indicate where certain terms may need legal definition, and suggestions for definitions that could be used.

We have structured this submission by measure in line with the impact assessment and discussions with the Commission to date. At the point the final combination and form of measures is confirmed, there may be merit in structuring the actual Regulation a little differently. Regulation (EU) No 1169/2011[170] on the provision of food information to consumers sets out all labelling requirements that are mandatory, and then all that are voluntary, and while a different topic, may be a highly useful model for this legal text for either structure or wording.

This may also prove more user-friendly. Stakeholders noted that to keep packaging legal they have to align with a wider range of regulation (e.g. PPWD, WFD, REACH, Green Claims, and for food businesses, all food labelling requirements). The accessibility of this Regulation in regards to labelling will reduce the administrative burden on Economic Operators.

This structural approach could also eliminate significant elements of repetition (for example the requirements for development and testing of the labelling systems and consideration of how they interact) and overlap (for example the relationship between introducing harmonised labels and removing confusing ones at Member State level). There is some repetition across the notes below for different measures currently; we have aimed to repeat information to be on the safe side in case a given measure is dropped or amended meaning a key observation that is more widely

[167] See https://www.ai-startups.org/top/wastesorting/ for examples

[168] See https://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/zenrobotics-applying-artificial-intelligence-waste-sorting_en

[169] https://packagingeurope.com/news/new-consortium-to-develop-artificial-intelligence-model-for-packaging-waste-sorting/8057.article. Colgate-Palmolive, Danone, Nestlé, PepsiCo, and P&G are members of both this initiative and Holy Grail 2.0.

[170] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02011R1169-20180101

applicable is lost. Nonetheless, measure M27c-y is the measure we started with and has the greatest level of detail on definitions and drafting choices, much of which is relevant elsewhere.

7.11.1 Measure M27c-y: Labelling criteria for provision of packaging material information to consumers to facilitate consumer sorting of waste

Commentary / definitions: *We have reworded this closer to some of the language seen in legislation on food labelling*

Although in a different context, Regulation (EU) No 1169/2011 on the provision of food information to consumers has some useful definitions and language that has informed decisions throughout this section:

- *Art 2 (2) (a) –" 'food information' means information concerning a food and made available to the final consumer by means of a label, other accompanying material, or any other means including modern technology tools or verbal communication". We use the term "packaging material information" here*
- *Art 2 (2) (a) i – "'label' means any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to the packaging or container of food". We do not see any need for a separate definition here.*
- *Art 2 (2) (a) j – "'labelling' means any words, particulars, trade marks, brand name, pictorial matter or symbol relating to a food and placed on any packaging, document, notice, label, ring or collar accompanying or referring to such food". We do not see any need for a separate definition here.*

"Composite packaging" (e.g. cartons) – is defined in art 3/2b as amended PPWD. PPWD also refers to the following definitions already: "the definitions of 'waste', 'waste management', 'collection', 'separate collection', 'prevention', 'reuse', 'treatment', 'recovery', 'recycling', 'disposal', and 'extended producer responsibility scheme' laid down in Article 3 of Directive 2008/98/EC shall apply"

The Commission:

10. Shall design and develop a system of pictogram symbols indicating the material composition of packaging, suitable for inclusion on packaging labels for primary and secondary packaging, which is readily visible and accessible to consumers when placed on packaging, by [date].

Commentary: *we suggest 2024, after the WFD for development, with the transition period starting thereafter – Jan 2025 for example.*

Additional definition of some of these terms may be needed in the Implementing Act – for example, the level of detail on material composition especially for multi-component packaging; other terms here like "readily visible" could also be clarified at that stage. Note (EU) No 1169/2011 defines some terms that may be useful at that point e.g. "field of vision", "principal field of vision", and "legibility" all of which would aid a more precise description of the general principle above about visibility and accessibility

Definitions: *"Symbol" and "pictogram" are used in other instruments without definition.*

a. The pictograms shall be designed to inform consumer disposal choices at end of use and will only be mandatory on primary and secondary packaging; Economic Operators may choose

to apply them to tertiary packaging, and are encouraged to align practice on labelling for tertiary packaging with that for consumers where appropriate. The Commission may provide further Guidance on this topic as part of the Implementing Act.

b. This system of symbols shall align with the harmonised approach to collection and sorting developed in the Waste Framework Directive revision, in particular in relation to signage and communications, and may additionally align with any symbols developed for products as well as packaging in that Directive

Commentary: *We assume both the system developed here and that developed for WFD will align with the general approach taken in the Nordic Pictograms, which apply to both packaging and products. The main difference stated in the impact assessment was the desire to avoid written words. We have not put these considerations into the legislation – they are more relevant to the development and testing stage of the labelling system]*

We assume the symbols proposed in Single Use Plastics Directive 2019/904 re plastics pollution remain separate – see also measure Mk – though it could be argued that a plastics pictogram here duplicates some of the labelling required by SUPD (which carries a primarily anti-litter message, but in relation to being "made of plastic"). The only area of packaging overlap with these SUPD symbols would be single use cups given the narrow range of items covered by the SUPD labelling requirement. If one symbol was chosen to the exclusion of another in those cases, then the primary symbol should be the comprehensive pictogram system proposed here, to maximise consistency and consumer understanding.

11. This system of pictogram symbols shall be subject to rigorous consumer testing and technical development centred on ease of understanding for consumers and likelihood to prompt optimal disposal behaviour at end of use, prior to being confirmed in an Implementing Act.

    This testing and development shall define the relevance and specification of the following:

a. Symbol design (the exact range and nature of symbols required, preferred colours, non-colour alternatives, preferred size, labelling approach to composite or multi-component materials)

Commentary: *Consumer testing is essential to develop and demonstrate symbols are suitable, and as simple as possible. The nature of harmonised collections under WFD may simplify the symbol requirement (e.g. do cartons get labelled as "cartons" or "paper" or something else; can we label "paper" and "card" with the same symbol) and testing would also determine how consumers deal with different material symbols for different components of a packaging item (e.g. "box", "lid", "wrapper"). There may also be technical considerations on how and where to label composite and multi-component items that are specified at this stage*

b. Alignment with other EU wide packaging labelling in this Regulation to ensure these are complementary and easily understood by consumers in combination as well as in isolation

Commentary: *For example, a reusable item would by default also have to show material composition, and producers might choose to add recycled content. It is unclear this helps consumers make optimal choices easily – the next point make provision for the Implementing Act to create exemptions in cases where multiple symbols might cause confusion*

c. Exemptions may be provided in the Implementing Act on the basis of:

i. Avoiding increased packaging size to meet the labelling requirement (e.g. a minimum size for the label defined either by the absolute label size, and/or the proportion of packaging surface it can take up)

Commentary: *We have not specified detail on this here as we believe it is more appropriate for the Implementing Act as it may be impacted by other design choices, however, models exist for wording in existing EU law – e.g. Batteries Regulation, and (EU) No 1169/2011 (art 16 (1) and (2))]*

ii. Avoiding additional packaging complexity i.e. the labelling requirement should not require extra material use, nor the addition of an additional material to the packaging item (e.g. a paper label on a container of another material where one was not previously provided), nor make an item harder or less valuable to recycle

Commentary: *This exemption is about the packaging itself not the packaging/labelling production process as it stands; but this could be explored further – e.g. although it is possible to etch a symbol onto a glass bottle, it would add significant production complexity and cost. However, if we add a technical/cost factor to the exemption decision, this is an opportunity for everyone to claim it is difficult for them and request special treatment. As per the previous point we recommend this is left for the Implementing Act, but models for this kind of exemption do exist in EU law*

iii. Avoiding consumer confusion arising from packaging items that qualify for multiple symbols mandated; the implementing act may specify a hierarchy of labelling in cases where testing suggests confusion may arise.

Commentary: *see earlier point – the hierarchy would probably be reuse > material composition > recycled content if provision of all was considered confusing. It might be appropriate to allow Economic Operators to decide how far down the hierarchy they would go on-pack*

1. [Decision for Commission on possible exemption: Not required for items where return to a national DRS scheme (for single use, or reusable beverage containers, or other products where the scheme is the preferred takeback route) is the optimal end of use route for consumers]

Commentary: *Stakeholders suggested that if return to DRS is the optimal consumer action we want prompted by the label, then material composition is superfluous, and potentially confusing, when the DRS symbol should be considered the primary disposal instruction.*

This may make sense for high-performing takeback schemes (mandated and likely for beverage DRS whether single use or reusable) but is less certain for more innovative applications of DRS to other products if they have low capture and thus a significant number of packaging items are going into general waste/recycling collections.

Eunomia recommend this exemption is left as an option in the Regulation, and consumer understanding and reactions can be tested during symbol development, with the Implementing Act confirming the final decision]

2. [Decision for Commission on possible exemption: Not required for items where return to a dedicated reuse system is the optimal end of use route for consumers]

Commentary: *The stakeholder argument here was similar to the one above. Our recommendation is as above – make the final decision in reaction to actual consumer understanding during development and testing. "Dedicated reuse system" may need to be matched to terminology elsewhere in the regulation – see further discussion of terms at M12u below.*

iv. [Decision for the Commission on possible exemption: Not required for items where the material type is self-evident, and labelling is challenging]

Commentary: *This was a specific stakeholder suggestion in relation to unlabelled glass bottles. Eunomia's recommendation is that this is unnecessary if an exemption exists in relation to additional packaging complexity as suggested above, and this also then avoids defining "self-evident" or an equivalent*

d. The detail of this system of symbols, including all elements set out above, shall be set out in an Implementing Act, no later than [date]. There shall be a transition period following this act coming into force of [three / four / five] years.

Commentary: *Our recommendation is that this Implementing Act cannot be done before 2024, as it should account for the WFD changes and new symbols must be tested and developed. A transition period significantly reduces costs and unintended consequences of labelling changes for economic operators; the speed of change desired is a political decision, but we recommend three years is a minimum based on the cost assessments in the impact assessment. A complimentary approach to this transition (that would ensure no packaging waste is generated by compliance) would be a measure similar to that in Food Labelling Regulation (EU) 2018/775 which enables a supplier to use existing packaging until stocks are exhausted. In any event, this transition period for new requirements would apply across multiple labelling measures. Note that the period to phase out divergent Member State requirements might be much shorter – see measure Mk.*

e. Allowance for equivalent or additional information on recycling or material composition may be set out digitally at the discretion of the economic operator. In these situations the Commission may require a link to digital information is provided (also subject to the exemptions above) as part of the Implementing Act. The Commission shall not specify the technology to be used for the provision of such digital links.

f. [Alignment with Digital Product Passports and Sustainable Products Initiative]

Commentary: *All the information provided on pack, and any additional packaging information produced online could long term be linked to DPP, in a set format - nothing here makes this more or less likely currently. We are not setting out in this Regulation how this should be done, but we could provide a power to do so in future or a requirement for the Commission to review this by a certain date. E.g. a general enabling power is in Regulation (EU) No 1169/2011 on food information – art 10 includes "In order to ensure consumer information with respect to specific types or categories of foods and to take account of technical progress, scientific developments, the protection of consumers' health or the safe use of a food, the Commission may amend Annex III by means of delegated acts, in accordance with Article 51"*

g. The Commission shall provide guidance for Economic Operators on their obligations and make freely available the symbols designed for incorporation into appropriate packaging labels. Member States shall provide additional guidance and support for Economic Operators placing packaging on the market to ensure they understand the implications of this Regulation.

Commentary: *there is a choice for the Commission on how much Commission does and how explicitly to place expectation on Member States, but need for guidance and support, especially for SMEs, was a key piece of feedback from stakeholders in phase 1. Guidance might need to take the form of clear guidelines on what is required from businesses, "how to" information or briefings to help with practical aspects, and extensive communication efforts to impacted businesses.*

Member States:

1. Shall not produce their own national or regional requirements for labelling provision of packaging material information to consumers or alternative requirements designed to achieve the same aim of facilitating consumer sorting of waste by other means (e.g. a requirement to label recyclability) either on pack or digitally

Commentary: *See also Mk. While harmonising material composition requirements at EU level should restrict Member States by default, this has not been the experience with PPWD to date. Note that Regulation (EU) No 1169/2011 on food information does explicitly restate this restriction (art 38) in that context. Additionally, the "or recyclability" component is important here – there are two different routes to providing consumer information to facilitate sorting, and we have chosen labelling material composition; Member States might seek to get round this restriction by taking the other route and arguing "recyclability" information is not harmonised at EU level. Making this a specific requirement would also mean this article could be enacted immediately, precluding further fragmentation of national regulations and damage to the single market – a key driver for this measure - while harmonisation in relation to the new approach was completed*

2. Shall remove any national or regional requirements for labelling packaging material composition or recyclability by [date].

Commentary: *See also Mk. There is a strong case for an immediate removal of requirements, to end fragmentation as soon as possible; however economic operators carrying previously required national labelling should not be penalised for continuing to do so in advance of the roll out of harmonised EU labelling being available, and completion of the transition period]*

Economic Operators placing packaging on the market

Definitions: *Economic Operator is defined in PPWD as " 'economic operators' in relation to packaging shall mean suppliers of packaging materials, packaging producers and converters, fillers and users, importers, traders and distributors, authorities and statutory organizations." We consider this valid for current purposes, however, Commission may wish to further specify which Economic Operator is specifically responsible for packaging labelling. Art 8 EU 1169/2011 does so in greater detail for food labelling and could be readily adapted e.g. Art 8 (1): "The food business operator responsible for the food information shall be the operator under whose name or business name the food is marketed or, if that operator is not established in the Union, the importer into the Union market." Other clauses in the article there might also be of use.*

1. Shall display appropriate symbols indicating packaging composition on their packaging in line with the requirements and any exemptions indicated in the Implementing Act detailed above
2. May also use these symbols in online packaging or product information, including in cases where the packaging itself is exempt
3. May display additional information on pack or digitally, but shall not develop alternative symbols or promote alternative labelling schemes for material composition or recyclability

Context/background of relevance to drafting:

1. *This measure replaces the current labelling requirement in the PPWD (see also measure Mx) and makes it mandatory. Article 8 of the PPWD states that "To facilitate collection, reuse and recovery including recycling, packaging shall indicate for the purposes of its identification and classification by the industry concerned the nature of the packaging material(s) used on the basis of Commission Decision 97/129/EC". The relevant Commission Implementing Decision*

129/97 on marking sets out a system for uniform numbering and abbreviations to be used on packaging made of different materials, but application is voluntary, and there is little evidence this has been used extensively by consumers.

2. *This, and other measures here, may appear to supersede Article 13 in the PPWD (which requires Member States to provide packaging users with various information relating to the return, collection, and recovery systems available to them, though the specific type and format for information to be provided in this regard is not harmonised). This reflects the current lack of harmonisation of separate waste collection systems across Member States as well. However, we would advise retaining much of the article 13 requirement which relates to wider information provision and is not simply about on-pack labelling. Labelling is only part of the behaviour change package needed for consumers, and other communications, including to promote the labelling scheme itself, may be appropriate. This current article 13 requirement may be much better defined as part of the WFD review of collection and sorting more generally.*
3. *There are existing Regulations that can provide a model for exemptions around labelling due to space constraints, from food (e.g. the EU Regulation on Food Information to Consumers 1169/2011) and the Batteries Regulation; however we propose this is left to the Implementing Act.*
4. *Industry stakeholders may be very keen to be involved with/consulted on the development and testing of the labelling systems, including consumer understanding etc, as the target group is their customers, and they consider themselves to have extensive marketing expertise. Referencing co-design in the development and testing above would reassure these stakeholders they would be included.*

7.11.2 Measure Mk: Restrictions on labelling options used to communicate particular packaging information, to reduce consumer confusion and facilitate the single market

***Commentary**: This content could be a standalone or linked to each of the other relevant measures, depending how the articles of the Regulation are structured. The measure has been reworded to match language and definitions in example legal text*

The Commission:

***Commentary:** no specific requirements proposed*

Member States:

1. Shall not legislate new national requirements for packaging information for consumers or waste operators in relation to the labelling areas covered in this Regulation: packaging material composition; packaging recyclability; sorting instructions for consumers; sorting information for waste operators; reusability; recycled content; requirements to either show or conceal a specific packaging Producer Responsibility Organisation identifier

***Definitions:** "Reusability" and "Recycled Content should be defined elsewhere in the Regulation. See also discussion for measure M12u and M38j.*

   a. Applies from the entry into force of this Regulation

Commentary: *prevents further fragmentation between that point and establishment of new harmonised labelling systems, which will take time*

b. Member States that have set such restrictions up already must remove them by [date]

Commentary: *See discussion on the value of specifying this explicitly under measure 27c-y; this would enable an immediate removal date for divergent requirements, while allowing a transition period for Economic Operators to change actual practice linked to the roll out of the new harmonised system.*

c. This restriction applies to primary, secondary, and tertiary packaging, even in cases where harmonised symbols and labels at European level are applied only to primary and secondary packaging.

Commentary: *Measures on labelling consumer sorting, recycled content, and reuse are all consumer facing, and do not apply to tertiary packaging; however, to protect the internal market, measure Mk must apply to tertiary packaging (which is subject to some current national labelling regulations – e.g. Italy)*

d. An exception is needed for

i. [National Deposit Return Schemes] for recycling or reusability

ii. Other [national takeback systems] for recycling or reusability

Commentary: *an ability to label for deposit bearing items and/or compatibility with a specific takeback system are essential, though this power could be given to specific scheme operators rather than Member States (i.e. it is the national scheme administrator that decides on labelling, rather than the Member State, though they might mandate a national scheme)**.** In any event it is takeback system compatibility that is being labelled in these cases. Note there may be cases (unlike single use drinks containers DRS being considered in this Regulation) where there is no restriction on sales outside the system; everything can be sold, it simply cannot be returned to a system that it is not compatible with*

Definitions:

For "DRS" see drafting notes for DRS measure. Note that single use drinks containers are not the only DRS systems. Reusable drink containers also have DRS in some countries already. DRS might be applied to other packaging in future to meet wider packaging policy objectives. So terms here need to be future proofed.

For "takeback" the consideration is as above but for systems that lack a "deposit". Key issue is for reusables – we do not want to restrict innovation in an area that needs to evolve and grow. But this must not be interpreted in a way that means Member States could argue a kerbside collection was a "takeback" system.

Economic Operators:

1. Shall not create or use alternative symbols in relation to the labelling areas covered in this Regulation: packaging material composition; packaging recyclability; sorting instructions for consumers; sorting information for waste operators; reusability; recycled content; requirements to either show or conceal a specific packaging Producer Responsibility Organisation identifier

a. May make additional communications on these topics on pack or online, provided these align with *Regulation of the European Parliament and of the Council on substantiation of green claims* and *Directive of the European Parliament and of the Council amending Directives*

2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better information and protection against unfair practices and other EU or national law

b. May use symbols and labels developed for consumer packaging on tertiary packaging where this is accurate and appropriate to the material in question; they shall not adapt or manipulate the appearance or meaning of such labels if they do so.

c. Do not need to phase out existing labels until the entry into force of new harmonised labelling requirements as described in Measure M27c-y.

Commentary: *too rapid a phase out of existing packaging will be expensive, inefficient and unnecessarily punitive for operators who have aligned with national requirements to date]*

d. May provide additional scheme specific information including identifying symbols in the case of DRS systems for recycling or reuse of beverage containers or other product- or item-specific takeback systems for recycling, or reusable or refillable packaging, where communicating scheme compatibility to consumers is essential

Commentary: *See discussion re Member State exemptions above; Scheme Operators or individual Economic Operators also need to be able to run non-national or own-product schemes*

Definitions*: "reusable" and "refillable" needs to align with wider definitions in the Regulation. Intent here is that reusable packaging is returned to the producer and refillable packaging is retained by the consumer. We do not want to do anything that might inhibit the growth of either activity. See also discussion at M12u.*

i. In the case of a packaging PRO operating a scheme as described above, they may require such additional scheme specific information or identifying symbols as a pre-requisite for inclusion of specific packaging items

ii. Packaging PROs shall not require the use of a PRO specific symbol on packaging unless this is part of signalling compatibility with a specific takeback scheme as described above

Commentary: *everything should be subject to packaging EPR over time, so simply promoting a brand like Green Dot serves no function; whereas demonstrating packaging is part of a DRS, or needs to be returned to a specific location to be reused, is essential information to enable consumer behaviour*

Context/background of relevance:

1. *Elements of this measure for Member States may not need to be spelt out (as they should not be legislating in areas where the Commission has set out harmonised requirements); however we know that this has not been the case with the existing PPWD, and note clarification on this kind of point is a feature of other EU legislation.*
2. *This measure as currently described does not cover*
   a. *biodegradability, compostability, or bioplastics labelling*
   b. *Symbols proposed in SUP Directive 2019/904 re plastics pollution[171]. These apply to products, with the exception of "cups for beverages", where there might be overlap with the labelling measures in the proposal.*

[171] https://ec.europa.eu/environment/news/single-use-plastics-pictograms-related-implementing-regulation-20202151-harmonised-markings-certain-2021-03-09_en

c. *the adoption and trialling of composite environmental indicators or labelling, where one or more of the elements described here contributes to the overall scoring or accreditation (see e.g. this pilot scheme* https://www.foundation-earth.org/*)*

d. *confusion arising from wider branding or eco-claims; however other Commission legislation will reduce issues arising.*

The Commission can determine whether these limitations in coverage need to be made explicit in drafting

3. *Directive of the European Parliament and of the Council amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better information and protection against unfair practices would prohibit (from draft text) "displaying a sustainability label which is not based on a certification scheme or not established by public authorities" – this is insufficient to achieve the ends of the measure proposed here as public authorities are setting these requirements*
4. *Other factors will also reduce confusion, independently of this measure:*

a. *Regulation of the European Parliament and of the Council on substantiation of green claims should restrict confusion in general e.g. proposed text (article 3, 3i): (from draft text) "The wording, imagery and overall product presentation, including the layout, choice of colours, images, pictures, sounds, symbols or labels, shall provide a truthful and accurate representation of the scale of the environmental benefit, and shall not overstate the environmental benefit achieved"*

b. *Confusion will also be reduced by the mandating of common standards in other measures in this Regulation, not just by banning of alternatives*

Therefore a key aim of this measure is maintaining the single market, rather than consumer understanding per se, though consumer understanding should be helped.

7.11.3 Measure M38j: Labelling criteria for provision of packaging recycled content information to consumers (voluntary scheme)

Commentary*: Note that there is some repetition between this section and M27c-y, as the same ground will need to be covered in drafting, though there may be ways to structure these measures together to avoid repetition in the final Regulation. The legislative phrasing here also needs to relate to the final legal wording selected for measures on recycled content more widely.*

The Commission:

1. Shall design and develop a standardised symbol indicating to consumers the recycled content of packaging, suitable for inclusion on packaging labels for primary and secondary packaging, and so readily visible and accessible to consumers when placed on packaging, by [date]. Application of this symbol is voluntary on the part of economic operators.

Commentary: *We propose the date here aligns with measure 27c-y. Use of the symbol on tertiary packaging would also be allowed, but this should not be a feature of development and testing as the primary audience is consumers, both for relevance, and for ensuring the avoidance of confusion with other symbols.*

2. There shall be allowance for equivalent or additional information on recycled content to be set out digitally at the discretion of the economic operator

3. The detail of this symbol shall be set out in an Implementing Act, no later than [date]. There shall be a transition period following this act coming into force of [three / four / five] years.
Commentary: *considerations the same as for 27c-y*

4. This symbol shall be subject to rigorous consumer testing and technical development centred on ease of understanding for consumers and avoidance of confusion with other packaging symbols in this Regulation.

Commentary: *There is a risk that recycled content symbols may confuse consumers in relation to recyclability, and this would need careful testing during any label development – including consideration of the fact the labels for different measures will appear together on packaging. These risks can best be managed by the required testing, and answered in an Implementing Act.*

This testing and development shall define the relevance and specification of the following:

a. Symbol design shall be defined and specified following development and consumer testing, prior to being confirmed in an Implementing Act.

Commentary: *The considerations around the design of this symbol on pack are similar to those for measure M27c-y above.*

b. [The symbol may include an indication of the recycled content percentage, aligned with the definition and certification of recycled content elsewhere in this regulation].

Commentary: *This is desired by producers, and may lead to competition to perform better, and even influence consumer choice. However, evidence consumer purchase decisions will be driven by this, or that any advantages for consumer behaviour in this regard are not outweighed by potential increased confusion across the broader suite of behaviours targeted by labelling measures, is limited – consumer testing may be desirable to resolve this. Additionally, the exact way in which recycled content claims are calculated may limit the validity or comparability of per item claims and is itself subject to an Implementing Act; there is therefore no point seeking to define the label in advance of knowing the methodology that would be required to validate the information.*

c. Symbol design shall account for international and EU standards on recycled content. The Commission shall consider ISO14021[172] and EU standards on recycled content in other PPWD measures in designing the final labelling symbol for this measure.

Commentary: *Specifically, ISO14021 includes detailed instructions as to the use of the Mobius loop symbol used for self-declared recyclable and recycled content claims, though it is notable that the Mobius symbol is also sometimes cited as confusing for consumers, and it seems likely/possible the new harmonised symbol may move away from the current ISO standard in this regard, hence use of the word "consider". Measure Mk might make any ISO standard using Mobius invalid in the EU too*

d. Alignment with medium-term trends for greater provision of harmonised sustainability information online.

Commentary: *see also 27c-y re product passports*

e. Alignment with other EU wide packaging labelling in this Regulation to ensure these are complementary and easily understood by consumers in combination as well as in isolation.

Commentary: *see 27c-y – in particular the point about a hierarchy of labels and the risk of confusion when labels are used in combination. The recycled content label is the least beneficial in*

[172] ISO14021:2016, https://www.iso.org/obp/ui#iso:std:iso:14021:ed-2:v1:en

our view for consumer behaviour change, so would be the one that would be most useful to amend to avoid confusion

f. Alignment with a certification scheme or distinct reporting requirements for Economic Operators as set out elsewhere in this Regulation shall be set out as part of the Implementing Act, taking into account the different information needs of consumers and regulators.

Commentary: *This measure does not entail a certification scheme for recycled content, it is only regulating how recycled content claims can be shared with consumers. It should reflect the recycled content certification in the rest of the Regulation, but how closely the consumer information on a specific bottle relates to a bottle, batch, or annual average (assuming percentages are shown on the label) should be treated pragmatically.*

Member States:

1. Shall not produce or legislate national or regional packaging information requirements for demonstrating the recycled content of packaging
   a. Applies from the entry into force of this legislation

Commentary: *applies from the entry into force of this Regulation; prevents Member States from setting unique national labelling requirements in the interim period between this Regulation and establishment of a harmonised approach*

   b. Member states that have set any symbols or labelling requirements up already shall remove them by [date]

Commentary: *as with 27c-y we would recommend Member States remove obligations immediately, but that there is no penalty for individual economic operators that continue to use legacy symbols until a full transition period has been allowed for and that transition period would also match 27c-y*

Economic Operators:

1. May choose to whether or not to use this symbol
2. May also use these symbols in online packaging or product information
3. In case an economic operator chooses to communicate packaging recycled content information on packaging, then they shall use the standardised symbol set out in this Regulation and subsequent Implementing Act.

Commentary: *Nothing in this section supersedes legal obligations to certify recycled content in line with other elements of the Regulation, or to accurately communicate Green Claims (on the latter see discussion under M27c-y). There may be scope for an additional article obligating Economic Operators to ensure alignment/ability to prove the recycled content level used on the label, but see also previous section on Commission requirements to define this in an Implementing Act*

4. If economic operators choose to use the recycled content label, they shall not
   a. increase packaging size (e.g. a minimum size for the label defined either by the absolute label size, and/or the proportion of packaging surface it can take up) or

b. add additional packaging complexity (i.e. the labelling requirement should not require extra material use, nor the addition of an additional material to the packaging item, nor make an item harder or less valuable to recycle) or

c. supersede any rules that may be set out in the Implementing Act limiting use of the recycled content labelling in cases where it might be confusing with other symbols

Commentary: *As a voluntary measure, formal exemptions are not needed in the same way as for other labelling measures but this expectation on the Economic Operator might guard against unintended consequences. It is the same as the legal exemptions under the mandatory measures e.g. Measure M27c-y above*

5. Shall not create or use alternative pictograms or symbols to communicate packaging recycled content information, though they may use additional words or design features.
6. May provide additional detail on recycled content on-pack, or online.
7. Economic operators do not need to phase out existing labels until the entry into force of new harmonised labelling requirements as described under point 1 above.

Context/background of relevance:

1. *This measure does not cover certification schemes for recycled content. Certification schemes do not require consumer communication to work. But labelling should match certification where practicable (bearing in mind consumer information needs may be less precise than those needed by a regulator). Alignment should be considered further as part of the Implementing Act above.*
2. *Standardising provision of this information may additionally inform consumer purchasing preferences or encourage competition between economic operators against this sustainability metric, if demonstrating recycled content provides them with a marketing or reputational advantage. This does not need additional action in the Regulation.*
3. *As a voluntary label, in practice we expect take-up is most likely in the (PET) drinks sector that have requested this.*
4. *Economic operators are keen to see this measure aligned with measure Mk, to avoid fragmentation of the market in relation to how recycled content is labelled by the imposition of individual Member State requirements.*

7.11.4 Measure M12u: Labelling criteria for packaging information to show reusability to consumers (mandatory measure variant)

Commentary: *As in previous section, there is overlap between requirements here and for M27c-y.*

A key challenge in drafting the Regulation for this measure is not to stifle innovation in an evolving sector where the best delivery models are not yet established or necessarily proven; this is a bigger risk with the mandatory variant of this measure than the original voluntary measure, and is likely to cause significant stakeholder concern. We have highlighted ways this risk might be reduced below.

Definitions and scope: *As phrased here we assume mandatory labelling only for reusable packaging that is returned to the producer for reissue - and not refillable packaging that remains*

with the consumer for multiple trips, though this latter might be also suitable for this measure in cases where it was standardised/required for interoperability with a specific refillable system.

*Currently, often refillable containers of this second type will have been sold as a "product" rather than as "packaging", but reuse business models are likely to evolve and care must be taken to both future proof the regulation **and** to avoid stifling innovation.*

This distinction between "reusable" and "refillable" packaging is suggested (though not defined this way) in the CEN standard and featured in the Commission Impact Assessment for this measure.

CEN 13429:2004 defines some of the terms here but there is a proposed action for the Regulation to request an update to this in the wider Impact Assessment. We are not sure how the Commission will pursue this, so the CEN definition may not be suitable. If the Commission propose a specific definition of reuse for this Regulation, that can be used.

The Commission:

5. Shall design and develop a symbol to indicate that an item of packaging is [reusable and can be returned to a reuse system], suitable for inclusion on packaging labels for primary and secondary packaging, and so readily visible and accessible to consumers when placed on packaging, and therefore designed to facilitate consumer sorting of packaging after use, by [date]

Commentary: *Blue text to be matched to wider definitions in Regulation.*

Note that this symbol serves greatest value when it is designed to facilitate a reuse system with a return-to-producer element for the packaging item rather than a refill system where the consumer retains the packaging item for multiple trips. It might also facilitate a refill system where the packaging item is retained by the consumer but is uniquely compatible with a specific system.

An EU-wide symbol will not be sufficient to communicate where and how specific packaging items can be returned, and thus this measure needs to be less legally restrictive overall than other labelling measures, as this secondary information will need to be communicated effectively by individual reuse systems, and system-specific symbols may be part of this (e.g. DRS for reusable drinks containers). This is highlighted in subsequent points.

This approach tacitly excludes non-packaging (as exemplified in Annex 1 PPWD – e.g. tool boxes) of course but there is a risk confusion may arise in discussion of "reusable" packaging which may need to be specifically guarded against – stakeholders producing items such as tool boxes were concerned during consultation (at which point the measure was not proposed as mandatory – they are likely to be even more cautious about it now)

6. The reuse symbol shall be subject to rigorous testing and development centred on ease of understanding for consumers and likelihood to prompt optimal disposal behaviour at end of use, prior to being confirmed in an Implementing Act.
7. This testing and development shall define the relevance and specification of the following:
    a. Symbol design (the exact range and nature of symbols required, preferred colours, non-colour alternatives, preferred size, labelling approach to composite or multi-component materials)

Commentary: *This wording is identical with M27c-y, and we would expect the technical requirement to be the same too. Commission may also wish to provide for the option to present information on minimum or average number of rotations, but we would advise against this in line with stakeholder feedback – this is not necessary information for the consumer at the point of their*

reuse decision, and may easily be confusing and lead to sub-optimal behaviour, however this could be tested for during development if desired

b. Alignment with other EU wide packaging labelling to ensure these are complementary and easily understood by consumers in combination as well as in isolation

Commentary: *see previous discussion re hierarchy/exemptions of labelling*

c. Consideration of whether similar labelling requirements should be applied to both reuse and refill systems, to reuse systems only, or there should be linked but distinct labels.

Commentary: *It is not clear what will add most value to the consumer at this stage; extensive testing and consultation on design is far more essential for a mandatory scheme than for a voluntary one*

d. Exemptions on the basis of

i. Avoiding increased packaging size and complexity (see measure M27c-y)

ii. Reusable packaging produced before [date] and retained in use is exempt from this requirement.

Commentary: *we do not wish to force early retirement of reusable containers; many will get relabelled when reused anyway, but to avoid discouraging reuse behaviour (which is still nascent and small scale in many cases) we suggest a broad exemption on this point. The date is potentially the coming into force of the Implementing Act for labelling.*

iii. De minimis to allow small scale, pilot, or hyper-local reuse provision to experiment and thrive

Commentary: *Reusable packaging is still an area where small scale provision and experimentation are common and we do not wish to stifle either. As this measure was originally voluntary there has been no consultation on the need or level for de minimis requirements, but they seem desirable given the undeveloped state of this market. This could be determined in the Implementing Act when other questions around the extent of coverage of this measure are answered*

e. Guidance on best practice in cases where the same packaging is considered reusable in one location (i.e. reuse systems are in place) but not in another (where they are not)

Commentary: *this is an element that becomes pressing with the mandatory variant of this measure, but may be resolved by other Commission measures on defining reuse; allowance for provision of local takeback instructions and scheme symbology may mitigate this somewhat, but it will be deeply unhelpful if the symbol is used on packaging a consumer cannot, in fact, reuse*

8. The detail of this symbol, including all elements set out above, shall be set out in an Implementing Act, no later than [date]. There shall be a transition period following this act coming into force of [five] years.

Commentary: *Legislation date potentially matches M27c-y. Longer might however make sense for reuse – a relatively untested consumer information requirement and one where the systems of the future are not yet known, however, not synchronising labelling changes may cause inefficiencies for Economic Operators in some cases. In any event, a transition period is recommended as longer than for M27c-y both to account for slow turnover of reusable packaging – though see exemption above – and to allow business / reuse systems with reusable packaging as long as possible to optimise how this will work for them. Reusable packaging models are currently either small scale, or very well established and high performing, and we want to disrupt them as*

little as possible in both cases. There was minimal support for a mandatory label from stakeholders, so giving as long a transition as possible seems desirable if this route is nonetheless pursued

9. Allowance for equivalent or additional information on reuse may be set out digitally at the discretion of the economic operator, or in cases of exemption for on-pack labelling. In these conditions the Commission may require a link to digital information is provided (also subject to the exemptions above). The Commission shall not specify the technology to be used for the provision of such digital links.

10. The Commission shall allow the creation of symbols (or other detailed "how to" instructions) demonstrating a packaging item is suitable for reuse in a specific reuse system by Economic Operators responsible for running such a reuse system. Such symbols or additional information may be placed alongside the harmonised symbol.

Commentary: *Like a single-use DRS, a reuse system must have the ability to show which items are eligible for return to the system for both consumers, and potentially business sites that accept return, and any incentive, such as a deposit, that is available; systems may additionally need to communicate greater detail about where to return etc. This need may also exist for some Refill systems if dedicated containers are used; such containers may or may not be provided as "packaging" depending on how refill business models develop*

11. [Note on provision on guidance and support in common with M27c-y*]*

Member States:

1. Shall not produce their own national or regional requirements for labelling packaging reuse or refill either on pack or digitally
   a. Possible exemption in line with Mk above for system specific labelling (e.g. existing reusable DRS eligibility symbols).

Commentary: *However this may be better as an Economic Operator exemption for PROs or businesses operating a reusable packaging system rather than Member States; as with M27c-y Member States only need to act in the case of a national scheme that products are required to join, but even then labelling requirements can be left to the scheme PRO*

2. Shall remove any national or regional requirements for labelling packaging reuse or refill in line with measure 27c-y re timings etc (and also the exemption above)

Economic Operators placing packaging on the market

1. Shall display appropriate symbols indicating packaging reusability on their packaging in line with the requirements and any exemptions indicated in the Implementing Act
2. May also use these symbols in online packaging or product information, including in cases where the packaging itself is exempt
3. Economic operators providing a reusable packaging system (whether individually or as part of a PRO) may develop or retain scheme specific symbols, or provide additional information on-pack or digitally, to aid public understanding of where and how to return packaging for reuse

Commentary: *As with earlier sections on definitions, whether this extends to refill needs consideration by the Commission in relation to wider reuse measures in the Regulation*

Context/background of relevance:

1. *Similar to measure 27c-y in many cases*
2. *There is a need to refer to other text in the Regulation on defining reuse – the label can only be used on packaging that meets specific reusability criteria. However, considering refill systems, and avoiding stifling innovation are key considerations too.*
3. *Reuse is mentioned but labelling for reuse is not addressed in detail in articles 8 and 13 of the PPWD currently (beyond the high-level expectations to communicate to consumers in article 13) so this is a wholly new requirement.*
4. *There is a strong case for a much stronger requirement to communicate the new reuse label than in the current PPWD or for the other labels proposed here. Given the limited extent of reusable packaging currently the public will not get default and extensive exposure to this label initially; where they do it will often be in relation to a successful existing reuse scheme (e.g. DRS for reusable containers in countries like Germany or Denmark) and avoiding confusion – there is no change in the functioning of these schemes – will be important*

7.11.5 Measure Mx: Update current material-based labelling requirements

Commentary: *Note that part of this measure is about not transferring articles from the PPWD into the new Regulation. The existing Directive 94/62/EC requirements (Article 8 (2)) would not be copied across, and would be replaced by the requirements outlined above, for M27c-y in particular. In addition we suggest that acceptable use of the alphanumeric labelling system for other purposes is explicitly set out in the legislation to eliminate continuing confusion.*

The Commission:

1. Shall prohibit Member States from requiring the use of alphanumeric labelling on all packaging (primary, secondary, and tertiary).

Commentary: *This should be implicit in measure Mk, and is already part of EU law but not complied with, so it may be worth explicitly mentioning alphanumeric labelling in those restrictions at Mk to avoid confusion. The timing for Member States and Economic Operators respectively should match that in Mk. Note however that some of the other labelling measures in the Regulation are consumer facing and cover only harmonisation of primary and secondary packaging – some national legislation re. alphanumeric codes covers tertiary packaging too, so the scope needs to be matched – this is also mentioned in measure Mk*

2. Shall commit to a review of labelling requirements that would facilitate packaging waste sorting in the waste management industry in light of emerging technologies; this review will be completed by [date].

Commentary: *This should be after the WFD as the decisions there on collections, and potentially products, may impact the aims and objectives of approaches with new technologies*

3. May introduce by means of an Implementing Act additional packaging labelling requirements that would facilitate packaging waste sorting in the waste management industry in light of emerging technologies and the review mandated above. This Implementing Act shall not be passed earlier than [date].

Commentary: *There may be an advantage to reassuring packagers that they have time to embed other changes in the Regulation before more will be required*

4. Shall allow Economic Operators to make continued use of alphanumeric material codes for purposes other than labelling packaging, and will provide a list of such codes as a guidance document.

Commentary: *The codes are used for some industrial applications, and to enable industry to have a shared frame of reference in some niche applications. This article will eliminate any downsides of removing these codes from legislation*

Member States:

1. Shall remove any national or regional mandatory requirements for labelling primary, secondary, or tertiary packaging with alphanumeric codes

Commentary: *See also measure Mk, which will cover this; but there may be value in making this need around alphanumeric explicit given the number of jurisdictions that have/are considering including this requirement in national legislation. As in measure Mk, we suggest requirements should be removed immediately, but Economic Operators would only be obliged to change their packaging in line with the wider harmonisation and transition timings for the labelling measures overall*

2. Shall not restrict the use of alphanumeric codes for applications other than labelling of packaging

Economic Operators:

1. Economic Operators are not required to phase out existing labels until the entry into force of new harmonised labelling requirements as described under M27c-y.
2. May continue to use alphanumeric codes for any purpose other than on-pack packaging labels.

Context/background of relevance:

12. The rules that would cease to apply are:

- *Article 8 of Directive 94/62/EC on packaging and packaging waste* ***provides a marking system for packaging and an identification system for packaging materials****. Article 8 (2) of this Directive provides that "[...] packaging shall indicate [...] the nature of the packaging material(s) used on the basis of Commission Decision 97/129/EC".*
- *The identification system itself is established in Commission Decision 97/129/EC and contains numbers and abbreviations.* ***Article 3 stipulates that the use of the numbering and abbreviations of the identification system shall be voluntary for the packaging materials mentioned****.*

13. While measure Mk plus the new labelling measures plus removal of the above requirements would in principle eliminate use of alphanumeric coding on packaging, there is currently non-compliance in this area[173], and there would be an advantage to explicitly restricting

[173] *REFIT Platform Opinion on the EU Packaging material by a Member of the Stakeholder Group (Mr Loosen),* 19/03/2018

alphanumeric codes for the avoidance of doubt, given how long they have been a feature of the PPWD and waste management landscape.

8 Task 6 – Plastic Carrier Bags and compostability

The measures relating to plastic carrier bags build upon recommendations made in the European Commission studies *Implementation of the EU Lightweight Plastic Carrier Bags Directive* and *Relevance of Biodegradable and Compostable Consumer Plastic Products and Packaging in a Circular Economy.* The measures considered are:

- Three measures designed to strengthen the plastic carrier bags reporting regime:
  - Measure 1 – mandatory reporting of consumption data on plastic carrier bags with a wall thickness ≥50 microns;
  - Measure 2 – setting an upper wall thickness threshold of 99 microns for the plastic carrier bags included under mandatory reporting on Measure 1, with voluntary reporting of consumption data on bags above this threshold; and
  - Measure 3 – mandatory reporting of separate, disaggregated consumption data on <15 micron and 15<50 micron lightweight plastic carrier bags.
- The implementation of a definition of 'sustained reduction' that would in effect require all Member States to achieve a consumption reduction target of 40 lightweight plastic carrier bags per capita by 31st December 2025.
- Measure 29d, which seeks to put in place criteria for which types of packaging should be made only from compostable plastic.

8.1 Reporting obligations Impact Assessment

8.1.1 Introduction

Directive (EU) 2015/720[174] (hereafter referred to as the 'Plastic Bags Directive') was introduced to reduce consumption of lightweight plastic carrier bags (LPCBs) in order to combat littering, change consumer behaviour and promote waste prevention. The Plastic Bags Directive amends the Packaging and Packaging Waste Directive (hereafter referred to as the PPWD),[175] which was adopted in order to prevent/reduce the impact of packaging and packaging waste on the environment.

Article 3 of the PPWD defines both LPCBs and very lightweight plastic carrier bags (VLPCBs), which are a subset of LPCBs, as well as plastic carrier bags in general. These categories of bag are differentiated in terms of wall thickness, as measured in microns, with one micron equalling one-thousandth of a millimetre. LPCBs are bags with a wall thickness of 0<50 microns, while VLPCBs are bags with a wall thickness of 0<15 microns. The scope of the Plastic Bags Directive is therefore plastic carrier bags with a wall thickness 0<50 microns.

Article 4(1a) of the PPWD requires Member States to take measures to achieve a sustained reduction in the consumption of lightweight plastic carrier bags (LPCBs) in their territory, either through the adoption of measures to ensure consumption does not exceed specified target levels

[174] DIRECTIVE (EU) 2015/720 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2015 amending Directive 94/62/EC as regards reducing the consumption of lightweight plastic carrier bags, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015L0720

[175] EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE 94/62/EC of 20 December 1994 on packaging and packaging waste, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01994L0062-20150526

as set in the Directive, or by prohibiting the provision of LPCBs free of charge at the point of sale of goods and services.

To this end, Article 4(1a) empowers Member States to adopt marketing restrictions in derogation of Article 18 of the PPWD in order to reduce consumption of LPCBs.

To comply with Article 4(1a), Member States may take either, or both, of two options:

> *(a) the adoption of measures ensuring that the annual consumption level does not exceed 90 lightweight plastic carrier bags per person by 31 December 2019 and 40 lightweight plastic carrier bags per person by 31 December 2025, or equivalent targets set in weight. Very lightweight plastic carrier bags may be excluded from national consumption objectives;*
>
> *(b) the adoption of instruments ensuring that, by 31 December 2018, lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products, unless equally effective instruments are implemented. Very lightweight plastic carrier bags may be excluded from those measures.*

Note that VLPCBs may be excluded from national consumption objectives under option a) and from measures under option b).

While Member States may not adopt marketing restrictions on plastic carrier bags (PCBs) with a wall thickness equal to or greater than 50 microns, Article 4(1b) empowers them to use economic instruments and national reduction targets in order to reduce consumption of these thicker bags (hereafter referred to as '≥50 micron PCBs').

Commission Implementing Decision (EU) 2018/896[176] requires Member States to calculate and report annual LPCB consumption data for the purpose of monitoring their performance against the consumption reduction requirements of the Plastic Bags Directive. Member States may report national consumption of LPCBs by either number or weight, using one of four reporting tables provided in the Appendix to Commission Implementing Decision (EU) 2018/896. Provision of consumption data on all LPCBs (i.e. of 0<50 microns) is mandatory, while disaggregated data on VLPCBs (i.e. 0<15 microns) and LPCBs of 15<50 microns, as well PCBs ≥50 microns, is requested on a voluntary basis.

Member States (and EEA countries) were required to report consumption data for the first time in 2020, for reference year 2018. Currently, data for reference years 2018 and 2019 has been reported to Eurostat, and this data constitutes the official dataset showing how the Plastic Bags Directive has impacted consumption rates of LPCBs across the EU.

Article 20a(1) of the PPWD states that:

> *By 27 November 2021, the Commission shall present a report to the European Parliament and to the Council, assessing the effectiveness of measures in Article 4(1a) at Union level, in combating littering, changing consumer behaviour and promoting waste prevention. If the assessment shows that the measures adopted are not effective, the Commission shall examine other possible ways to achieve a reduction in the consumption of lightweight plastic*

[176] COMMISSION IMPLEMENTING DECISION (EU) 2018/896 of 19 June 2018 laying down the methodology for the calculation of the annual consumption of lightweight plastic carrier bags and amending Decision 2005/270/EC, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.160.01.0006.01.ENG

carrier bags, including the setting of realistic and achievable targets at Union level, and present a legislative proposal, if appropriate.

The requirement to present a report assessing the effectiveness of the measures in Article 4(1a) was fulfilled via the Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive[177] (Directive 2015/720), undertaken by Eunomia on behalf of the Commission. This study was based on the two years of consumption data reported to Eurostat (although 2019 data was provisional and not yet verified at the time of writing), along with information gathered via surveys of Member States and supplementary information from other sources. On the 2018 data, for those countries that reported and whose data was judged fit for publication by Eurostat, median consumption was found to be 120 LPCBs per capita, while on the provisional 2019 data consumption was found to 105 LPCBs per capita.

While it was possible to give this high level assessment, the study identified a number of issues with the current reporting requirements and subsequent data provision that mean it is not possible to adequately assess whether the provisions of the Plastic Bags Directive are working in the way they were intended (i.e. to combat littering, change consumer behaviour and promote waste prevention). In brief, these issues are:

- A lack of data on consumption of VLPCBs and ≥50 micron PCBs means that it is not possible to assess whether consumption of these bags has increased in response to reduction measures targeting 15<50 micron LPCBs, as a substitution effect.
- Where Member States exclude VLPCBs from their consumption targets/reduction measures, a lack of data on VLPCBs can mean it is not possible to assess their performance against the requirements of the Plastic Bags Directive.

In response to these issues, the Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive (Directive 2015/720) proposed the following measures concerning increased reporting requirements:

- Reporting on consumption of ≥50 micron PCBs should be made mandatory;
- Reporting of disaggregated consumption data on VLPCBs and 15<50 micron LPCBs should be made mandatory; and
- Member States (and EEA countries) should be required to report the number/weight of VLPCBs excluded from their consumption targets/reduction measures.

In addition, there is a question of where the upper threshold for reporting should be set, in terms of wall thickness. The study concluded that, pending further investigation, a 100 micron threshold may be sensible. On this basis, reporting on PCBs with a wall thickness equal to or greater than 100 microns (hereafter referred to as '≥100 micron PCBs') could be either:

- Mandatory;
- Voluntary; or
- Not requested.

These changes would be enacted via amends to be made to the Plastic Bags Directive (and therefore to the PPWD), and to Decision 2018/896 containing the rules and formats for Member State reporting on PCBs.

[177] European Commission, Directorate-General for Environment, Sherrington, C., Watson, S., Marsh, P., et al., Scoping study to assess the feasibility of further EU measures on waste prevention and implementation of the Plastic Bags Directive . Part II, Implementation of Plastic Bags Directive, 2022, https://data.europa.eu/doi/10.2779/304791

8.1.2 Current state of data collection and reporting

The data reporting regimes currently vary considerably across Member States and EEA countries, as is shown in Table 8-1. There is variation in both the methods of data collection used, as well as the type of information collected.

- While some collect data via EPR schemes, others collect it through surveying and sampling of different stakeholders
- Some countries already report separately on VLPCBs (<15 micron) bags and ≥50 micron PCBs, whereas others do not.

There is also a distinction between the entities from whom data is collected. Most data regimes collect the information from producers / importers of bags. A few obtain information from retailers, which would involve a larger number of collection points when compared with collecting information from producers to achieve complete coverage of the data. Where retailer information is collated, in a few cases this is done via a survey, in which case data are likely to be less robust. Therefore, some regimes look to place higher burdens on industry than others.
The above confirms that changes to the reporting obligations will potentially have a different impact in different countries.

8.1.3 Measure 1: including PCBs with a wall thickness ≥50 microns

The Plastic Bags Directive requires that Member States achieve a sustained reduction in consumption of LPCBs (i.e. 0<50 microns), and the reporting requirements are correspondingly designed to gather consumption data on these bags in order to measure performance against this requirement. Data on ≥50 micron PCBs, meanwhile, can be provided voluntarily. However, there is a risk that reduction measures targeting LPCBs may have a substitution effect, whereby consumers merely switch to using ≥50 micron PCBs at similar rates of consumption.

Measure 1 therefore considers extending the current requirements on Member States (on reporting the annual consumption of PCBs to the Commission) to include mandatory reporting on consumption of PCBs with a wall thickness equal to or greater than 50 microns.

8.1.3.1 Description of the measure

Measure 1 considers the situation where the requirements on Member States to report annual consumption of PCBs (Article 4 of the PPWD) to the Commission are extended, to include PCBs with a wall thickness ≥50 microns. Data on these bags would be reported as a separate category (as is currently the case on a voluntarily basis), rather than being combined with data on VLPCBs.

The rationale for the Measure is that without consumption data on ≥50 micron PCBs, it is not possible to know what substitution effects reduction measures aimed at LPCBs are having, in terms of shifting consumption to heavier PCBs. Therefore, it is not possible to know if the Plastic Bags Directive is having the perverse consequence of increasing consumption of ≥50 micron PCB.

The Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive identified three national datasets providing evidence of substitution. While for Germany and Spain the data indicated a limited amount of substitution, UK data showed that from 2017 to 2019 sales of single-use bags in the largest 10 supermarkets decreased by 56%, while sales of 'Bags for Life' increased by 65%, equating to something like a one-to-one substitution of LPCBs with ≥50 micron PCBs. There is therefore a risk that similar substitution effects to those seen in the UK may be occurring in the EU.

Table 8-1: Data Collection Method and Voluntary Data Reported, 2019

Country	Source(s) of Data	Stakeholders Involved	Reports Data on <15 micron LPCBs?	Reports Data on ≥50 micron PCBs?
Austria	Producer/importer reporting via EPR scheme	Producers/importers PROs Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (reports to Eurostat)	Yes	No
Belgium	Producer/importer reporting via EPR scheme	Producers/importers PRO (Fost Plus) Interregional Packaging Commission (reports to Eurostat)	Yes	No
Bulgaria*	Statistical survey of retailer sales data	Retailers National Statistical Institute Ministry of Environment and Water (reports to Eurostat)	No	No
Croatia	Producer/importer reporting via EPR scheme	Producers/importers Environmental Protection and Energy Efficiency Fund (manages EPR) Ministry of Economy and Sustainable Development / Institute for Environment and Nature (reports to Eurostat)	Yes	Yes
Cyprus	Producer/importer survey Retailer survey Statistical Service estimates based import and sales data	Producers/importers Retailers Statistical Service Department of Environment, Ministry of Agriculture, Rural Development and Environment (reports to Eurostat)	Yes	No
Czech Republic	Producer/importer via EPR scheme	Producers/importers PRO (EKO-KOM) Ministry of the Environment of the Czech Republic (reports to Eurostat)	Yes	No

Country	Source(s) of Data	Stakeholders Involved	Reports Data on <15 micron LPCBs?	Reports Data on ≥50 micron PCBs?
Denmark	Consultancy estimate based interviews with producers/importers	Producers/importers NIRAS (consultancy) Danish Plastics Federation (provided average bag weights) Danish Environmental Protection Agency (reports to Eurostat)	Yes	No
Estonia	Producer/importer reporting to Packaging Register Retailer survey (0.4% of market)	Producers/importers Retailers Skepast ja Puhkim (research institute) Estonian Environment Agency (reports to Eurostat)	Yes	No
Finland	Producer/importer reporting via packaging register	Producers/importers Finnish Packaging Recycling RINKI Ltd. (manages the register) The Centre for Economic Development, Transport and the Environment for Pirkanmaa (reports to Eurostat)	Yes	Yes
France	Retailer survey Bioplastics industry estimate (for bioplastic bags)	Retailers French Trade and Retail Federation Bioplastics industry organisations French Ecological Transition Agency (ADEME) Ministry for an Ecological Transition (reports to Eurostat)	No	No
Germany	Retailer survey	GVM Gesellschaft für Verpackungsmarktforschung mbH Umweltbundesamt (German Environment Agency - reports to Eurostat)	Yes	Yes
Greece	Producer/importer reporting to National Producer's Registry (weight PoM) Retailer reporting of sales and revenue from charge	Producers/importers Retailers Hellenic Recycling Organisation (manages registry) Independent Authority for Public Revenue Ministry of Environment and Energy (reports to Eurostat)	Yes	Yes

Country	Source(s) of Data	Stakeholders Involved	Reports Data on <15 micron LPCBs?	Reports Data on ≥50 micron PCBs?
Hungary	Producer/importer reporting to National Tax and Customs Administration (under environmental product fee)	Producers/reporters National Tax and Customs Administration Ministry for Innovation and Technology (reports to Eurostat)	Yes	Yes
Ireland	Retailer reporting of revenue from bag levy, made to Revenue Commissioners Distributor and retailer survey (on bags exempt from bay levy)	Retailers Department of Finance / Revenue Commissioners University College Dublin (conducted survey on exempt bags) Department of the Environment, Climate and Communications (reports to Eurostat)	Yes	No
Italy	Producer/importer reporting via EPR Monitoring of sales data (≥50 micron PCBs)	Producers/importers CONAI – National Packaging Consortium Italian Institute for Environmental Protection and Research (collects data and reports to Eurostat)	Yes	Yes
Latvia	Producer/importer reporting via EPR	Producers/importers PROs State Environmental Service of Latvia (reports to Eurostat)	Yes	Yes
Lithuania	Producer/importer reporting to EPA Retailer reporting to EPA	Producers/importers Retailers Environmental Protection Agency (reports to Eurostat)	Yes	No
Luxembourg	Producer/importer reporting via EPR/PRO	Producers/importers Valorlux (manages EPR scheme) Administration de l'environnement (reports to Eurostat)	Yes	No
Malta	Import data (based on shipping codes)	National Statistics Office Environment and Resources Authority (reports to Eurostat)	No	No

Country	Source(s) of Data	Stakeholders Involved	Reports Data on <15 micron LPCBs?	Reports Data on ≥50 micron PCBs?
Netherlands	Retailer survey	Retailers Ministry of Infrastructure and Water Management (reports to Eurostat)	Yes	Yes
Poland	Retailer reporting via electronic registry	Retailers Marshals of the voivodeships Ministry of Climate and Environment (reports to Eurostat)	Yes	Yes
Portugal	Retailer reporting to Tax and Customs Authority	Retailers Tax and Customs Authority Portuguese Environment Agency (reports to Eurostat)	No	No
Romania	Producer/importer reporting	Producers/importers National Environmental Protection Agency (reports to Eurostat)	No	Yes
Slovak Republic	Producer/importer reporting to Ministry of Environment	Producers/importers Ministry of Environment (reports to Eurostat)	Yes	Yes
Slovenia	Producer/importer reporting to Finance Administration (under environmental tax) Retailer reporting to Environment Agency (on <15 micron LPCBs not exempt and so charged for)	Producers/importers Retailers Financial Administration of the Republic of Slovenia (Ministry of Finance) Slovenian Environment Agency (data collection and reports to Eurostat)	Yes	Yes
Spain	Producer/importer reporting to public register	Producers/importers Ministry for the Ecological Transition and the Demographic Challenge (reports to Eurostat)	Yes	Yes
Sweden	Producer/importer survey made by Swedish Environmental Protection Agency	Producers/importers Swedish Environmental Protection Agency (collects data and reports to Eurostat)	Yes	Yes

Country	Source(s) of Data	Stakeholders Involved	Reports Data on <15 micron LPCBs?	Reports Data on ≥50 micron PCBs?
Norway	Producer/importer reporting via EPR scheme	Producers/importers Green Dot Norway (manages EPR scheme) Norwegian Environment Agency (reports to Eurostat)	No	No

*Information for Bulgaria is for reference year 2018, as it did not report data on plastic carrier bag consumption to Eurostat for the reference year 2019.

Furthermore, the Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive found that 14 Member States have targeted ≥50 micron PCBs in their reduction measures.[178] Collecting consumption data on ≥50 micron PCBs would allow the performance of such targeted measures to be assessed, and allow for comparison with Member States not targeting these thicker bags.

8.1.3.2 Effectiveness

Currently, only 12 Member States collect data specifically on ≥50 micron PCB consumption (as shown in Table 8-1), and potential substitution effects can only be identified for those countries. The measure would therefore address the data gaps for those countries that do not currently collect data on ≥50 micron PCBs.

If Member States provided consumption data on ≥50 micron PCBs as a result of Measure 1, then the Commission would be able to observe the relative consumption rates of these thicker bags and LPCBs in Member States, and would then be able to assess whether any substitution effects are occurring. The Commission would also be able to observe how consumption reduction measures targeting ≥50 micron PCBs are impacting consumption rates in those Member States that have introduced such measures.

The Plastic Bags Directive is intended reduce consumption of LPCBs to combat littering, change consumer behaviour and promote waste prevention. However, the intention is not that it should increase consumption of other types of PCBs. Measure 1 would provide the data necessary to tell if this is happening and would therefore allow a properly informed assessment of the impacts of the Directive.

It is possible that collecting consumption data on ≥50 micron PCBs would reveal that consumption has increased in response to measures targeting LPCBs. Should the Commission decide to extend the scope of the Plastic Bags Directive to ≥50 micron PCBs in the future — such that Member States be required to implement consumption reduction measures on these bags — then the existence of robust consumption data will be valuable in informing policy in this area (e.g. in the setting of consumption reduction targets).

The primary barrier to the effectiveness of the measure is the data not being available in any given Member State.

8.1.3.3 Ease of implementation

As was discussed in Section 8.1.2, reporting regimes differ across Member States. In 2019, 20 countries collected data via producers/importers and of these 10 are already collecting consumption data on ≥50 micron PCBs. Meanwhile, 12 countries collected data via retailer sources, with four of these collecting data on ≥50 micron PCBs. Note that some Member States collected data from both producers/importers and retailers.

Therefore, 14 countries were already collecting data on ≥50 micron PCBs in 2019, with the majority of these collecting this information via producers/importers. The change in reporting obligation would predominantly impact the remaining countries which are currently not yet collecting consumption data for ≥50 micron PCBs.

As noted above, the primary barrier to the effectiveness of the measure is the data not being available in any given Member State. Here, there is a distinction between data not being currently available simply because stakeholders (i.e. producers/importers, retailers, etc.) have not been asked to collect

[178] These are: Austria, Croatia, Czech Republic, Denmark, Finland, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Slovak Republic, Slovenia, and Spain.

it, and because some feature of the market means that it is very difficult or impossible to collect. It is instances of the latter case that present a serious barrier to effective implementation.

However, if there was clarity from the Commission on what producers/importers and retailers are expected to report through the setting of mandatory reporting requirements for ≥50 micron PCBs, then this should serve to stimulate and incentivise industry to generate and provide this data.

One barrier may be encountered where Member States collect data on LPCBs via administrative mechanisms associated with measures under option b), such that data is collected on the number of bags subject to a charge issued at the point of sale. Under such an approach, where ≥50 micron PCBs are not charged for, data will not be collected on these bags. Therefore, an additional data collection method would need to be introduced to capture data on ≥50 micron PCBs.

8.1.3.4 Administrative burden

The change in reporting obligations will have varying impacts depending on the existing reporting regimes in place in different countries. Feedback received from Member States during consultation confirmed that the burden of mandatory reporting obligations on ≥50 micron PCBs would fall primarily on the importers, producers and distributors of PCBs and secondarily on PROs, national packing registers and statistical offices. However, Member States were not able to provide estimation of administrative burdens (i.e. hours worked, or full-time equivalent posts) on importers, producers, or distributers.

Two Member States (Estonia, Germany) and Norway responded to a consultation on administrative burdens associated with mandatory reporting obligations of ≥50 micron PCBs. Estonia currently does not collect data on ≥50 micron PCBs, but stated that probably an obligation to do so would not add significant administrative burden to its national Packaging Register. However, it was not able to provide an estimate of additional burdens on producers, importers and distributors.

Estonia and Germany reported that the administrative burden on public authorities associated with meeting all of the current reporting requirements are equal to 10 hrs of work annually. Assuming that reporting regimes in other Member States require a similar amount of time, the total recurrent admin costs of the current reporting requirements under the PCB Directive are estimated €6,939 annually. Incremental increases on these burdens would be expected as a result of introducing Measure 1.

In Norway, ≥50 micron PCBs are currently part of the EPR scheme but are not reported separately from LPCBs, and separate reporting would require some additional time and cost, primarily to the producers, importers and distributors, and secondarily to producer responsibility organisation (PROs). No information was provided on estimated additional burden (i.e. hours worked, or full time equivalent employee posts) to importers, producers, distributors PROs, national packing registers and statistical offices.

For 2018 and 2019, Germany collected data on ≥50 micron PCBs from retailers party to a voluntary agreement to charge for PCB. However, this will change for data for reference year 2022 onwards, as Germany replaced its voluntary retail agreement with a ban on 15<50 LPCBs in 2022. The Federal Statistical Office is currently building a new reporting system for VLPCBs (exempt from the ban), and this reporting system will not include ≥50 micron PCBs.

Additionally, Estonia expressed concern about the time and administration required to amend its national Packaging Act in order to include mandatory reporting on ≥50 micron PCBs.

As noted above, 13 Member States were already collecting data on ≥50 microns PCBs voluntarily (as shown in Table 8-1). The 13 Member States currently not reporting data on ≥50 micron PCBs would need to undertake work to identify producers, importers and distributors of these bags. Assuming that each of the 13 Members States would require 20 hrs of one-off administrative work to identify and

register these economic operators, the annualised (over 20 years) one-off initial administrative costs associated with the implementation of Measure 1 would be around €27,000.

8.1.3.5 Economic impacts

It is not expected that there will be any significant economic impacts arising from changes to the reporting regime, other than those arising from the changes to administrative burdens outlined above.

8.1.3.6 Environmental impacts

It is not expected that there will be any environmental impacts directly arising from changes to the reporting regime. Better data will, however, allow the Commission to see whether the provisions are succeeding in achieving the environmental objectives – if this is not the case, the improvement in information will provide the evidence that further change to the provisions is necessary.

8.1.3.7 Social impacts

It is not expected that there will be any significant social impacts arising from changes to the reporting regime.

8.1.3.8 Stakeholder views

14 countries were already collecting data on ≥50 micron PCBs in 2019 (as shown in Table 8-1) and it is likely that these countries would therefore be favourable to a measure introducing a mandate for this practice. These countries presumably already see the value in collecting data on ≥50 micron PCBs, for both their own national purposes and contributing to an EU wide dataset. To the extent to which these countries see an EU dataset as valuable – in terms of both enabling comparisons of performance among Member States and assessments of EU performance as a whole – they would also presumably see value in having a complete, mandatory set of data that included the 13 Member States currently not reporting data on ≥50 micron PCBs.

Based on extensive previous experience consulting Member States on matters of carrier bag policy, one possible objection from Member States not already collecting data on ≥50 micron PCBs is that, as these bags are reusable and less likely to be littered, there is less justification for requiring mandatory provision of consumption data on them. The thinking here is that the Plastic Bags Directive was primarily created to address littering of LPCBs, and so requiring reporting on bags beyond the immediate scope of the Directive is somewhat removed from the original purpose of the legislation.

However, while it is true that addressing LPCB littering was a primary goal of the Plastic Bags Directive, another goal is achieving waste prevention. To the extent to which ≥50 micron PCBs are substituting LPCBs as a result of consumption reduction measures introduced in response to the provisions of the Directive, this would be antithetical to goal of waste prevention, and the Directive would not be achieving its aims as intended.

8.1.4 Measure 2: setting an upper threshold of 99 microns under Measure 1, with additional voluntary reporting on ≥100 micron PCBs

Measure 2 is intended to work in conjunction with Measure 1, and should only be considered in the instance that Measure 1 is also adopted.

Data on ≥50 micron PCBs can currently be provided voluntarily. Measure 1 proposes making this reporting mandatory, but does not include an upper wall thickness threshold for which PCBs should be included in the reporting. Measure 2 considers setting such a threshold at 99 microns, while allowing Member States to report annual consumption of ≥100 micron PCBs on a voluntary basis. Therefore,

Measure 2 supplements Measure 1 by providing clarity on the types of PCBs that should be included in the mandatory reporting under Measure 1.

8.1.4.1 Description of the measure

Measure 2 is intended to define an upper wall thickness limit for the mandatory reporting on ≥50 micron PCBs proposed under Measure 1. A 99 micron threshold is proposed, based on the best available evidence. Measure 2 supplements Measure 1, and should only be introduced in conjunction with Measure 1; there is no circumstance under which Measure 2 alone would be introduced.

There is a risk that ≥50 micron PCBs could be substituted for LPCBs in response to consumption reduction measures targeting LPCBs, and there is some evidence of this occurring. However, this risk is greater for PCBs closer to the 50 micron threshold, and there is evidence that ≥100 micron PCBs can be substantially different to LPCBs and thinner ≥50 micron PCBs.

Laboratory testing undertaken by the Irish Department of the Environment, Climate and Communications indicates that ≥100 micron PCBs bags are likely to be made from woven plastic textile material. Such bags will be more robust than LPCBs and even 50<100 micron PCBs. ≥100 micron PCBs are intended to have a long lifetime and to be reused many times (for example, Austria has in fact defined 'reusable PCBs' as those made from plastic fabric, or of comparable stability).

Therefore, while LPCBs and 50<100 PCBs are composed of plastic film material, there is evidence that ≥100 micron PCBs tend to be composed of plastic textile material. Measure 2 separates out the thicker, plastic textile bags so that mandatory reporting is not required, while leaving Member States the option of reporting consumption of these bags on a voluntary basis. A benefit of this would be that plastic film bags (50<100 microns) will not be reported in the same category as plastic textile bags. It should be noted that Germany has previously asked for clarity on what types of bags should be included in the currently voluntary ≥50 micron PCB category, and whether very thick PCBs should be included.

Due to the economics of their production in terms of resources spent, plastic textile bags have an inherently higher value than plastic film PCBs. They are, therefore, very unlikely to be provided free at the point of sale. The UK market shows that their cost price is generally more substantive than charges on LPCBs or 50<100 micron PCBs, and it is assumed that this is generally applicable across Member States of the EU. Due to their higher cost, as well as their usefulness, they are less likely to be littered than thinner PCBs, and the associated environmental impacts therefore generally expected to be much lower.

Therefore, a 99 micron threshold seems to be a sensible cut-off point for mandatory reporting requirements. Measure 2 proposes making this cut-off.

Measure 2 also proposes allowing Member States to report additional data on ≥100 micron PCBs on a voluntary basis. Voluntary provision of consumption data is felt to be more appropriate given that the adverse environmental consequences associated with these bags are less than for 50<100 micron PCBs. Furthermore, given the variation in data collection methods across Member States, some countries may find it difficult to provide data on ≥100 micron PCBs. The aim would be to encourage Member States to collect and provide this data, but without introducing a mandate that some may struggle to meet and without necessitating administrative burdens that may be difficult to justify on environmental grounds.

Consumption data on ≥100 micron PCBs would, however, be useful as further supporting evidence in respect of substitution impacts. With a full dataset covering VLPCBs, 15<50 micron LPCBs, ≥50 micron PCBs and ≥100 micron PCBs, it would be possible to observe how PCB consumption was

distributed over the full range of PCB types. It would then be possible to assess any relationships between consumption rates among the PCB types, in terms of substitutions from one category to another. The value of including ≥100 PCBs would be to complete the picture, and to help determine if these bags are in fact achieving high reuse rates.

8.1.4.2 Effectiveness

As noted in Section 8.1.3.2, currently 14 Member States collect data on ≥50 micron PCB consumption (as shown in Table 8-1). However, the scope of this data is not clear, in that the reporting regime does not provide an upper threshold limit for the wall thickness of the PCBs included. By introducing such a threshold at 99 micron PCBs, while allowing Member States to report consumption of PCBs above this threshold on a voluntary basis, the measure would provide clarity on the reporting requirements, while resulting in a clearly disaggregated data set.

Voluntary reporting under Measure 2 would likely result in a somewhat more restricted dataset that would nevertheless prove useful in understanding the relative consumption rates of all categories of wall thickness of PCBs. While it is less likely that there are substitution dynamics associated with ≥100 micron PCB, data on these bags would help to assess whether this is in fact the case.

Although these thicker bags carry a reduced risk of litter, their higher material content means that they must be reused multiple times in order to have the desired effects in terms of waste prevention. Voluntary data would also help to assess whether ≥100 micron PCBs are achieving the high reuse rates that they are designed for.

The main risk regarding the effectiveness of Measure 2 is that the 99 micron threshold has not been properly tested in consultation with Member States and industry, and there has been no investigation into the types of ≥50 micron PCB available on the EU market. As it stands, the threshold is based on one study undertaken by one Member State, and there is no evidence regarding how applicable it is to other Member States.

8.1.4.3 Ease of implementation

14 Member States reported data on ≥50 micron PCBs to Eurostat for the reference year 2019. The measure would require this information to be further categorised for those countries, such that PCBs of a thickness ≥100 microns could be identified separately.

It is not possible to know if the Member States already collecting data on ≥50 micron PCBs have set an upper wall thickness threshold on the types of PCBs on which they collect data. Measure 2 would require these countries to only collect and report data on PCBs with a wall thickness of 50<100 microns, while allowing for voluntary reporting of ≥100 micron PCBs. This is anticipated to be a relatively minor change to the reporting for these countries.

For the remaining 13 Member States that are not already collecting data on ≥50 micron PCBs, they would have to begin collecting data on 50<100 micron PCBs, with the potential to also collect data on ≥100 micron PCBs if they were able and chose to do so.

8.1.4.4 Administrative burden

Two Member States (Estonia and Germany) and Norway responded to a consultation on administrative burdens associated with reporting on ≥100 micron PCBs. Estonia suggested that reporting on ≥100 micron PCBs should be on a voluntary basis as these bags are likely to be reused by consumers.

The total recurrent admin costs of the current reporting requirements under the PCB Directive are discussed in section 8.1.3.4. Incremental increases on these burdens would be expected as a result of introducing Measure 2, where countries decide to report this information.

Germany confirmed that ≥100 micron PCBs are being used several times and do not have high littering potential, and that therefore it does not currently plan on collecting consumption data on these bags.

In Norway, ≥100 micron PCBs are currently part of the EPR scheme, but are not reported separately from LPCBs and doing so would require some additional time and cost, primarily to producers, importers and distributors, and secondarily to the PROs. No information was provided on estimated additional burden (i.e. hours worked, or full time equivalent employee posts) to importers, producers, distributors, PROs, national packing registers or statistical offices.

There would also potentially be the requirement to undertake work to identify producers, importers and distributors of these larger bags – leading to associated one off administrative burdens. This is expected to overlap somewhat with the work undertaken under Measure 1 on this area, where Member States also report the larger bags under Measure 2. In addition, the requirement is not mandatory so Member States will not necessarily collect this information.

8.1.4.5 Economic impacts

It is not expected that there will be any significant economic impacts arising from changes to the reporting regime, other than those arising from the changes to administrative burdens outlined above.

8.1.4.6 Environmental impacts

It is not expected that there will be any environmental impacts directly arising from changes to the reporting regime. Better data will, however, allow the Commission to see whether the Directive's provisions are succeeding in achieving the environmental objectives – if this is not the case, the improvement in information will provide the evidence that further change to the provisions is necessary.

8.1.4.7 Social impacts

It is not expected that there will be any significant social impacts arising from changes to the reporting regime.

8.1.4.8 Stakeholder views

In consultation for this impact assessment, Estonia commented that in its opinion ≥100 micron PCBs are probably used repeatedly by consumers, and therefore questioned the point of collecting consumption data ≥on these bags It suggested that data collection could be voluntary, which is in agreement with Measure 2. Similarly, Germany commented that ≥100 micron PCBs are likely to be bags that are used several times and do not have such a high littering potential.

Based on extensive previous experience with consulting Member States on matters of carrier policy, it seems likely that most Member States would agree with Estonia and German here. Other Member States have previously commented that, as a primary aim of the Plastic Bags Directive has been to reduce littering, the collection of data on bags that are not littered should not be mandated. It is very unlikely that ≥100 micron PCBs are commonly littered in any given Member States, and therefore Member States are not likely to see the need for mandatory reporting on these bags. However, it is hard to imagine Member States objecting to a voluntary addition to the reporting regime.

Furthermore, Germany has previously requested clarity on whether very thick, reusable PCBs should be included in the current voluntary data on ≥50 micron PCBs. It is therefore likely that other Member

States, as well as Germany, would welcome clarity on what should be included in the ≥50 micron PCB category, by the setting of an upper threshold. This would clearly be more important with respect to Measure 1.

8.1.5 Measure 3: separating data on <15 micron and 15<50 micron LPCBs

The Plastic Bags Directive requires that Member States achieve a sustained reduction in consumption of LPCBs (i.e. 0<50 microns), and the reporting requirements are correspondingly designed to gather consumption data on these bags in order to measure performance against this requirement. Reporting of data disaggregating LPCBs into VLPCBs (<15 micron) and 15<50 micron LPCBs is not mandated, but can be provided voluntarily.

However, specific data on VLPCBs is necessary to:

- Properly assess performance against the consumption reduction targets of Article 4(1a), option a) of the PPWD; and
- Assess whether any substitution effects are occurring.

Measure 3 therefore considers requiring the mandatory provision of separate data on VLPCBs and 15<50 micron LPCBs. It also includes a requirement that, where Member States have exempted VLPCBs from their consumption targets and/or reductions measures, the number/weight of these exempt bags should be reported on a mandatory basis.

8.1.5.1 Description of the measure

Where Member States do not voluntarily provide data disaggregating VLPCBs from 15<50 micron LPCBs, it is not possible to know the proportion of each bag type consumed within the total reported LPCB consumption figure. It is therefore not possible to observe any substitution effects that may be occurring in terms of consumers switching to <15 micron LPCBs in response to measures on 15<50 micron PCBs.

The Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive identified some evidence of possible substitution to VLPCBs from 15<50 micron LPCBs. Over 2018–2019, 16 Member States provided voluntary data on VLPCBs and 15<50 micron LPCBs, and among these VLPCBs accounted for 50% or more of per capita consumption in 11 cases in 2018, and in 13 cases in 2019. There was also an increase in VLPCB consumption as a proportion of total consumption from 2018 to 2019 in nine of the Member States, while VLPCB consumption rose overall from 2018 to 2019 in five cases: Cyprus, Czechia, Germany, Spain, and Lithuania. Therefore, it is clear that VLPCBs represent a significant proportion on LPCBs overall, and that this proportion appears to be increasing in some cases.

Furthermore, where Member States exclude VLPCBs from their reduction measures or consumption targets, but do not provide disaggregated data, it is not possible to assess the effectiveness of their consumption reduction measures and/or their performance against the targets. For example, in 2019, Italy and France – Member States that have taken option a) of Article 4(1a) of the PPWD – both reported overall LPCB consumption equating to >90 bags per capita, and did not report separate data on VLPCBs. Therefore, while they may have been compliant with the 2019 target of <90 LPCBs per capita if VLPCBs were exempted – as the Plastic Bags Directive allows – it was not possible to assess this without knowing the number/weight of VLPCBs consumed.

Other Member States taking option a) either provided VLPCB data or reported LPCB consumption of <90 bags per capita anyway, and so could be assessed as meeting the target. However, the problem seen with France and Italy is likely to affect more countries in the context of the more challenging 2025 target of 40 LPCBs per capita.

In response to these issues, Measure 3 therefore proposes amending the four reporting tables contained in the Annex of Decision 2018/896 to require mandatory provision of separate data on VLPCBs and 15<50 micron LPCBs.

A related issue is that currently Member States are not asked to report the number/weight of VLPCBs that they have exempted from their consumption targets and/or reduction measures. Therefore, the Commission is lacking this basic information about how Member States have implemented the Plastic Bags Directive, and it is not clear in which cases VLPCBs should be deducted from total LPCB consumption when measuring performance against the consumption targets.

Therefore, Measure 3 also proposes that Member States be required to report the number/weight of VLPCBs they have exempted from their consumption targets and/or reductions measures.

8.1.5.2 Effectiveness

Currently, five Member States (Bulgaria, France, Malta, Portugal and Romania) and additionally Norway, are not providing voluntary disaggregated data on VLPCBs and 15<50 micron LPCBs. The measure would therefore address the data gaps for these countries.
If these countries provided separate consumption data on VLPCBs and 15<50 micron LPCBs as a result of Measure 3, then the Commission would be able to observe the relative consumption rates of these LPCB categories in all Member States. This would allow for complete picture of relative consumption in the EU as a whole.
Provision of a complete set of disaggregated data would allow for a complete assessment of whether any substitution effects are occurring between VLPCBs and 15<50 micron LPCBs in the EU.
A complete disaggregated dataset for LPCBs would also allow the Commission to properly assess, in all cases, whether Member States are meeting the consumption reduction targets of the Plastic Bags Directive, allowing for exemptions for VLPCBs. This will likely be important for the 2025 target of 40 bags per capita, for which compliance may depend on whether VLPCBs are exempted or not. It will also be important if the Commission should decide to apply consumption targets to all Member States, and not just those taking option a), in the future.
Related to this, the requirement that Member States report the number/weight of VLPCBs they have exempted from their consumption targets and/or reductions measures is crucial if the Commission is to be able to assess whether Member States are meeting the consumption targets – as well as simply providing a complete picture of how the Plastic Bags Directive has been implemented.

Therefore, Measure 3 would result in an improved understanding of the impact of the provisions on LPCBs contained within the Plastic Bags Directive (and by extension the PPWD), and would bring the reporting regime into full alignment with the Directive's performance objectives.

8.1.5.3 Ease of implementation

As discussed in section 8.1.5.2, 22 Member States reported disaggregated data on VLPCBs and 15<50 micron LPCBs to Eurostat for the reference year 2019, as shown in Table 8-1, with only Bulgaria, France, Malta, Portugal and Romania (and additionally Norway) not doing so. Therefore the majority of countries affected by the reporting regime already collect data on VLPCBs, suggesting that most will not be impacted substantially by the proposed change.

Consultation with Member States as part of the Study on the Implementation of the EU Lightweight Plastic Carrier Bags Directive raised the point that there can be difficulties with collecting granular data on <15 micron LPCBs from producers/importers and retailers, as they do not always know the wall thicknesses of the bags. Also, if wall thickness is not included in the specifications during the trade of bags, then producers will not provide this information. However, if there was clarity from the Commission on what producers/importers and retailers are expected to report through the setting of mandatory reporting requirements for VLPCBs, then this should serve to stimulate and incentivise industry to generate and provide this data.

Of the five Member States currently not reporting disaggregated data on VLPCBs and 15<50 micron LPCBs, three are collecting their data via retailer surveys (Bulgaria, France, Portugal), while Romania is collecting its data directly from producers/importers and Malta is using shipping data. As there are examples of Member States collecting disaggregated data from both retailer surveys and producer/importer reporting, there appears to be no inherent methodological barrier to Bulgaria, France, Portugal and Romania collecting this data. Malta's current methodology, meanwhile, does not even differentiate LPCBs from 'sacks and bags including cones: of polymers of ethylene' and 'other plastics' in its shipping imports data. This methodology is clearly inappropriate to the needs of the reporting regime, is almost certainly generating inflated consumption data and will have to be improved upon regardless.

In consultation for this impact assessment, Norway noted that the PRO Green Dot Norway has been estimating VLPCB consumption data on request by its Environment Agency,[179] but that competition between PROs may mean that this becomes impossible in the future.

One barrier may be encountered where Member States collect data on LPCBs via administrative mechanisms associated with measures under option b), such that data is collected on the number of bags subject to a charge issued at the point of sale. Under such an approach, where VLPCBs are exempted from charges (as is common), data will not be collected on these bags. Therefore, an additional data collection method would need to be introduced to capture data on VLPCBs. This is the case in Ireland, for example, where VLPCB consumption is estimated via a market survey of retailers.

8.1.5.4 Administrative burden

Two Member States (Estonia and Germany) and Norway responded to a consultation on administrative burdens associated with mandatory reporting of separate data on VLPCBs and 15<50 micron LPCBs. Currently, Estonia and Germany both voluntarily report separate data on VLPCBs and 15<50 micron LPCBs, and for them changing from voluntarily to mandatory reporting would not add any additional burdens.

Estonia has a new automated information system on carrier bags and estimated that currently it spends 10 hrs annually on reporting data on LPCBs. In Germany, the data collection is carried out by a research project and supervised by the Federal Environmental Agency. This supervision requires 10 hrs annually. Since 2022, Germany has banned 15<50 micron LPCBs which has resulted in changes to its data collection methodology. The Federal Statistical Office is currently building a new reporting system for VLPCBs.

Norway currently does not have separate data on VLPCBs and 15<50 micron LPCBs. In cooperation with the PRO Green Dot Norway, Norway estimates that it would require around an additional 30 hrs to collect separate data on VLPCBs and 15<50 micron LPCBs (20 companies, spending 1.5 hours each).

As noted above, 22 Member States were already collected separate data on <15 micron and 15<50 micron LPCBs voluntarily (as shown in Table 8-1). The 5 Member States currently not reporting separate data 15<50 micron LPCBs voluntarily would require to contact the producers, importers and distributors. Assuming that each of the 5 Members States would require 5 hrs of one-off administrative work to contact these economic operators and inform them about the change in reporting requirement, the annualised (over 20 years) one-off administrative costs associated with the implementation of Measure 3 would be around €2,600.

[179] Norway did not report VLPCB data to Eurostat for reference years 2018 and 2019, and it is not clear whether either this data will be reported for reference years 2020 and 2021, or else simply will not be reported.

8.1.5.5 Economic impacts

It is not expected that there will be any significant economic impacts arising from changes to the reporting regime, other than those arising from the changes to administrative burdens outlined above.

8.1.5.6 Environmental impacts

It is not expected that there will be any environmental impacts directly arising from changes to the reporting regime. Better data will however allow the Commission to see whether the Directive's provisions are succeeding in achieving the environmental objectives – if this is not the case, the improvement in information will provide the evidence that further change to the provisions is necessary.

8.1.5.7 Social impacts

It is not expected that there will be any significant social impacts arising from changes to the reporting regime.

8.1.5.8 Stakeholder views

As discussed in section 8.1.5.2, 22 Member States are already collecting disaggregated data on VLPCBs and 15<50 micron LPCBs (as shown in Table 8-1), and it is likely that these countries would therefore be favourable to a measure introducing a mandate for this practice. These countries presumably already see the value in collecting disaggregated LPCB data, for both their own national purposes and contributing to an EU wide dataset. To the extent to which these countries see an EU dataset as valuable – in terms of both enabling comparisons of performance among Member States and assessments of EU performance as a whole – they would also presumably see value in having a complete, mandatory set of data that included the five Member States currently not reporting disaggregated LPCB data.

For the remaining five Member States that are not currently collecting the data, based on previous extensive experience with carrier bag policy and with consulting Member States on this topic, the following assessments seem reasonable:

- France is in the process of setting up an operational reporting system on LPCB consumption, linked to its EPR scheme, that should provide better quality data in future. Reporting using the new system will be begin in 2023, for reference year 2022. It is not known whether this system is being designed to collect disaggregated data on VLPCBs and 15<50 micron LPCBs. While it would be natural to assume that 'better quality data' would include improvements to data granularity, a complication for France is that its national legislation does not include a definition of VLPCBs, but instead refers to 'non-checkout bags', without a specification on wall thickness. Therefore, from France's perspective, there may be additional difficulties around introducing new legislation requiring reporting on VLPCBs.
- As noted above, Malta's current methodology does not even sufficiently differentiate LPCBs from other plastic products and is likely resulting in inflated consumption data. It is in Malta's own interest to introduce a new, more accurate data collection methodology that produces usable consumption data. While Malta's thoughts on this are not known, given that it will have to establish a new methodology at any rate, it therefore has an opportunity to design one that would capture the disaggregated LPCB data required under Measure 3.
- Based Portugal's reporting to Eurostat for the reference year 2019 in the Metadata and Quality Report sheets, it appears that it has begun collecting data on VLPCB consumption, and will presumably be reporting this for future years. Therefore, the best available evidence suggests that Portugal would be favourable towards Measure 3.

- There is no evidence to suggest whether Bulgaria would be favourable about Measure 3. However, it did not report data for reference year 2019, and for reference year 2018 its data collection methodology involved survey results for both 2018 and 2019. Therefore, it seems likely that its methodology would be benefit from improvement, and so there would be an opportunity to design a new methodology that capture disaggregated LPCB data as required under Measure 3.
- Romania is collecting data directly from producers/importers, and for reference year 2019 this included data on ≥50 micron PCBs. This indicates that producers/importers are able to differentiate the types of bags they are placing on the market. There is no evidence to suggest what attitude Romania would take towards Measure 3, but given that producers/importers can differentiate ≥50 micron PCBs, and given that many other Member States with producer/importer reporting can collect data on VLCBs, it seems likely that Romania could meet the requirements of Measure 3.

8.2 Sustainable consumption reduction Impact Assessment

8.2.1 Introduction

Directive (EU) 2015/720 (hereafter referred to as the 'Plastic Bags Directive') was introduced to reduce consumption of lightweight plastic carrier bags (LPCBs) in order to combat littering, change consumer behaviour and promote waste prevention. The Plastic Bags Directive amends the Packaging and Packaging Waste Directive (hereafter referred to as the PPWD), which was adopted in order to prevent/reduce the impact of packaging and packaging waste on the environment.

Article 3 of the PPWD defines both LPCBs and very lightweight plastic carrier bags (VLPCBs), which are a subset of LPCBs, as well as plastic carrier bags in general. These categories of bag are differentiated in terms of wall thickness, as measured in microns, with one micron equalling one-thousandth of a millimetre. LPCBs are bags with a wall thickness of 0<50 microns, while VLPCBs are bags with a wall thickness of 0<15 microns. The scope of the Plastic Bags Directive is therefore plastic carrier bags with a wall thickness 0<50 microns.

Article 4(1a) of the PPWD requires Member States to take measures to achieve a sustained reduction in the consumption of lightweight plastic carrier bags (LPCBs) in their territory, either through the adoption of measures to ensure consumption does not exceed specified target levels as set in the Directive, or by prohibiting the provision of LPCBs free of charge at the point of sale of goods and services.

To this end, Article 4(1a) empowers Member States to adopt marketing restrictions in derogation of Article 18 of the PPWD in order to reduce consumption of LPCBs. While Member States may not adopt marketing restrictions on plastic carrier bags (PCBs) ≥50 microns, Article 4(1b) empowers them to use economic instruments and national reduction targets in order to reduce consumption of these thicker bags.

To comply with Article 4(1a), Member States may take either, or both, of two options:

> *(a) the adoption of measures ensuring that the annual consumption level does not exceed 90 lightweight plastic carrier bags per person by 31 December 2019 and 40 lightweight plastic carrier bags per person by 31 December 2025, or equivalent targets set in weight. Very lightweight plastic carrier bags may be excluded from national consumption objectives;*

(b) the adoption of instruments ensuring that, by 31 December 2018, lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products, unless equally effective instruments are implemented. Very lightweight plastic carrier bags may be excluded from those measures.

Note that VLPCBs may be excluded from national consumption objectives under option a) and from measures under option b).

While Article 4(1a) of the PPWD requires Member States to take measures to achieve a sustained reduction in LPCB consumption, and empowers them to do so via options a) and b), the PPWD does not define 'sustained reduction'. To enable the Commission to assess whether Member States are meeting the requirement, a definition is therefore needed.

8.2.2 Description of the measure

The proposed definition of 'sustained reduction' is:

"A sustained reduction is achieved if annual consumption does not exceed 90 LPCBs per person by 31st December 2019, and 40 LPCBs per person by 31st December 2025, and does not thereafter exceed an annual consumption of 40 LPCBs per person."

Adopting this definition would effectively mean that all Member States would be required to meet the 2025 target of option a) of the PPWD. As a consequence, any consumption reduction measures prohibiting the free provision of LPCBs at the point of sale under option b) would also have to achieve a sufficient reduction in consumption.

This would address the most serious risk associated with option b): that consumer fees on LPCBs are set at nominal amounts that do not provide an effective economic disincentive to consumption. In practice, this should force Member States to consider what level of LPCB consumer fee is appropriate for their market, and to mandate the setting of such fees, as necessary.

The definition of 'sustained reduction' would be enacted via amends to be made to the Plastic Bags Directive (and therefore to the PPWD).

8.2.3 Effectiveness

Policy approaches and consumption reduction performance vary across Member States and EEA countries, as shown in Table 8-2. One important consideration regarding the potential impact of the proposed definition of 'sustained reduction' is whether countries have taken option a), option b), or both option a) and option b) of Article 4(1a) of the PPWD:

- For countries taking option a), the 40 LPCBs per person by 31st December 2025 target already applies. Therefore, for these countries, there will be no additional impacts from implementing the proposed definition of 'sustained reduction'.
- For countries taking option b), no consumption reduction target currently applies. Therefore, implementing the proposed definition of 'sustained reduction', which would introduce the 40 LPCBs per person by 31st December 2025 for these countries, could potentially impact these countries significantly. The extent to which individual countries would be impacted depends upon their current and future consumption reduction performance, and what additional measures they would need to put in place to meet the target.
- For countries taking both option a) and option b), it is not always clear whether they have already implemented the target, and therefore it is not always clear what the impact of implementing the proposed definition of 'sustainable reduction' will be:

- Some countries have explicitly adopted the consumption reduction target of option a) and are using the option b) reduction measure of a prohibition on the free of LPCBs to meet the target. For these countries, therefore, there will be no additional impacts from implementing the proposed definition of 'sustained reduction'.
- Some countries have adopted market prohibitions and/or product taxes on producers/importers that would be categorised as option a) type measures, alongside a prohibition on the free provision of LPCBs under option b). For such cases, the PPWD does not make clear whether the consumption reduction target of option a) applies, or whether by taking option b) countries divest themselves of the target requirement.
    - If the target does currently apply, then there will be no additional impacts from implementing the proposed definition of 'sustained reduction'.
    - If the target does not currently apply, then the extent to which individual countries would be impacted depends upon their current and future consumption reduction performance, and what additional measures they would need to put in place to meet the target.

The above confirms that the implementation of the proposed definition of 'sustained reduction' will potentially have a different impact in different countries.

The interaction with exemption on very lightweight plastic carrier bags (VLPCBs) must also be considered. Article 4(1a) of the PPWD provides that very lightweight plastic carrier bags (VLPCBs) may be excluded from national consumption objectives under option a) and from measures under option b). It is assumed that the Commission intends that countries will be able to exclude VLPCBs from the 40 LPCBs per person target associated with the proposed definition of sustained reduction – which is the same as that of option a) – as well as the requirement that consumption should not thereafter exceed an annual consumption of 40 LPCBs per person.

Because the potential impacts of implementing the proposed definition of 'sustained reduction' relate to the burdens associated with countries having to introduce additional measures in order to meet the target, to assess the impacts of the proposed definition it is therefore necessary to consider countries' performance once VLPCBs are excluded from their consumption figures.

A difficulty is that this is not always possible, because currently there is no mandatory requirement for countries to report separate, disaggregated data for VLPCB consumption; rather, this is provided on a voluntary basis. Note that Measure 3 under the intervention area on plastic carrier bag reporting obligations (see section 8.1.5) proposes mandating the provision of separate data on VLPCBs and 15<50 micron LPCBs.

Table 8-2: Summary of Current Policy, Performance, and Potential Impact of Sustained Reduction Definition

Country	Policy	VLPCB consumption per capita (2019)	15<50 micron LPCB consumption per capita (2019)	Total LPCB consumption per capita (2019)	Potential impact of enforcing sustained reduction target across all Member States
Austria	Option a)	29	8	37	The target already applies to Austria as it has taken option a).
Belgium	Option a) and b)	6	11	17	Belgium is already reporting consumption figure for all LPCBs that is below the target. Enforcing the sustained reduction target should therefore not cause a problem for Belgium.
Bulgaria	Option a) and b)	/	/	181	Bulgaria does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. The LPCB consumption figure is high, and while Bulgaria has banned <25 micron LPCBs under 390mm x 490mm as of 2022, it is not clear whether this will reduce overall consumption enough to meet the target. Therefore, there is potential for the sustained reduction target to be problematic for Bulgaria.
Croatia	Option a) and b)	/	/	94	Croatia has banned 15<50 micron LPCBs as of 2022, meaning that only VLPCBs are left on the market. As these bags can be exempted from the target, the sustained reduction target would not be problematic for Croatia.

Cyprus	Option b)	91	64	155	Cyprus plans to introduce a ban on 15<50 micron LPCBs in the near future, and this ban would presumably come into effect by 2025. Therefore, it is likely that Cyprus would not have a problem meeting the target.
Czech Republic	Option b)	236	12	248	Although overall consumption in the Czech Republic is very high, most consumption is of VLPCBs, and 15<50 micron LPCB consumption is well below the target. If VLPCBs were exempted from the consumption target, then the Czech Republic would not have a problem meeting the target.
Denmark	Option a) and b)	/	/	69	Denmark banned 0<30 micron LPCBs in 2021 (with an exemption on VLPCBs used as primary packaging for loose food items). It also has the highest legislatively mandated consumer fee in the EU, at €0.54. Therefore, while total LPCB consumption is below the target and Denmark does not collect disaggregated data on VLPCBs that allows them to be exempted, it still has a strong chance of meeting the target. Therefore, there is low risk of the sustained reduction target causing problems for Denmark.
Estonia	Option a) and b)	100	52	152	Estonia has already implemented the reduction target of option a) with a consumer charge as the means of meeting the target. Therefore, enforcing the sustained reduction target would not pose any additional problems.
Finland	Option a) and b)	88	60	148	Finland has already implemented the reduction target of option a) with a consumer charge as the means of meeting the target. Therefore, enforcing the sustained reduction target would not pose any additional problems.

France[180]	Option a)	/	/	105	The target already applies to France as it has taken option a).
Germany	Option a) and b)	44	11	54	Germany has already implemented the reduction target of option a) with a consumer charge as the means of meeting the target. Therefore, enforcing the sustained reduction target would not pose any additional problems.
Greece	Option b)	68	45	113	Greece's consumption rate for 15<50 micron LPCBs is already close to the target, so if VLPCBs were exempted then only a small further decrease would be needed to meet the target. Greece has a mandatory consumer fee set at €0.07, but is not planning on introducing further measures. It likely that Greece could reduce consumption to below the target level by 2025 with further work, but if it does nothing then the sustained reduction target could be problematic.
Hungary	Option a)	20	66	87	The target already applies to Hungary as it has taken option a).
Ireland	Option b)	47	5	52	Ireland's 15<50 micron LPCB consumption is already far below the target. If VLPCBs were exempted, it would have no problem meeting the target.
Italy	Option a) and b)	/	/	111	Italy does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. Italy's reduction measures have been in place since 2018 and it does not plan to introduce further measures. Therefore, there is a risk that enforcing the sustained reduction target could be problematic for Italy.

[180] France 2019 data is the same as that previously provided for 2018.

Latvia	Option a) and b)	213	71	283	Latvia still has some way to go to meet the target even after VLPCBs are discounted. It also has low consumer charges that are unlikely to reduce consumption enough to meet the target by 2025. Therefore, there is a risk that enforcing the sustained reduction target could be problematic for Latvia. However, it should be noted that from 2025 Latvia is banning 15<50 micron bags made with conventional plastic via a requirement that these bags be made from natural fibres (e.g. paper) or bioplastics. It is not clear what impact on consumption this measure will have.
Lithuania	Option b)	280	52	331	Overall consumption in Lithuania is very high, but the majority of the consumption is VLPCBs. Lithuania's 15<50 micron LPCB consumption is only 12 bags per capita above the target. However, it does not have a mandated consumer fee level, and the typical fee level is very low at €0.01. Furthermore, it does not plan to introduce further consumption reduction measures. Therefore, without further efforts it is far from certain that 15<50 micron LPCB consumption will reach the target level, meaning that the sustained reduction target could be problematic for Lithuania.
Luxembourg	Option a) and b)	40	23	63	Luxembourg has already implemented the reduction target of option a) with a consumer charge as the means of meeting the target. Therefore, enforcing the sustained reduction target would not pose any additional problems.
Malta[181]	Option a)	/	/	420	The target already applies to Malta as it has taken option a).

[181] Malta's LPCB data relates not only to LPCBs but also to also other plastic products, which accounts for the very high per capita consumption figure.

Netherlands	Option b)	15	15	29	The Netherlands is reporting an overall LPCB consumption rate already below the target. It should be noted that there are problems with the consumption calculation methodology used, with the Netherlands reporting an error margin of around 17%. However, even within the margin of error, the reported consumption figure is comfortably below the target, especially if VLPCBs are exempted. The risk for the Netherlands would be if the consumption figures rose dramatically following the implementation of an improved calculation methodology.
Norway	Option b)	/	/	139	Norway does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. A further complication is that Norway has implemented option b) via a voluntary retailer agreement, and as such has limited means of further reducing consumption under its current reduction measure. These issues mean that the sustained reduction target would likely be problematic for Norway. However, as Norway is not a Member State but rather an EEA country, clarity is needed on whether the target would be binding for Norway.
Poland	Option b)	/	/	23	Poland is already reporting an overall LPCB consumption rate below the target. Therefore, enforcing the sustained reduction target should not cause a problem for Poland.
Portugal	Option b)	/	/	8	Portugal is already reporting an overall LPCB consumption rate far below the target. Therefore, enforcing the sustained reduction target should not cause a problem for Portugal. However, it should be noted that there are concerns with Poland's reported figure, given how very low it is compared to the consumption reported by other Member States.

Romania	Option a)	/	/	95	The target already applies to Romania as it has taken option a).
Slovakia	Option b)	91	13	105	Slovakia's consumption rate for 15<50 micron LPCBs is already far below the target, so if VLPCBs were exempted then no further work would be needed to meet the target. Enforcing the sustained reduction target should therefore not cause a problem for Slovakia.
Slovenia	Option a) and b)	61	12	73	Slovenia has already implemented the reduction target of option a) with a consumer charge as the means of meeting the target. Therefore, enforcing the sustained reduction target would not pose any additional problems.
Spain	Option a) and b)	100	53	152	Spain's 15<50 micron LPCB consumption is only 13 bags per capita above the target, so it has a strong chance of meeting the target by 2025 with further effort. In 2021, Spain introduced a ban on non-compostable LPCBs, following Italy's approach of promoting the use of compostable LPCBs as biowaste collection sacks. It remains to be seen whether this approach will serve to reduce consumption of 15<50 micron LPCBs, and it is this which will most impact how problematic the sustained reduction target would be for Spain.
Sweden	Option a)	75	74	150	The target already applies to Sweden as it has taken option a).

Currently, seven Member States have explicitly implemented a 2025 target of 40 LPCBs per capita under option a) (Austria, Belgium, France, Hungary, Malta, Romania, Sweden) while a further five Member States have explicitly adopted the option a) target with a consumer charge (option b)) as the means of meeting the target (Estonia, Finland, Germany, Luxembourg, and Slovenia). Therefore, there are only 12 out of 27 Member States explicitly working towards a quantified consumption reduction goal. The risk implicit in this is that, for the remaining 15 Member States, should consumption reduction measures prove ineffective and consumption rates stagnate at relatively high levels, then there is no legislative driver to stimulate further consumption reduction efforts.

The proposed definition of 'sustained reduction' would address this risk by amending the Plastic Bags Directive (and by extension the PPWD) to hold all Member States to the same consumption reduction target of 40 LPCBs per capita by 31st December 2025. As noted, it is assumed that the permitted exemption within option a) that allows VLPCBs used as primary packaging for loose food items in order to prevent food waste, or for hygiene reasons, to be excluded from performance against the target would be extended to the general target introduced under the proposed definition of 'sustained reduction'.

The Plastic Bags Directive is intended reduce consumption of LPCBs to combat littering, change consumer behaviour and promote waste prevention. Implementing the proposed definition of 'sustained reduction' would help to ensure that these goals were met by holding all Member States accountable to a defined target.

The primary barrier to the effectiveness of the proposed definition is that certain countries may find it difficult to achieve the consumption reduction target, or else simply to prove their compliance with the target.

8.2.4 Ease of implementation

Based on the high level analysis shown in Table 8-2, there are six Member States and one EEA country for the which the implementation of the proposed definition of 'sustained reduction' could be problematic. This is because they will find it difficult to meet the target, or prove compliance with the target, with based on their current consumption reduction measures and data reporting. These countries are Bulgaria, Greece, Italy, Latvia, Lithuania, Spain, and Norway.

For Bulgaria, Italy, and Norway the potential problems are related, to a greater or lesser extent, to the fact that these countries have so far not reported the voluntary data on VLPCB and 15<50 micron LPCB consumption. It is important to note that, should the Commission introduce mandatory reporting of separate consumption data for VLPCBs and 15<50 micron LPCBs (as per Measure 3 under the intervention area on plastic carrier bags reporting obligations as discussed in section 8.1.5), then the problems identified for these countries could potentially be easily mitigated.

Table 8-3 presents projections for LPCB consumption (split into VLPCB and 15<50 micron LPCB consumption) for 2025, for the seven countries identified. Further detail on the situations in these countries and how the projections were reached is provided in Appendix C.

Table 8-3: Projected LPCB consumption rates for 2025

Country	Projected 2025 per capita consumption rates		
	VLPCBs	15<50 micron LPCBs	Total LPCBs
Bulgaria	/	/	145
Greece	68	41	109
Italy	/	/	102
Latvia	152	51	202
Lithuania	275	47	322
Spain	100	40	140
Norway	/	/	114

8.2.5 Administrative burden

The main administrative burden associated with introducing the proposed definition of 'sustained reduction' is that following from countries' needs to prove compliance with the 2025 target. If indeed the intention is that VLPCBs can be excluded from the performance against the target as they can be under the current target of option a) (as discussed in section 8.2.3), then countries will only need to demonstrate that their consumption of 15<50 micron LPCBs is within the target level.

This will require collection and reporting of separate, disaggregated consumption data on VLPCBs and 15<50 micron LPCBs, something which is currently voluntary and not done by all countries. However, Measure 3 under the intervention area on plastic carrier bag reporting obligations (see section 8.1.5) is proposing that the Commission mandate this provision of separate data. Therefore, if the Commission goes ahead with this separate recommendation, then countries will be collecting and reporting data on VLPCBs and 15<50 micron LPCBs anyway, and the introduction of the 'sustained reduction' definition will not result in any further administrative burdens.

8.2.6 Economic impacts

Implementing the proposed definition of 'sustained reduction' is expected to lead to a reduction in LPCB consumption in those countries not currently working towards a consumption reduction target. The overall economic impact across the six Member States where such impacts have been quantified is -€40,422k. As such, the policy is anticipated to result in economic savings to society.

The prevention of plastic waste thus achieved would mean that the waste management systems in these countries would have less plastic waste to deal with, and therefore the waste management costs associated with LPCBs would go down. This would include a reduction in the clean-up costs associated with litter (impacts of which have not been quantified in the above figure). This reduction in costs would be an economic benefit for society in the effected countries, and for the EU overall.

Companies currently manufacturing or importing LPCBs would be negatively impacted by a loss in business due to fewer LPCBs being manufactured and imported. As such, a significant contribution to the net economic impact presented above is the avoided costs of production associated with manufacturing fewer single use bags. This is offset to a certain extent, however, by substitution effects – since alternative types of carrier bags are assumed to replace LPCBs (also quantified in the above figure). Companies manufacturing or importing these alternative bags would see some increase in business and therefore benefit economically.

The initial 2013 impact assessment undertaken prior to the introduction of the Plastic Bags Directive noted that, in the EU, 70% of single-use carrier bags were imported from outside of the EU, while reusable carrier bags were mainly produced within the EU.[182] This suggests that the loss of manufacturing business within the EU as a result of further reductions in LPCB consumption would be limited, while the majority of increased manufacture of reusable bags due to substitution effects would be within the EU. However, it should be noted that this is based on an assessment of the carrier bag market published in 2013, and that no recent data is available to indicate whether this assessment of the market still holds true.

8.2.7 Environmental impacts

The reduction in LPCB consumption that should be achieved as a result of implementing the proposed definition of 'sustained reduction' would lead to a reduction in demand for plastic material, and so less plastic would be manufactured. This would lead to environmental benefits in the form of both greenhouse gas (GHG) savings and reduced impacts in respect of air pollution. Net environmental benefits are shown in Table 8-4. A significant contributor to these impacts is a reduction in impacts related to plastic production. Recycling benefits are lost, reducing environmental benefits slightly, and there is some contribution from the manufacture of multi-use bags, which also results in a contribution towards environmental impacts. However, the net figure declines still further, due to avoided residual waste management impacts, and as such there are environmental benefits from the measure overall.

Table 8-4: Environmental impacts

Impact	Unit	Result
Net change in plastic consumption	Tonnes LDPE	-37,924
Climate change	Tonnes CO_2e	-61,456
Damage Costs (GHGs and air quality)	€k	-€13,069

The plastic waste prevention achieved would also result in less plastic waste both entering the waste management system and being lost to the environment as litter (the latter being quantified under social impacts, see section 8.2.8). The reduced volume of plastic waste in the waste management system would lead to a reduction in the greenhouse gas emissions associated with the treatment of plastic waste. The reduction in litter would result in a reduction in both land

[182] COMMISSION STAFF WORKING DOCUMENT EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT Accompanying the document Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 94/62/EC on packaging and packaging waste to reduce the consumption of lightweight plastic carrier bags, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52013SC0443&from=PL

based and marine plastic pollution, which would have positive impacts for both the environment and wildlife – these impacts are not quantified in the above results, due to a lack of data.

8.2.8 Social impacts

Data on the social impacts is presented in Table 8-5: Social impacts, which shows indicative results for impacts on employment and littering. The results show both a reduction in employment and a reduction in the overall amount of litter produced.

Table 8-5: Social impacts

Impact	Unit	Result
Employment impacts	Number FTEs	-85
Litter impacts	Tonnes litter	-504

The reduction in littering associated with LPCB waste prevention would bring benefits to society in terms of improved visual amenity of the environment, with associated benefits for the mental health of citizens. In addition to removing littered LPCBs from the environment, additional cleansing resource that would have otherwise been spent on LPCBs would be freed up for the removal of other littered packaging from the environment – this is not quantified in the data presented in section 8.2.6 on economic impacts.

The measure would result in a small loss of jobs, associated with a reduction in employment in the waste management industry, due to the need to manage less waste (these job impacts are primarily associated with the recycling sector in each country).

8.2.9 Stakeholder views

Attempts were made to contact all the countries identified in section 8.2.4 in order to understand how implementation of the proposed definition of 'sustained reduction' would impact them, and further to understand their views on this. Responses were received from Latvia, Norway and Spain.

8.2.9.1 Latvia

Latvia has introduced both a natural resource tax on producers/importers (an option a) type measure) and a fee on LPCBs charged to consumers (option b)). However, when asked, the Latvian Ministry of Environment did not consider Latvia to have taken option a) and it stated that it has not yet adopted the 40 LPCBs per capita by 2025 target. This then is evidence that countries do not always consider that the adoption of option a) type measures, along with option b) measures, means that they have taken option a).

From 1st January 2025, Latvia is requiring that LPCBs be replaced with bags made of paper and cardboard or other natural fibre and bioplastic raw materials (with an exemption for VLPCBs). This measure will complement the existing natural resource tax and consumer fee. Against this background of measures, the Ministry of Environment stated that it is hard to predict whether it would meet the 2025 target of 40 LPCBs per capita.

The Ministry of Environment stated that it would not recommend implementing the proposed definition of 'sustained reduction' before 2025, "until the introductory requirements have been

reached." This is taken to mean that the definition should not be adopted until Member States have had the full time to fully implement and embed the measures they have introduced in response to the requirements of the Plastic Bags Directive; as option a) originally set a deadline of 2025, no legislative changes should be made at EU level before that point.[183]

The Ministry of Environment further commented that, if the proposed definition of 'sustainable reduction' was adopted, then "b) type measures will practically be deleted, and the Directive 2015/720 will be substantial amended." However, this is not true, as consumer facing charges would remain a viable and important consumption reduction measure. Indeed, as noted earlier, there are Member States that have implemented the target of option a) with a consumer charge (option b)) as the means of meeting the target.

8.2.9.2 Norway

Norway has taken option b), with a consumer charge implemented via a voluntary retailer agreement. It has not implemented any option a) type measures and has not adopted the 40 bags per capita target. However, the Norwegian Retailer's Environment Fund (NREF) has defined a goal for 2025 of a 50% reduction on 2016 consumption, adjusted for volume sold in the retail market, which translates to a target of 90 bags per capita by 2025. In 2022, NERF raised the fee that retailers pledge to pay to NERF for each bag sold, resulting in a ~50% price increase for consumers (from 2 NOK to 3 NOK), and it also continues to run information campaigns for the public. Based on these measures and current performance, NERF reports that Norway is certain to achieve its 90 bags per person target.

NERF stated that, should a mandatory 2025 target of 40 LPCBs per capita be introduced, it was not certain that Norway would be able to meet the target in a way that makes sense environmentally. It reported that, in Sweden, the tax on LPCBs (charged to producers/importers at 3 SEK per bag and passed on to consumers, with retailers typically charging 6–7 SEK per bag) has resulted in consumption of paper bags more than doubling. NERF intends that Norway should transition to reusable alternatives and not just a substitute paper bags for LPCBs. While NERF is working to promote reusable alternatives, it will take some time to change consumer behaviour.

Finally, NERF noted that the general objectives of the EU policy initiative on plastic carrier bags were to limit negative impacts on the environment, and to encourage waste prevention and the more efficient use of resources. NERF believes that it makes more sense to integrate a per capita consumption target for LPCBs with the proposed reduction target for packaging waste, in the broader context of waste prevention and resource efficiency.

8.2.9.3 Spain

Spain has introduced both a ban on non-compostable LPCBs (an option a) type measure) and a fee on LPCBs charged to consumers (option b)). However, Spain considers that it has taken option b), and that it has not implemented the option a) target of 40 bags per capita by 2025. This provides further evidence that just because a country has implemented a measure other than a consumer charge, this does not mean it has adopted option a) and the entailing target.

Spain provided provisional consumption figures – not yet reported to Eurostat and so unverified – for 15<50 micron LPCBs for references years 2020 and 2021 that indicate that a 50 bags per

[183] Clarification was requested on this point, but no response was received. Latvia's statement could also be taken to be mean that the definition should not be implemented prior to Latvia introducing its own specific requirement that LPCBs be replaced with bags made of paper and cardboard or other natural fibre and bioplastic raw materials in 2025.

capita target should be met by 2021, once <15 micron LPCBs are excluded. Furthermore, it hopes that consumption will thereafter stay below the target level.

The figures show a large decrease in consumption from 2020 to 2021, and this likely reflects the impact of the introduction of the ban on non-compostables in 2021. However, the provisional data also shows a large increase in the number of <15 micron compostable LPCBs consumed in 2021, which is evidence of consumers substituting 15<50 micron bags with <15 micron bags.

At the present time, Spain is not intending to introduce any further consumption reduction measures.

8.3 Further Analysis for Measure 29d

8.3.1 Introduction

Measure 29d considers the impacts arising from the situation where a small group of packaging items – tea bags, coffee capsules / bags, fruit and vegetable stickers, and certain types of PCBs – are made only from compostable plastic. Conventional plastic polymers are not to be used for these products, to reduce the possibility of consumer confusion arising from similar products requiring different end of life treatment routes.

This section provides additional supporting analysis in respect of the implementation of Measure 29d – the measure which seeks to put in place criteria for which types of packaging should be made only from compostable plastic. The aim of the section is to set out background information regarding the current state of play in key Member States as well as to identify key aspects that would need to be considered and addressed if Measure 29d is to be implemented successfully without causing additional complications in other systems and other parts of the packaging legislation.

Section 8.3.2 responds to the request from the Commission for further information in respect of data from Member States on contamination of both biowaste feedstocks and conventional recycling systems resulting from the co-existence of plastics made from compostable polymers alongside those made from conventional plastic. Section 8.3.4 responds to a similar request for more information on littering.

In Section 8.3.3 the analysis sets out issues raised in discussion with several Member States who had, in previous consultations, expressed concerns with regards to the implementation of measures designed to significantly increase the prevalence of compostable plastics – namely Germany and Luxembourg. It does this by way of highlighting some of the barriers that would need to be overcome in specific countries if the Measure were to be implemented. In subsequent sub-sections, under Section 8.3.5, the report highlights further activities that would ideally be considered prior to the implementation of Measure 29d in some form, with the discussion following on from points raised by the Member States in the discussions. One of these concerns is the need to continue to consider the overlap between measures to encourage the use of compostable plastic and measures supporting waste prevention, which is a key focus of the plastic carrier bag (PCB) legislation. This topic is the focus of Section 8.3.5.2. Support from updates to the Standard EN 13432 is a further key activity which might support implementation – this is discussed in Section 8.3.5.3. Further considerations are discussed in Section 8.3.5.4. A concluding paragraph – highlighting the key barriers that would need to be addressed, and key areas of focus – is provided in Section 8.3.7.

8.3.2 Contamination data

8.3.2.1 Biowaste contamination data

Conventional plastic bags of all types – both VLPCBs and LPCBs – have been banned in Italy for a number of years; it is intended that bags of both types be made from compostable plastic. The shift towards compostable plastics was aimed at resolving the contamination problem in its biowaste treatment systems. The country has the highest collection rate for food waste in the EU,[184] and now also has the greatest prevalence of compostable bags. Data suggests the ban has not, however, been completely effective and some conventional plastic bags are still being used by retailers and consumers, as is discussed further below.

Monitoring data from industry body the Consorzio Italiano Compostori (CIC) covering 27 biowaste plants across the country confirms that, in 2020, compostable plastic made up 3.7% of the input composition of biowaste accepted at the monitored plants – up from 1.5% in 2017. There remained, however, significant contamination of the biowaste streams from conventional plastic, despite the ban on carrier bags made of this material (implemented in 2014). Conventional plastic contamination remained steady over the period, at around 3% of the input composition. It is noted that a significant proportion of this is not packaging. The total non-compostable contamination in the Italian biowaste plants that were monitored was 5%.

The Italian system is aimed at ensuring that compostable bags are used within its biowaste collection system and there is a target of 50% of compostable bags being treated through the biowaste system, a target which the CIC indicated was close to being met in 2021.[185] Most compostable bags used for a second time in Italy are LPCBs. Levels of specific compostable bags manufactured for use in biowaste collection only are relatively low, but the proportion of compostable very lightweight bags is gradually increasing. Data on the contribution of the different types of container bag, based on the monitoring data, is presented in Table 8-6. From this it can be seen that there is some use of conventional plastic bags as a form of containment for biowaste collection, but that containment is dominated by compostable plastics – with LPCBs made from compostable plastic making a significant contribution to towards total containment.

Table 8-6 Biowaste Collection Containers – Italian system

Container category	Biowaste collection bag type	Contribution to category of container with respect to biowaste collection	Category contribution towards biowaste containment
Compostable plastic	Lightweight plastic carrier bags	38.5%	63.8%
	Compostable plastic bags for organic waste recycling	15.1%	
	Very lightweight plastic carrier bags	7.6%	
	Large compostable plastic bags (> 50l)	2.4%	
	Compostable paper bags	0.2%	
	Lightweight plastic carrier bags	10.6%	36.2%

[184] ECN (2022) Guidance on Separate Collection: The untapped potential and steps forward for separate collection of household food waste for high-quality recycling

[185] Personal communication, CIC March 2021

Container category	Biowaste collection bag type	Contribution to category of container with respect to biowaste collection	Category contribution towards biowaste containment
Non compostable plastic	Plastic bags for organic waste collection	2.7%	
	Very lightweight plastic carrier bags	1.8%	
	Large plastic bags (up to 50l)	13.1%	
	Large plastic bags (> 50l)	7.9%	
	Shopper and bags for organic waste collection in Plastics with additives / OXO bio-degradable plastics	0.1%	

Data from Spain published in 2020 suggests slightly higher contamination levels from conventional plastic than is evident from the Italian CIC monitoring data. Data from Rodrigues et al[186] from 20 plants in Catalonia indicates plastic contamination is averaged at 4.7%. It is noted there is more dense plastic here than bags (3.2% vs 1.5%, respectively). As of 1st January 2021, both VLPCBs and 15<50 micron LPCBs made of conventional plastic are banned, with only compostable permitted on market.[187] This is likely to have reduced conventional plastic contamination with respect to the PCBs, although as in the case of Italy, it has not reduced this completely.

Contamination levels in the input feedstock at biowaste plants appear to be highly variable in Germany, which, like Italy, has a well-established tradition of biowaste collection. The country also has a relatively low use of compostable plastic bags compared with other countries, as is discussed further in Section 8.3.3.1. The data on input composition contamination in Germany appears to be less comprehensive than that for Italy or Spain, and there has been no systematic monitoring of this at either a national or regional level according to Germany's central Environmental Agency, the Umwelt Bundesamt (UBA).

The German Association of Alternative Fuels, Waste Wood and Biowaste (Fachverband Ersatzbrennstoffe, Altholz und Biogener Abfaelle) provided an estimate of to 15% contamination on its website.[188] Meanwhile, the Bundesgütegemeinschaft Kompost e. V cites data from the Leichtweiß-Institut, which found contamination levels to range from just under 1% to 12%.[189] Germany's UBA estimates input contamination at up to 10% in dense urban areas, but noted that

[186] Rodrigues LC, Puig-Ventosa I, Lopez M, Martinez FX Ruis AG Bertran TG (2020) The impact of improper materials in biowaste on the quality of compost, Journal of Cleaner Production, 251

[187] It is noted that food waste collection systems are less well established in Spain than is the case in Italy; capture rates in 2018 were only 3% nationally for Spain whereas the Italian rate at the same point was 47%. See ECN (2022) Guidance on Separate Collection: The untapped potential and steps forward for separate collection of household food waste for high-quality recycling

[188] https://www.bvse.de/verwertung/presse-altholz-ersatzbrennstoffe-bioabfall/1914-markt-fuer-biogene-abfaelle-mengensteigerung-aber-qualitaetsprobleme-im-input.html

[189] https://www.kompost.de/fileadmin/user_upload/Dateien/HUK-Dateien/2020/Q1_2020/QM-Biogut_final__titel.pdf

these levels have not been routinely measured in Germany in a systematic way (although there is more information available on compost output contamination).[190]

Data from the Bavarian region presented as part of the C.A.R.M.E.N. project suggests lower levels of contamination, at between 1-2%.[191] This data was collated as part of a research project looking at the potential for compostable VLPCB to be used as biowaste containment: both biowaste collection bags and compostable VLPCB were accepted at the plant for treatment during the study.

Data on the breakdown of the German contamination (with respect to the type of materials that are the contaminants) is even more sparse, but another 2016 research paper found that for the city of Lüneburg plastic bags and food packaging were the most common impurities, with an overall contamination level of 7% (w/w).[192] This data again indicates that plastic contamination can be significant in German plants.

The UK's Renewable Energy Association submitted data to the UK parliament confirming input contamination levels of between 1 and 20%, confirming that compostable packaging was also removed along with the other contaminants as facilities were not able to distinguish these materials from other contaminants.[193] Recent work published by the Scottish Environmental Protection Agency provided supporting evidence that the use of compostable caddy liners and bags supports both an increase in the quantity of biowaste collected and an increase in the quality of the food waste collected.[194]

Contamination of input streams can be tackled through appropriate pre-treatment steps, including screening of biowaste input fractions, but this results in the loss of biowaste with increased material sent for residual treatment – while also resulting in higher treatment costs for biowaste operators.

8.3.2.2 Contamination of conventional recycling streams

The best place for which to consider data on the contamination of conventional recycling streams with compostable plastic is Italy, due to the relatively high prevalence of compostable plastic in that country. For most other EU countries, use remains relatively low, making it much less likely that such contamination will be an issue.

Although both VLPCBs and 15<50 micron LPCBs are now only supposed to be made of compostable plastic in Italy, ≥50 micron conventional plastic bags are still legally in use, and these can be recycled in the country. There is some potential, therefore, for the use of compostable carrier bags to contaminate recycling streams, including the streams designed to accept the larger LDPE bags. Alongside this, there remain some smaller LPCBs made of conventional plastic, as the ban on these has not yet been totally successful at eliminating their use (although numbers of these items declined from 2016 to 2020). The continued prevalence of these smaller bags also has the potential to cause further confusion among consumers, and therefore potentially increase the contamination of conventional plastic recycling.

To date, contamination of conventional recycling streams by compostable plastic has been a lesser issue in Italy than contamination of biowaste feedstocks as outlined in Section 8.3.2.1. However,

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[190] Personal communication with Tim Hermann at UBA

[191] Von Hesler F (2022) Field Test of compostable Fruit and Vegetable bags – circular economy with compostable fruit and vegetable bags – presentation in English on the outputs of the C.A.R.M.E.N. project https://www.carmen ev.de/service/forschungsprojekte/praxistest bio beutel/

[192] https://www.muellundabfall.de/ce/fehlbefuellung-von-biotonnen-und-ihre-ursachen/detail.html

[193] REA(2022) REA written evidence to EFRA committee inquiry on plastic waste, 21st February 2022

[194] SEPA (2019) Plastic in food waste at compost sites, project report November 2019

the data indicates some contamination does occur. Contamination levels were slightly less than 1% in 2016-7 according to data published by COREPLA; the streams were more contaminated by compostable plastic where films were included within the recycling streams.[195] It is understood that contamination levels lower than 1% are not considered to constitute a significant problem for the conventional recycling streams. Contamination levels had increased by 2021 to reach 1.3%; therefore, the EPR scheme BIOREPACK (aimed at compostable packaging) agreed to reimburse the recyclers for the costs of contamination incurred in that year.[196]

8.3.3 Barriers to overcome in Specific Member States

This section sets out the situation in two countries that are likely to experience some difficulties making a shift towards banning conventional plastic bags and considers barriers that would need to be overcome to implement Measure 29d at a Member State level. Input was obtained through consultation with several Member States that had previously raised significant concerns during earlier consultations taking place during research in respect of the implementation of the Plastic Bags Directive across EU Member States.

8.3.3.1 Germany

As was previously mentioned in Section 8.3.2.1, biowaste collection infrastructure is reasonably well established in Germany. This includes the collection of food waste by means of a "Green Bin" System, which every citizen must have access to (as required by the Circular Economy Act [KrWG]) - although the literature suggests lower capture levels of food waste in Germany than Italy, according to data recently published by the European Compost Network.[197] Treatment infrastructure includes composting, AD facilities, and combinations of these (Germany has mostly dry AD facilities). There are some short composting processes of around 2 weeks, similar to the systems in operation in the Netherlands, although it is noted that the output from these systems is not necessarily in compliance with the hygiene rules in operation in Germany.[198]

The country is an interesting contrast to Italy, which also has well established biowaste collections. Federal law permits the use of compostable biowaste collection bags specifically used to collect biowaste (these are not packaging and are not covered by the PPWD). The decision on whether to accept these bags at biowaste plants and for use in the green bin is, however, in practice left to municipalities, because of the variation in biowaste treatment infrastructure in the country. Around half of German municipalities do not currently accept any kind of plastic (including the specifically manufactured compostable biowaste collection bags) – it is understood from discussion with the UBA that quality of compost has been the primary driver of concerns in this respect. In other areas of the country, however, the use of compostable plastic bags designed for biowaste collection is well established.

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[195] COREPLA (2017) I monitoraggi presso gli impianti di selezione della raccolta differenziata degli imballaggi in plastica, available from https://gallery.mailchimp.com/6eaaaac70cb009e45fca0c1b1/files/edd5a132-bdd6-44b9-8427-ad53b6842d4c/Claudia_Anna_Beretta.pdf

[196] See https://www.anci.it/wp-content/uploads/ACCORDO-ANCI-CONAI-13-DEF-signed-5.pdf

[197] The recently published ECN report confirms that Italy's food waste capture rate was 47% in 2018, whereas the comparable rate for Germany is 27%. See: ECN (2022) Guidance on Separate Collection: The untapped potential and steps forward for separate collection of household food waste for high-quality recycling

[198] These may restrict the use of the so-called "Frischkompost" (fresh compost) which is produced by these systems

Recent updates to the German Biowaste Ordinance have taken place and were published in May 2022.[199] For compostable biowaste collection bags to be used in Germany, bag manufacturers need to obtain three certificates, with the certification process being linked to the use of the bags:

- Certified to EN 13432 and/or EN 14995;
- Certified 50% biobased content;
- Certified to be fully compostable in 6 weeks, i.e., a shorter degradation time than is the case with EN 13432 and/or EN 14995.[200]

If the biowaste bags meet these certifications and are appropriately labelled (requirements for which are also stipulated through the new Annex 5 of the Ordinance), the biowaste collection bags are not considered to be input pollution.

The recent updates to the Ordinance explicitly confirm that very lightweight (and other) carrier bags made of compostable plastic would not now be acceptable at German biowaste facilities. However, immediately prior to this legislative update, a major research project VLPCBs made of compostable plastic was undertaken in Bavaria with the aim of considering the second use of fruit and vegetable bags for subsequent biowaste collection in biowaste treatment systems, as is proposed by Measure 29d. The results of that study were generally very positive, both from the perspective of resident participation and from the perspective of acceptance of the bags at the biowaste treatment facility.[201] This therefore suggests that barriers would be greater in some parts of the country than others.

In the German system, conventional plastic packaging and compostable packaging cannot be placed in the green (biowaste) bin and is not expected to be reused. Compostable VLPCBs are exempt from a ban on placing LPCBs on the market in Germany, implemented 1st January 2022. However, since these are not permitted now at composting plants, such bags would need to be treated via the yellow bin/bag plastic collection, and EPR fees are paid in relation to this packaging being treated through the conventional recycling system. In contrast, in Italy, the EPR fees now paid by compostable bag producers are aimed at covering treatment costs for the bags to be treated at biowaste facilities.

Paper bags are permitted to be sent to biowaste treatment facilities without the need to demonstrate compliance with EN 13432 or the other requirements and are relatively prevalent in Germany – including being used for the collection of biowaste. If the paper is coated, this coating must be certified to the same level as compostable plastic bags (i.e., the three abovementioned certifications are required). Other paper items do not need to meet the same certifications, leading to potential problems with contaminants from inks, wet strengtheners, oil/grease repellents, etc. that would not occur if the bags were required to meet EN 13432, for example.

Input contamination is an issue at some facilities (as is discussed in Section 8.3.2.1), although many remove the contamination via pre-treatment with screening. Some stakeholders suggested that contamination levels were higher in areas with no compostable plastic collection bags, although monitoring of input contamination in Germany is less systematic than in some other European countries, as was discussed under section 8.3.2.1. The updated German Biowaste Ordinance has now set contamination thresholds of 0.5% input contamination (on a dry weight basis) for glass, plastics and metals, meaning that all plant will require some form of pre-

[199] Verordnung über die Verwertung von Bioabfällen auf landwirtschaftlich, forstwirtschaftlich und gärtnerisch genutzten Böden, available from https://www.gesetze-im-internet.de/bioabfv/

[200] This test is still at pilot stage; details are available at https://www.dincertco.de/din-certco/en/main-navigation/products-and-services/certification-of-products/environmental-field/dinplus-biowaste-bags/

[201] Details available via https://www.carmen-ev.de/service/forschungsprojekte/praxistest-bio-beutel/

treatment first – this is expected to be in the form of biowaste screening, which is already in widespread use in the country. The new requirement is also anticipated to require some additional training of personnel working at biowaste treatment plants. The UBA noted that output contamination with compostable plastic collection bags was not a problem, and that plant can generally meet compost quality requirements in place in the country. However, some biowaste is considered to be lost through the pre-treatment screening processes and screening also adds to biowaste treatment costs.

The UBA expressed concerns that accepting some compostable packaging might open the gateway to large numbers of other compostable plastic products. The implementation of Measure 29d could give some reassurance in this respect, as the prioritisation process will ensure that there will be a large number of packaging items that cannot be made from compostable polymers.

The UBA raised further concerns regarding an increase in contamination arising from the situation where only VLPCBs were to be made from compostable polymers, due to consumer confusion between VLPCBs and 15<50 micron LPCBs, which would then be made of different types of material. This may also result in more significant contamination of conventional plastic recycling streams in Germany, where carrier bag recycling (of LDPE bags) is more widespread than in Italy. It is noted that Germany has – with effect from January 2022 – banned 15<50 micron LPCB, and this is expected to reduce the potential for pollution arising from these bags, assuming the ban is successfully implemented.

Against this, recently published German research showed that the use of compostable collection bags reduces the pollution associated with the use of conventional plastic bags and their fragments.[202] This study focussed on the contamination of compost by bags of all types.

The above discussion confirms that, at a minimum, Germany would likely need to revise its recently published Ordinance in the event that Measure 29d were to be implemented, since VLPCBs (and other forms of compostable plastic bags used as packaging) are now not permitted to be treated at any German biowaste treatment facility. Some biowaste treatment systems may need to change their operations to accommodate the bags. There may be opportunities to remove some of these barriers through further consideration of the Standards and certifications, given the recent work being done on certification in Germany with regards to the acceptance of the biowaste collection bags, as set out above. This topic is discussed further in Section 8.3.5.3.

8.3.3.2 Luxembourg

Luxembourg had also previously raised significant reservations in respect of the widespread use of compostable LPCBs. Although some progress has been made, food waste collection appears less well established in Luxembourg than in either Italy or Germany – the ECN report indicated food waste capture to be at 13% in 2018 (the comparable rate for Italy being three times higher at the same point in time).[203]

Further discussion with the Ministry undertaken as part of this project confirmed the desire of the authorities there for waste prevention – of all types of bags - to be prioritised over a shift to greater potential use of compostable bags. Issues have also arisen in biowaste treatment facilities from the use of compostable bags, and therefore these items are removed as contamination.

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[202] Kern M, Newmann F, Sipenkothen HJ, Turk T and Loder M (2020) Kunststoffe im Kompost: Praxisversuche zur Bestimmung der Polymerzugehörigkeit, Mullund Abfall Fachzeitschrift fur Kreislaufund Resourcenwirtschaft, available from https://muellundabfall.de/ce/kunststoffe-im-kompost/detail.html

[203] ECN (2022) Guidance on Separate Collection: The untapped potential and steps forward for separate collection of household food waste for high-quality recycling

Authorities in Luxembourg raised similar concerns to those highlighted in Germany, namely that the introduction of compostable carrier bags of all types might result an influx of further types of compostable packaging; this is anticipated to be mitigated by the design of Measure 29d, which will restrict the types of packaging that may be made of compostable polymers in the future.

8.3.4 Potential Impacts on Littering

Littering data is in general very limited. There is no specific data from Italy that would suggest an additional problem with litter in this country arising from the widespread use of compostable carrier bags.

German stakeholders, including the UBA, confirmed there was no issue with littering of the bags in that country because there are very few VLPCBs or 15<50 micron LPCBs made from compostable polymers (only the biowaste collection bags used in some parts of the country). Recent legislative updates have meant that labelling updates are required, with labelling now being tightly specified; this does not cover any instructions to reduce the potential for littering because such bags are not littered.

Measure 30 of the Impact Assessment undertaken in 2021 was aimed at providing guidance on the labelling of compostable plastic items – one key element of which was the inclusion of wording on the need for compostable plastics to be treated through the appropriate waste management route. Whilst there were some potential issues with space restrictions on some packaging products which might make the inclusion of appropriate labelling a challenge, this is less likely to be an issue with LPCBs.

8.3.5 Activities Required to Support Measure 29d

This section considers both the supporting activity required to ensure the implementation of Measure 29d works alongside existing legislation on LPCBs and other actions required to ensure that its implementation achieves the desired aim of reducing contamination in recycling and biowaste streams.

The section starts, in Section 8.3.5.1 with a reflection on the current drafting of Measure 29d as per the submitted draft of the Impact Assessment to the Regulatory Scrutiny Board (RSB) - needed as context for the discussion that follows.

8.3.5.1 Current drafting of Measure 29d

The draft of the Impact Assessment submitted to the RSB indicates that VLPCBs are to be made only from compostable plastic under Measure 29d. The current draft does not make clear, however, whether 15<50 micron LPCBs will be made only from conventional plastic or permitted to be both conventional and compostable. In contrast, the previous draft of the Impact Assessment produced by Eunomia in December 2021 included both VLPCBs and 15<50 micron LPCBs in the group of products that were to be made only of compostable plastic. As a consequence, the subsequent discussion in this section considers the implications of all three possible outcomes.

8.3.5.2 Maintaining the Waste Prevention Focus of LPCB legislation

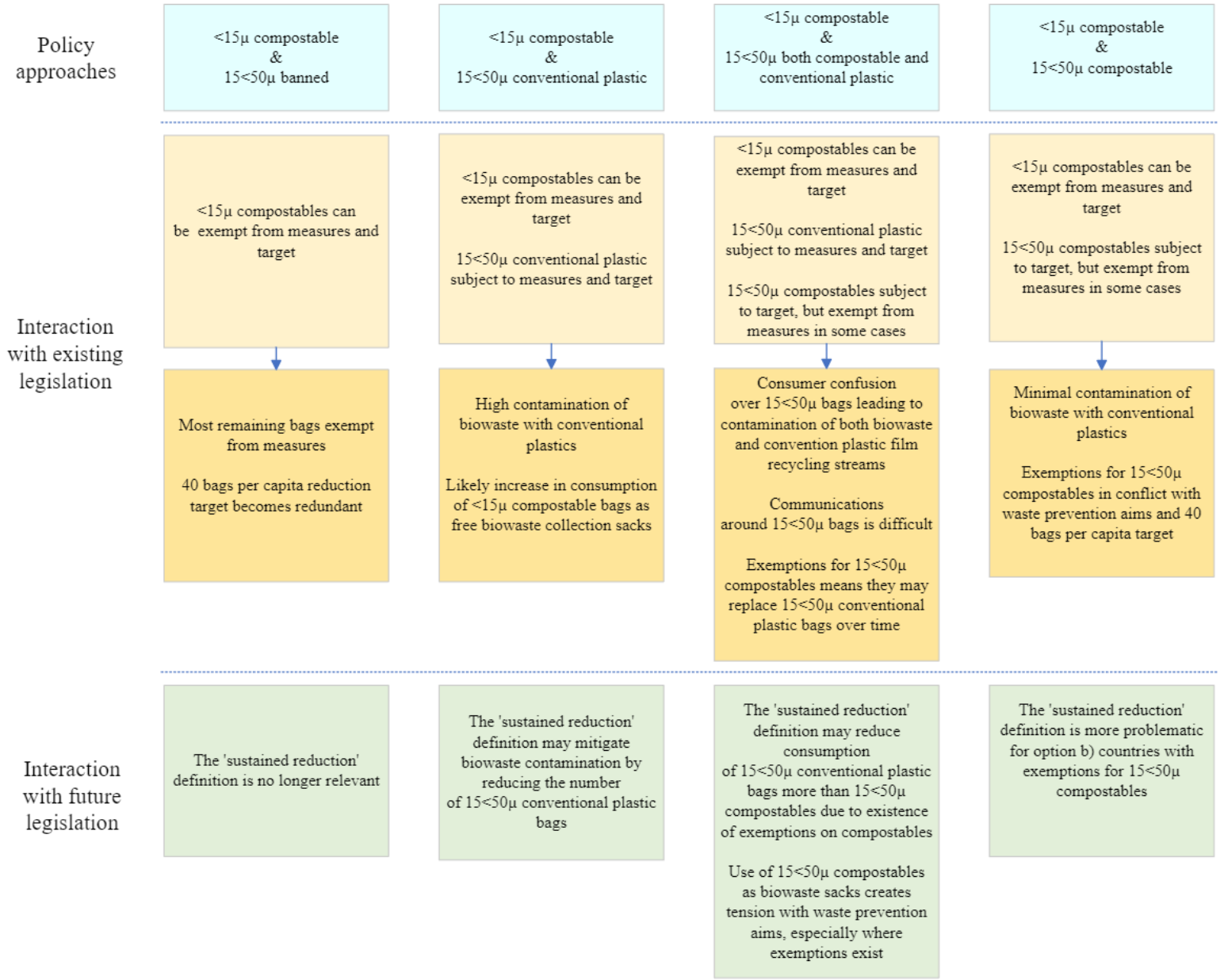
Discussion with stakeholders confirms there is support for the continued need to prioritise waste prevention alongside any further shift towards compostable bags. This, in turn, confirms there is a need to properly consider the implications for waste prevention of any bans on compostable or conventional plastic bags of different sizes – and to consider the implications for the LPCB legislation as currently drafted.

There are four possible policy approaches under different interpretations of Measure 29d. These are:

1. A mandate that VLPCBs be compostable, and a prohibition against placing 15<50 micron LPCBs on the market (i.e. a ban).
2. A mandate that VLPCBs be compostable, and a mandate that 15<50 micron LPCBs be made of conventional plastics.
3. A mandate that VLPCBs be compostable, and no mandate regarding the composition of 15<50 micron LPCBs (such that both compostable and conventional plastic 15<50 micron LPCBs remain on the market).
4. A mandate that VLPCBs be compostable, and a mandate that 15<50 micron LPCBs be compostable.

Figure 9-1 presents these policy approaches along with the primary consequences resulting from their interaction with existing legislation and potential future legislation. The following sections discuss the relevant issues in more detail.

Figure 8-1 Plastic carrier bag policy approaches under Measure 29d, and interaction with existing and future policy



8.3.5.2.1 VLPCBs are compostable, and 15<50 micron LPCBs are banned

The first potential policy approach under Measure 29d is:

A mandate that VLPCBs be compostable, and a prohibition against placing 15<50 micron LPCBs on the market (i.e. a ban).

It is noted that some countries such as Germany have recently mandated a ban on PCBs between 15<50 micron; this, in turn, suggests the above option may need to be considered.

Currently, the PPWD allows Member States to exempt VLPCBs used as primary packaging for loose food items from their consumption reduction measures and to excluded them from their consumption figures for the purpose of proving compliance against consumption reduction targets. As the majority of VLPCBs are used for this purpose, the majority of these bags can be exempted from measures and targets. Therefore, if all LPCBs with a wall thickness equal to or above 15 microns were banned, then most LPCBs left on the market would be eligible for these exemptions.

The consequences of this in terms of interaction with current policy would be:

- The 40 bags per capita by 2025 target of option a) would become redundant, as the majority of bags on the market could be exempted from it, as well as from the measures implemented to meet the target.
- The prohibition on the free provision of LPCBs under option b) would have very limited application, as in practice it mostly applies to 15<50 micron LPCBs. All but one of the 22 countries prohibiting the free provision of LPCBs under option b) have made an exemption of some kind for VLPCBs.

In addition, this policy approach would further make the implementation of the proposed definition of 'sustained reduction' redundant. The definition is intended to extend the 40 bags per capita target to all countries, but as only exemptible VLPCBs would be left on the market, the target would have no application.

8.3.5.2.2 VLPCBs are compostable, and 15<50 micron are made of conventional plastics

The second policy approach under Measure 29d is:

A mandate that VLPCBs be compostable, and a mandate that 15<50 micron LPCBs be composed of conventional plastic material.

On this approach, compostable VLPCBs could be exempted from consumption reduction measures and the 40 bags per capita target, while the measures and target would apply to conventional plastic bags of 15<50 microns.

This would likely result in an increase in consumption of VLPCBs bags relative to 15<50 micron bags. The latter would continue to be subject to measures disincentivising consumption, while the former would largely be unaffected by measures and would likely be seen by consumers as free biowaste collection sacks (where biowaste collection systems were established). If the use of VLPCBs compostable bags in biowaste collection did begin to drive up consumption of these bags, then this would be contrary to the waste prevention aims of the PPWD. However, these bags would be replacing specifically manufactured biowaste collection sacks, and an increase in biowaste collection may be achieved.

The primary problem associated with this approach is that having both compostable and conventional plastic bags on the market can lead to consumer confusion as to the differences between the types of bags. As a result, there is a high risk of householders using conventional plastic bags as biowaste collection sacks, leading to contamination of the biowaste stream with conventional plastic material.

The potential for conventional plastic to contaminate biowaste is discussed for a number of countries in Section 8.3.2.1.

It is also more likely that there would be greater contamination of conventional recycling streams under this solution. Current data suggests that Italy – the country with the greatest consumption of compostable VLPCBs and LPCBs – sees only minimal contamination of its conventional recycling system by compostable bags. However, there are fewer PCBs made from conventional bags in that country, since these items have been banned in the legislation – and as such only the larger PE bags are being recycled. Most bags not ending up in biowaste will therefore be disposed of as residual waste, reducing the potential for consumer confusion.

The potential for further contamination arising from only VLPCBs being compostable was raised by the UBA. It was noted earlier that in practice, in Germany, the risk may be lower, since the size range 15<50 microns has been banned – making the German situation comparable to that described in Section 8.3.5.2.1.

If the Commission was to implement the proposed definition of sustained reduction, then this should result in a reduction in the number of 15<50 micron conventional plastic bags on the market, which may serve to mitigate the risk of biowaste contamination to some degree. However, the problem of consumer confusion would remain, and with it the risk of contamination.

8.3.5.2.3 VLPCBs are compostable, and 15<50 micron can be either compostable or made of conventional plastics

The third policy approach under Measure 29d is:

A mandate that VLPCBs be compostable, and no mandate regarding the composition of 15<50 micron LPCBs.

On this approach, both compostable and conventional plastic 15<50 micron LPCBs would remain on the market.

On this approach, compostable VLPCBs could be exempted from consumption reduction measures and the 40 bags per capita target, while the measures and target would apply to both conventional plastic bags and compostable bags of 15<50 microns. However, some countries have implemented exemptions for compostable LPCBs that would likely continue to apply to 15<50 micron compostable LPCBs on this policy approach.

In such cases, where compostable 15<50 micron bags are exempted from consumption reduction measures but conventional plastic 15<50 micron bags are not, it can be expected that consumers would favour the compostable bags, meaning that the compostable bags would likely replace the conventional plastic bags over time.

The primary problem with this approach is, as with the second approach, that it would introduce a high risk of contamination. The problem is worse in this case, however, as there would not only be contamination of biowaste with conventional plastic material, but compostable bags would also likely enter the conventional plastic film recycling stream in greater numbers. Again, this is due to consumer confusion and the difficulty of differentiating between different types of bags. In this case, consumer confusion would only be made worse by the existence of two types of 15<50 micron LPCBs on the market.

A point of difference with the second approach is that the consumption of compostable VLPCBs as biowaste sacks would likely not be driven as hard. This is because there would also be some compostable 15<50 micron LPCBs on the market exempt from consumption reduction measures, and consumers would use some of these bags as biowaste collection sacks.

If countries adopt the 40 bags per capita target and have exemptions to reduction measures in place for compostable 15<50 micron LPCBs, there is a problem that these bags are subject to the target but not to the measures used to meet the target. If these bags are also used as biowaste sacks then this produces an incentive towards consumption, creating a conflict with the waste prevention aim of the PPWD, and making it harder for the 40 bags per capita target to be met. Implementing the proposed definition of 'sustained reduction' would mean that the target applied to all countries, thus putting these dynamics in place for all countries with exemptions in place for compostable 15<50 micron LPCBs.

On this approach, it is likely that the 40 bags per capita target introduced under the proposed definition of 'sustained reduction' would have more impact in reducing consumption of conventional plastic 15<50 micron LPCBs than compostable 15<50 micron LPCBs, due to the presence of reduction measure exemptions for the compostables bags. Again, the likely result would be that the compostable bags would replace the conventional plastic bags to some extent over time.

8.3.5.2.4 VLPCBs are compostable, 15<50 micron LPCBs are compostable

The fourth policy approach under Measure 29d is:

A mandate that VLPCBs be compostable, and a mandate that 15<50 micron LPCBs be compostable.

On this approach, compostable VLPCBs could be exempted from consumption reduction measures and the 40 bags per capita target, while the measures and target would apply to compostable bags of 15<50 microns.

The mandate that both VLPCBs and LPCBs were to be compostable was the option that was put forward in Eunomia's draft of the Impact Assessment submitted in December 2021. The rationale for including the LPCBs within this group was partly based on the Italian data which showed that LPCBs could be successfully used as biowaste containers. Data presented in this report shows that the most frequently used item for biowaste containment in that country – by some margin - was LPCBs. Use of VLPCBs in collections in that country is increasing, however.

The approach would to a large extent solve the contamination problems associated with the second and third approaches. As there would be no bags made of conventional plastics on the market, there would be no such bags to enter the biowaste collection system. While the case of Italy (which has banned non-compostable LPCBs) proves that it is difficult in practice to remove all conventional plastic bags from the market, an EU wide ban on these bags would likely be more effective at keeping these bags off national markets, as the scope for cross-border import within the EU would be much reduced.

The main problem in terms of interaction with the current legislative regime is that, where countries have exemptions to their consumption reduction measures in place for compostable LPCBs, this is in conflict with the waste prevention aims of the PPWD. If countries also adopt the 40 bags per capita target under option a), then exemptions on compostable 15<50 micron bags also make it more difficult to meet the target. The implementation of the proposed 'sustained reduction' definition would mandate the target for all countries, meaning that all countries with exemption to their reduction measures for compostable 15<50 micron LPCBs would find it hard to meet the target.

The solution would be to restrict the powers of countries to implement exemptions to their consumption reduction measures for compostable LPCBs. If there were no exemptions for compostable 15<50 micron LPCBs, then part of the tension with waste prevention aims would be resolved. However, there would remain the incentive to consumption from their use as biowaste collection sacks.

Article 4 of the PPWD currently states:

"Member States shall take measures to achieve a sustained reduction in the consumption of lightweight plastic carrier bags on their territory.

Those measures may include the use of national reduction targets, maintaining or introducing economic instruments

as well as marketing restrictions in derogation from Article 18, provided that these restrictions are proportionate and non-discriminatory.

Such measures may vary depending on the environmental impact of lightweight plastic carrier bags when they are recovered or disposed of, their composting properties, durability or specific intended use."

It is the statement that "Such measures may vary depending on the environmental impact of lightweight plastic carrier bags when they are recovered or disposed of, their composting properties, durability or specific intended use" that would require amending regarding the extent to which measures may vary based on composting properties.

8.3.5.2.5 General considerations on the PCB legislation

A number of general considerations apply across all approaches. These are:

- Wherever there are exemptions in place for compostable LPCBs, there is reduced waste prevention activity on these bags.
- There may be an increased risk of littering associated with compostable LPCBs, due to the perception on the part of some consumers that it is environmentally 'less bad' to litter these bags – although there is very little data available in respect of littering (as was noted in Section 8.3.4). While this is likely to be the case for a relatively small proportion of consumers, it is important that all policy approaches be backed up with education campaigns and clear messaging on waste prevention and proper disposal / use of bags.
- With any mandates on bags within the 15<50 micron range, there is a risk of manufacturers and retailers switching to very lightweight plastic bags just under the 15 micron threshold that are nonetheless not intended to be used as primary packaging for loose food items, but to carry general goods in the same way as 15<50 micron bags. These bags would have minimal reuse potential and are more likely to break during use and so be littered: although the thinness would not be a barrier to the bags being given a second life as a biowaste container. The issue does provide support for implementation of the previously proposed changes to definitions of 'very lightweight plastic carrier bags' and the allowed exemptions on these bags, to ensure that countries can only exempt VLPCBs used as primary packaging for loose food items in order to prevent food waste or for hygiene reasons from their reduction measures and consumption targets.

8.3.5.3 Updates to Standards

The application of appropriate standards defining the performance of compostable plastic in biowaste facilities remains a key element in the system. If defined properly, the standards should ensure that compostable plastic will be acceptable at the full range of composting / AD plant at which it could be treated. However, the range of potential treatment facilities in operation in Europe is such that setting appropriate definitions in this respect remains a considerable challenge: it is clear from the discussion on Germany, for example, that the variation in biowaste treatment practices can cause issues even within the same country.

At the time of writing, the key standard which governs the acceptability of compostable plastic in Europe – EN-13432, which applies to all compostable packaging items in accordance with the current PPWD – is being revised. It is noted that, alongside this, the standards committee has also recently

drafted a further standard, EN-17427, aimed at ensuring bags made of compostable plastic are suitable for home composting systems.

No formal outputs from the revision process of EN-13432 are yet available. Discussion with stakeholders undertaken as part of the consultation process for this project has confirmed, however, that a key focus of recent discussions of the update committee has been the need to consider, in particular:

- Shorter composting times than are currently required under the EN-13432 standard;
- The acceptability of compostable plastic at AD plants, particularly where there is no subsequent post-AD composting step – it is understood a separate working group has been convened to consider this topic; and
- The potential for in-country testing (at actual facilities) to resolve issues – the current standard has a focus on laboratory testing, but this may lead to different outcomes than when testing takes place at actual plant.

With respect to the last point, it is important to note that even in Italy – where the use of compostable plastics is considerable – products must go through a separate certification system in addition to EN-13432, prior to being deemed acceptable for use. This includes in-plant testing to make sure degradation proceeds under the actual conditions found in the plant.

This, in turn, suggests that Germany's recent decision to further stipulate the certification process required of compostable plastics (as part of the Ordinance) may be an important step towards improving the future acceptability of these products. The updates to the German Ordinance require compostable plastic to meet a shorter composting time than that currently required by EN 13432. Products meeting this standard would also be more likely to be accepted in other countries that also have shorter composting times, such as the Netherlands.

It is noted, however, that the Italian certification places different requirements on compostable plastic manufacturers than the likely requirements of the new German Ordinance. There is thus the risk that an increasing number of country specific variations might be required in the future – making it increasingly challenging for compostable plastic manufacturers to meet the variety of standards. Attempts at harmonising biowaste systems – at least to some extent – would therefore mitigate some of these future challenges.

Whilst some progress appears to have been made in respect of considering the range of composting times in operation across European biowaste facilities, the acceptability of compostable plastics at European AD plant was noted as a particular challenge. Specific issues with AD are considered further under Section 8.3.5.4.

8.3.5.4 Other Considerations

The discussion in respect of the German system confirms that many countries will need to consider updates to EPR in the event that Measure 29d is implemented, in order to ensure that funding is available for the correct management route through which the compostable packaging will be treated. The German system expects that packaging is treated via the conventional plastic recycling system, and there is no funding through the system for packaging to be treated by biowaste management systems. In contrast, in the Italian system, EPR fees for compostable plastic packaging placed on the market are aimed at funding the treatment of compostable bags via the biowaste system. The fees therefore help ensure there is sufficient investment in the biowaste system to accommodate the treatment of these items of packaging.

Work is also ongoing in respect of tackling the issue of the acceptability of compostable plastic at AD facilities. Most of the AD treatment capacity in the UK is wet AD, and does not have a post-AD

composting step. Compostable plastics do not degrade in these treatment systems. Although the UK is no longer a part of the EU, the issue remains relevant for Member States as a similar situation exists in Sweden. It is also not clear whether in the future the same issue will arise in other countries which have yet to develop biowaste treatment infrastructure. Wet AD is preferred where countries have a strong focus on generating renewable energy from their biowaste treatment systems, as it results in high biogas yields.

UK operators are considering a number of approaches to tackling the issue of compostable plastics. One of the more promising options is the use of autoclave systems ahead of the wet AD process: technology operators going down this route include Aerothermal and Econward. Where this is used, the autoclave system results in further breakdown of the compostable plastic such that it will then subsequently breakdown as part of the AD process. Such systems also result in increased recovery of other contaminants (including conventional plastic) and high process stability – as well as increased biogas yields and higher recovery of organics.[204] Although the use of an autoclave results in additional process costs, it is noted that removing high levels of contamination also results in costs to operators, whilst additional biogas (and therefore energy) yields would also result in a financial benefit to operators in most cases.

It is noted that the Italian biowaste treatment system does not permit the digestate from wet AD facilities to be spread on land: all digestate would be required to go through a composting step as part of the product certification process for marketing compost.[205] As such, the issue does not arise in Italy even where wet AD systems are in use.

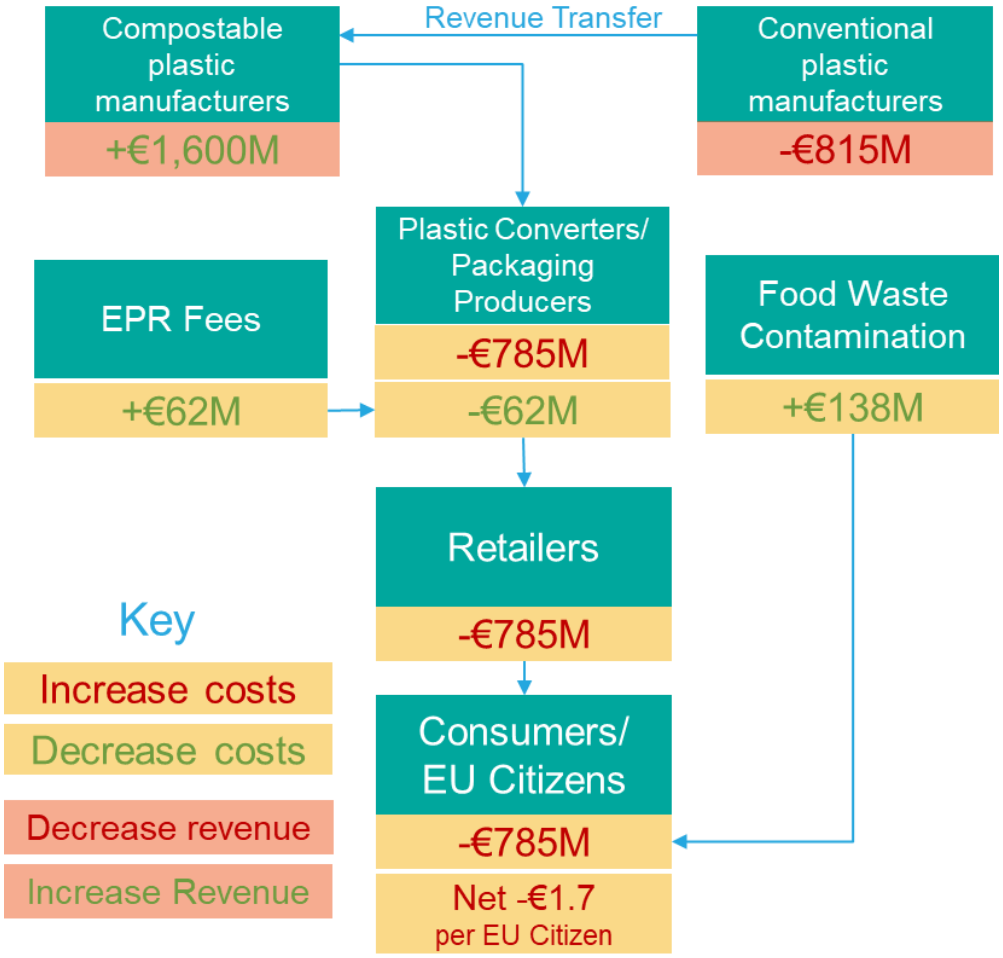
8.3.6 Transfer of financial costs

Figure 8-2 shows how the financial impacts of Measure 29d are distributed around different actors. There is a revenue transfer from conventional plastics to compostable plastics producers which results in a net cost increase for packaging producers and retailers as the cost of compostable material is higher. This cost differential is likely to reduce in the future, but it is not known by how much. The increase costs are partially offset by a reduction in EPR fees and a reduction in the costs associated with dealing with plastic contamination in food waste. It is not known how the later will be passed through as it is currently a 'hidden cost' which may or may not be accounted for in EPR fees in the future. It will either manifest as a reduction in EPR fees or in overall waste management costs which may eventually be passed on to EU citizens.

[204] Confirmed in discussion with process operators Aerothermal and Econward

[205] Confirmed in discussion with the Italian CIC, March 2021

Figure 8-2 Measure 29d Transfer of financial costs



8.3.7 Conclusions

The analysis in this section confirms that Member States experience significant issues with contamination of biowaste feedstocks from conventional plastic. In Italy – the country that is by far the most advanced in respect of biowaste collection in Europe – some progress has been made to tackle this through a requirement that both VLPCBs and 15<50 micron LPCBs be made of compostable plastic, with a ban on the use of conventional plastic for these products. This has resulted in some additional contamination of conventional plastic recycling streams – although this has generally been a lesser problem than contamination of the biowaste stream has been. However, the ban on conventional plastic bags has not been entirely successful in Italy (with illegal bags still being used), whilst Italy's LPCB consumption rate remains relatively high.

As of yet, no other European country is using compostable carrier bags to the same extent as Italy, which means that the problem associated with contamination of conventional plastic with compostable plastic is far less likely to be identified. However, there is considerable evidence of widespread contamination of biowaste feedstocks (particularly with plastic) in other European countries in areas where food waste collections have been established. In most cases, this is being tackled by pre-treatment to remove the contaminants. Although this works for removing contamination, the result is a loss of biowaste and increased cost to operators.

Some Member States will face barriers to the implementation of Measure 29d. Reform of EPR schemes is likely needed in some cases, and legislation may need to be revoked that currently prevents VLPCBs made of compostable polymers from being accepted for treatment at some European biowaste facilities. Revisions to the standard EN-13432, which are currently being considered, may improve the situation – although there is also a risk that this may result in a number of related standards being issued for specific Member States, which would make it harder for the single market on compostable polymers to function. Progress on some other challenging aspects, such as the acceptance of compostable plastic at wet AD facilities, is occurring relatively slowly, but solutions are now also being developed that could potentially address this problem in the future.

In its current form, Measure 29d appears to be drafted to allow only VLPCBs to be made from compostable polymers, while 15<50 micron LPCBS can still be made from conventional plastic. This has the potential to increase levels of contamination due to the confusion that may arise from the use of products that are similar in appearance but are made from different materials – which is the very issue Measure 29d is aiming to tackle. One possibility is that 15<50 micron LPCBs are also banned completely (as is already the case in some European countries), which would have further implications for the drafting of LPCB legislation, as set out in the above analysis. Alternatively, 15<50 micron LPCBs could also be made only from compostable polymers, as is the case in Italy – where these bags appear to play a significant role in biowaste containment in food waste collection systems.

Although the use of VLPCBs and 15<50 micron LPCBs made from compostable polymers has the potential to address some of the contamination concerns, there is a need to not lose sight of the waste prevention focus of the LPCB legislation. If 15<50 micron LPCBs were also to be made only from compostable polymers – the impact of which was analysed in Eunomia's original Impact Assessment published in 2021 – it may be necessary that the Commission consider removing Member State's powers to grant to grant exemptions to their consumption measures for compostable LPCBs. In this situation, Member States would have to implement measures to reduce consumption of compostable LPCBs in line with consumption targets. Meanwhile, ≥50 micron PCBs would continue to only be made from conventional plastic, with a focus on reuse and eventual recycling at end-of-life. This would assist in reducing the potential impact on conventional plastic recycling systems from the use of compostable LPCBs, and help to reduce any potential littering impacts.

Lastly, it is important to note that the definition of 'very lightweight plastic carrier bags' and the permitted scope of exemption on <15 micron LPCBs remain ambiguous in the legislation as currently drafted. The problem is that it is not made sufficiently clear that only bags that are used as primary packaging (either for loose food items in order to prevent food waste, or for hygiene reasons) can be exempted from consumption reduction targets and measures. This has implications for any mandates introduced on bags within the 15<50 micron range, as there is a risk of manufacturers and retailers switching to VLPCBs just under the 15 micron threshold that are nonetheless not intended to be used as primary packaging for loose food items, but to carry general goods in the same way as 15<50 micron bags. These bags would have minimal reuse potential and are more likely to break during use and so be littered – although the thinness would not be a barrier to the bags being given a second life as a biowaste container.

In order to ensure that Measure 29d does not have the unintended negative consequence of incentivising consumption of VLPCBs, the legislation should be amended to simply define VLPCBs as bags with a wall thickness under 15 microns, and to make clear that exemptions are only allowed for VLPCBs used as primary packaging – either for loose food items (in order to prevent food waste) or for hygiene reasons.

9 Additional information

The following sections provide additional information not related to tasks under the previous sections.

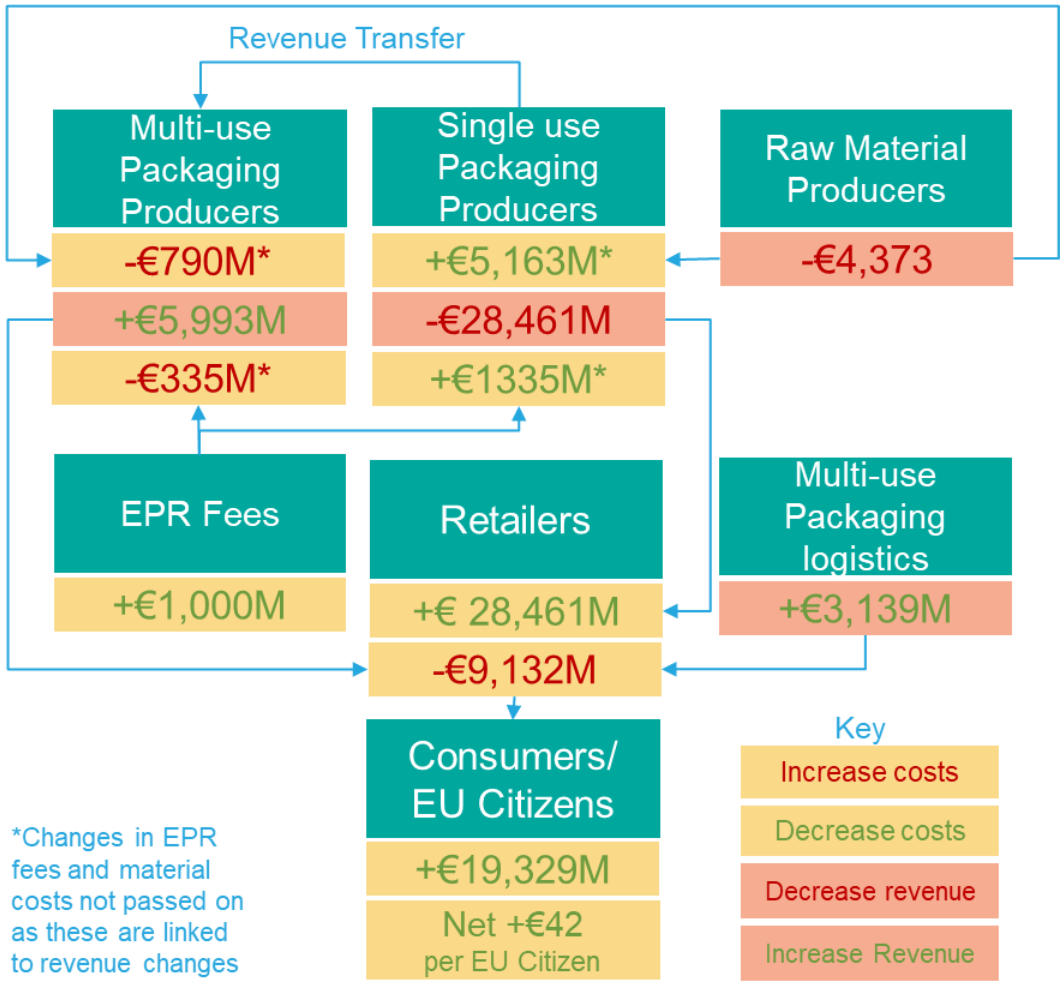
9.1 Transfers of Financial Costs

The following subsections provide an overview of how the costs identified for each measure are transfers between actors and ultimately to the consumer/EU citizen. Whilst it is not certain whether all costs borne by industry will be transferred, it is assumed for the purposes of the analysis that any increase in costs by producers will filter down the value chain. All costs are for the specific *measure* and will change when combined with other measure as part of an option, although the key actors and where revenues transfer from one industry to another will not change.

9.1.1 Measure 8b – Mandatory reuse target

Figure 9-1 shows how mandatory reuse targets see a significant transfer of revenue from single use packaging producers to multi-use packaging producers. This results in a net reduction in packaging requirement which is passed through as a cost reduction to retailers. The costs associated with production and the logistics of reusable packaging are also passed to the retailer, but this is lower than the cost savings resulting in a net financial benefit to consumers. This diagram also applies to 8c, but with higher costs due to the higher targets.

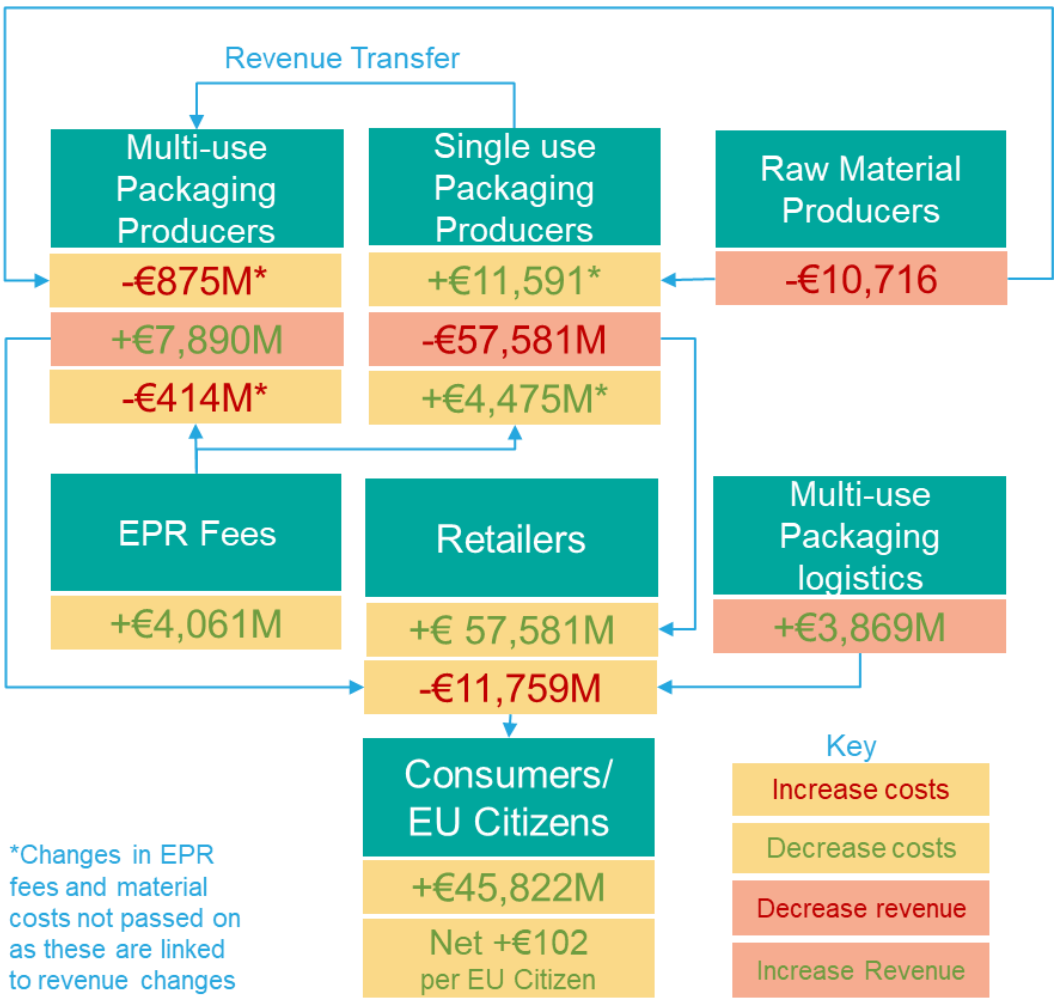
Figure 9-1 Measure 8b – Mandatory reuse target transfers of financial costs



9.1.2 Measure 2b – Waste prevention target

Figure 9-2 is similar to M8b with a transfer of revenue from single use to reuse, but to a lesser extent as other waste prevention measures can also be employed. This also means a larger reduction in material use and consequently a larger reduction in revenue overall for packaging producers.

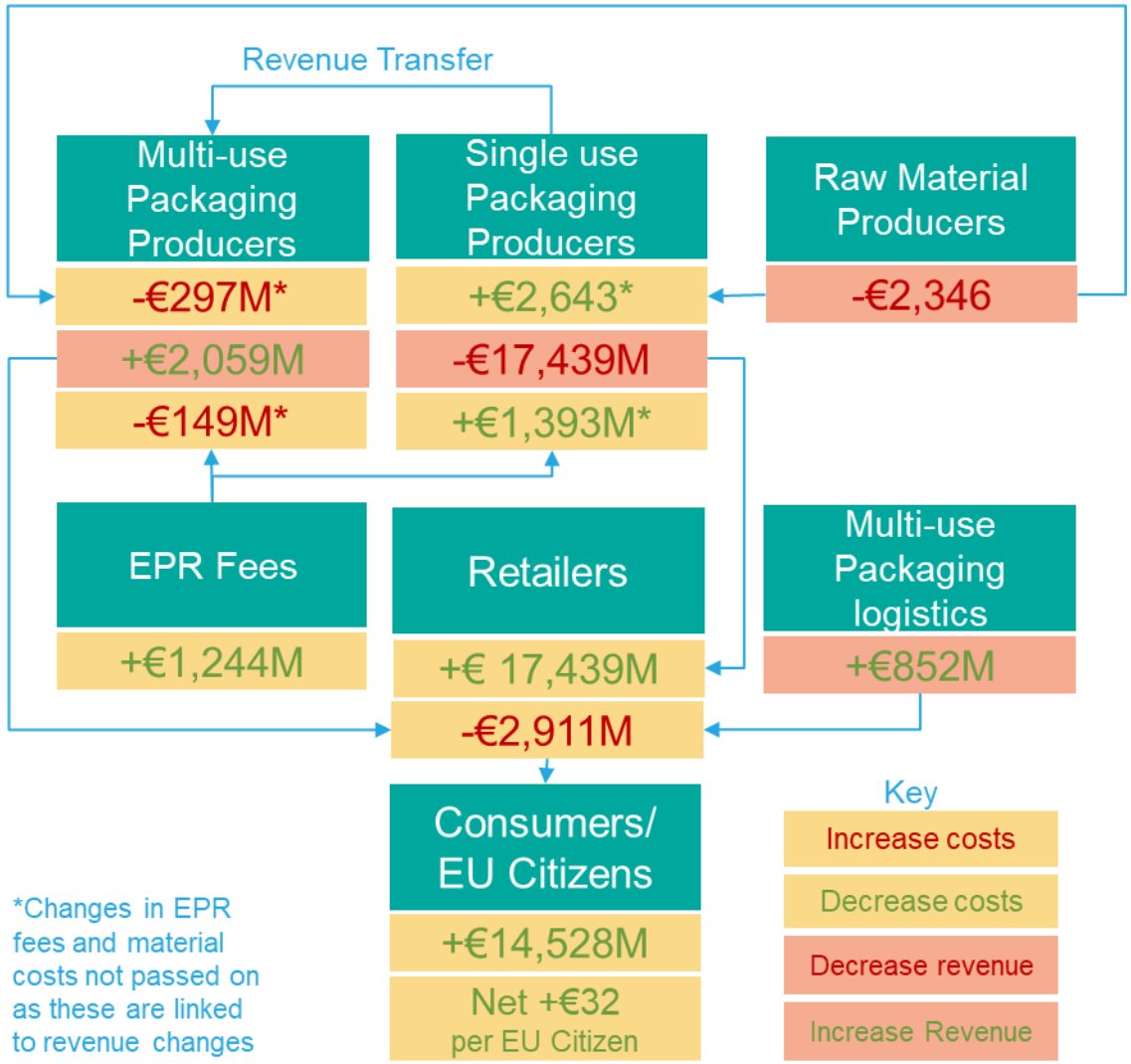
Figure 9-2 Measure 2b – Waste prevention target transfers of financial costs



9.1.3 Measure 7 – Phase out Avoidable / Unnecessary Packaging

Figure 9-3 shows a similar spread of costs as M8b and 2b. When avoiding unnecessary packaging, this also can result in moves towards reusable alternatives, but the main costs are seen as a reduction in revenue by single use packaging producers resulting in a corresponding overall reduction in material costs.

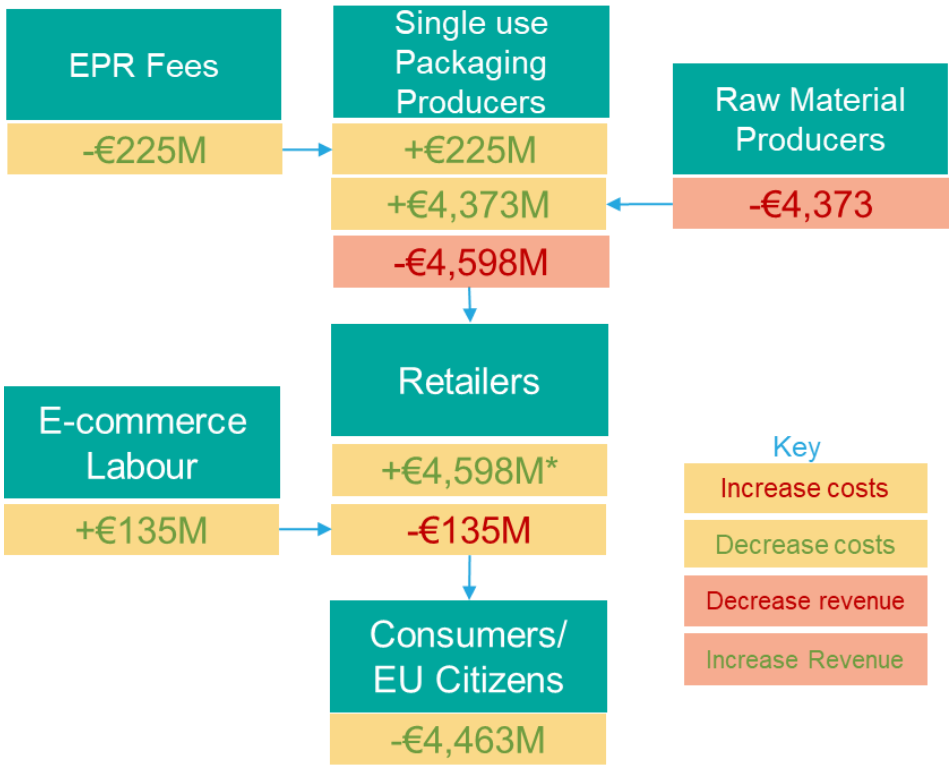
Figure 9-3 Measure 7 – Phase out Avoidable / Unnecessary Packaging transfers of financial costs



9.1.4 Measure 5 – Void space limit

Figure 9-4 shows that the main financial impact for void space removal is a reduction revenue for raw material producers. For packaging producers it is assumed than that the savings from lower EPR fees and raw material costs are passed on to the retailers due to price competition in the market. The cost to e-retailers is likely to be a small increase in labour needed to optimise outgoing packaging.

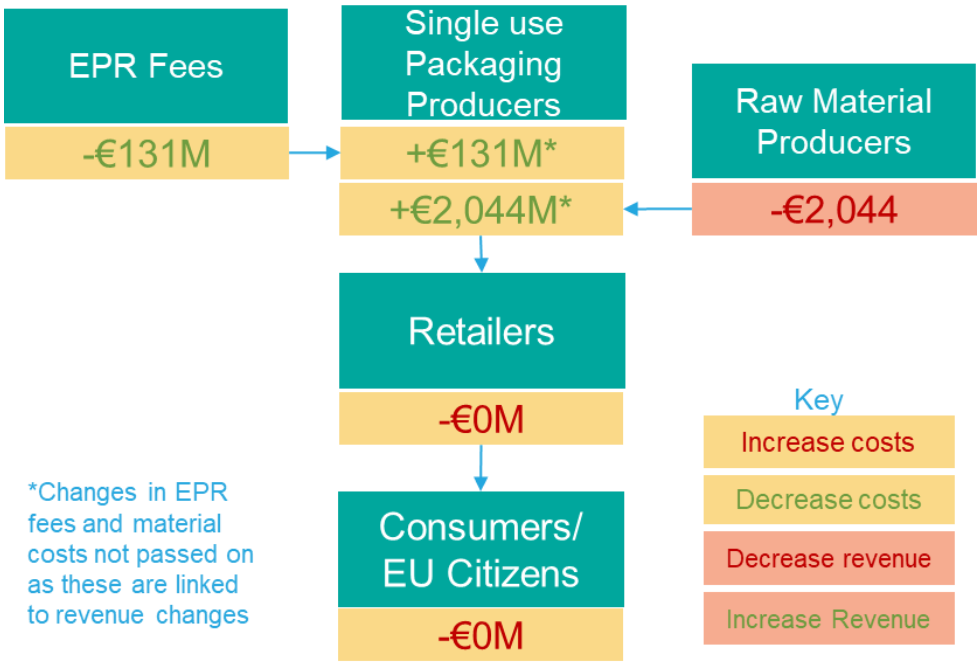
Figure 9-4 Measure 5 – Void space limit transfers of financial costs



9.1.5 Measure 3 – "best in class" weight limits

Figure 9-5 shows that the packaging producers are likely to be the primary beneficiary of this measure as reduced costs from using less raw material may not then be passed on to retailers as the number of packaging items is not reduced (only the mass of each item is reduced).

Figure 9-5 Measure 3 – "best in class" weight limits transfers of financial costs



9.2 Interactions with other Waste Legislation

The following text provides some additional context for why the measures in the PPWD are required due to the fact that existing recent legislation (particularly on plastics) is not sufficient to drive the changes required. This is principally due to the uncertainty around impacts (partially due to how recent some legislation is) and that the scope is much less than that of the PPWD.

9.2.1 SUPD

The SUPD requires Member States to "achieve an ambitious and sustained reduction in the consumption of single-use plastics" and targets cups for beverages (including their covers and lids) and food containers. Although the directive does prohibit Member States from placing a range of single-use plastics on the market, the only single-use plastic that is related to packaging is polystyrene containers for takeaway food and beverages – which makes up a fraction of the overall market for plastic packaging. Furthermore, there are no specific quantitative targets provided in the directive, thus making it difficult to disaggregate this data and the overall scope is still only limited to takeaway containers.

Future projections for recycled content follow the standard approach for a business as usual scenario i.e. the potential impacts of adopted and agreed policy measures were taken into account for the projections. Only mandatory and legally binding existing recycled content targets were included when designing the model assumptions. Voluntary commitments and similar policy measures or views from stakeholders on the potential for future change in recycled content are not considered, as these do not provide sufficient certainty of future change to be included in a business as usual scenario.

9.2.1.1 Recycled Content

Following the above approach, recycled content projections are therefore kept at baseline levels, with the exception of beverage containers, which are assumed to meet the specific targets laid down in the Single-use Plastics Directive, these are:

- 25% of recycled plastic in PET beverage bottles from 2025; and
- 30% in all plastic beverage bottles from 2030

The 30% target for all plastic beverage bottles is split in the model across PET and non PET beverage containers, with the former modelled with a higher rate (30.3%) compared to the latter (20%) in 2030. In combination these serve to meet the 30% overall target for all beverage bottles.
By 2030 the beverage bottles covered under the SUPD are expected to account for 17% of plastic packaging placed on the market but due to the target will be responsible for 32% of the total recycled content used in plastic packaging overall. The lack of a recycled content target for other plastic packaging therefore creates a disproportionate amount of PET bottle recycling (also due to the 90% collection target). The SUPD target provides very little incentive to increase recycling and recycled content of polyolefins as these currently only account for 3% of the beverage bottle market – and this may shrink further as some producers switch to PET.

9.2.1.2 Consumption Reduction

Article four states that "…ambitious and sustained reduction in the consumption of the single-use plastic products…" are required by Member States. The scope of this relevant to the PPWD is specifically plastic fast food containers and no other packaging. In the baseline modelling there is no specific category for these types of packaging, but they would fall under *'Rigid food e.g. pots, tubs and trays'* which accounts for 24% by weight of total plastic packaging by 2030 and only 5% of overall packaging including other materials. Given this, and that the category also includes all other forms of

rigid packaging and not just fast food, the scope of the SUPD with regard to consumption reduction is much smaller than that of the PPWD.
Importantly, the SUPD does not specify a particular reduction proportion and therefore Member States are likely to react with different intensities and some inconsistency will result. At the time of the baseline development the Member States had not yet published a description of measures which will be adapted to meet this requirement (needed by July 2021).
Similarly, the restriction on placing on the market (Article 5) food containers made of expanded polystyrene will also only affect a small proportion of *'Rigid food e.g. pots, tubs and trays'.* This is also only likely to result in material switching rather than a sustained reduction and due to the relatively small impact and this uncertainty the impact is not included in the baseline model.

9.2.2 Plastic Own Resources

European Council meeting of 17-21 July 2020 introduced an own resource based on plastic packaging waste that is not recycled to finance the EU budget over the 2021-2027 period. Member States are to provide a contribution which is proportional to the quantity of plastic packaging waste in their respective territory, with a correction mechanism in support of low income countries.[206] This is intended to incentivise Member States to increase recycling of plastic packaging.
The baseline model was developed in early 2021, at which point the impact of the contribution based on the non-recycled plastic packaging waste was unknown and therefore was not quantified in the baseline modelling. The scenario used was that Member States do not choose to share the burden of the contribution with industry through taxation on virgin materials/ unrecycled packaging, or choose to do so, but to a limited extent that is insufficient to incentivise switches to recyclable packaging design/ types and therefore has minimal impact on recycling rates and recycled content.
Since then, the extent to which the €800 per tonne of plastic contribution will be shared with industry in different Members States remains unclear and currently no Member States have decided to create a harmonised tax (transposing the plastics own resource contribution into national law).
However, two Member States have since indicated that they intend to generate revenue from plastics packaging with Spain and Italy both introducing a tax rate €450 per tonne but for ***all single-use/non-reusable, non-recycled plastic packaging*** from. Both of these could be seen as a reaction to the requirements of the SUPD (consumption reduction) and go partway to paying for the plastics own resource contribution. Exemptions in Italy are limited to medical devices, medicines and compostable plastics, whereas Spain excludes plastic packaging for medicines, sanitary products, food for special medical purposes and infant formula for hospital use.
Data for exact calculations of Member State contributions will not be available until after July 2023 (as data for Eurostat is reported in July of the year N+2). For the remining Member States that have not indicated the implementation of a national tax (i.e. the contribution will be absorbed by their own budget), the impact on plastic waste generation and recycling is likely to be very minimal. For Spain and Italy, there will be an incentive from 2023 for packaging producers to incorporate more recycled plastic in packaging as the tax rate is likely to be higher than the increased cost of recycled material. There is also an incentive in Italy to increase the use of compostable plastics although market penetration for these materials is already higher than any other EU country. However, it is unclear how the markets in those countries will respond particularly for applications that are more difficult to include recycled content (e.g. food packaging) which makes it difficult to incorporate into the baseline in a reliable and robust way.

[206] European Council (2020) Special meeting of the European Council (17, 18, 19, 20 and 21 July 2020) – Conclusions, available at https://www.consilium.europa.eu/media/45109/210720-euco-final-conclusions-en.pdf

10 Policy Options Modelling

The following results provide an update to the cost benefit analysis (CBA) model that was previously developed for PPWD Impact Assessment study with the results of the policy options presented in Section 7.0. Therefore, full detail of how the model was constructed and the assumptions behind it can be found in the relevant annexes in the associated reports (for example, the methodology for modelling the baseline can be found in Appendix B and for modelling the impacts can be found in Appendix D). However, some key information to facilitate interpretation is also reproduced in this report.

The CBA model builds up the options by taking the measures sequentially in a mass flow; where a top-down MS-level target for waste prevention and reuse is in place, half the waste prevention impact is assumed to be due to waste prevention and avoiding unnecessary packaging, and the other half due to other increases in reusable packaging in place of single-use items.

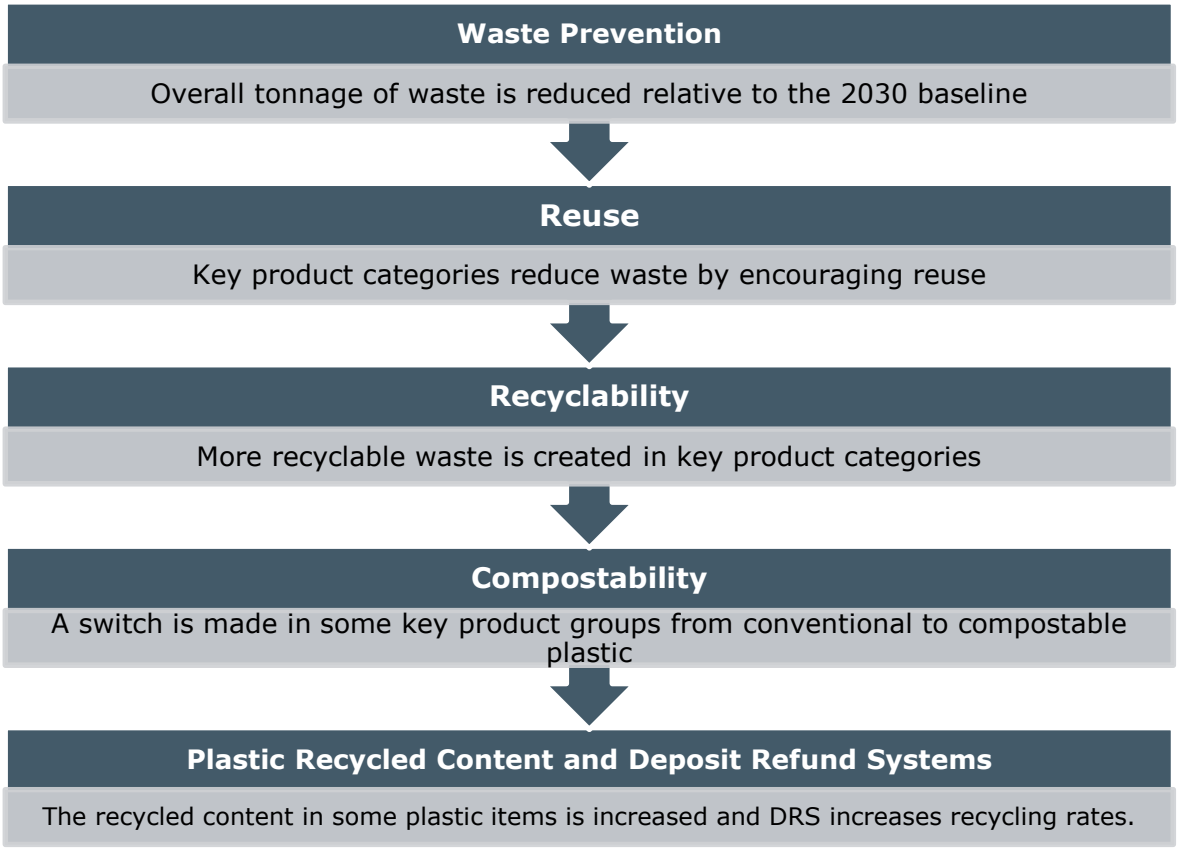
More specifically, the following waste flow impacts are modelled to contribute to achieving the targets:

- The phasing out of avoidable/unnecessary packaging, resulting in packaging switches from single use to reusable alternatives;
- Application of best-in-class weight limits;
- Additional light-weighting of packaging items to reach half the weight reduction required to meet the target waste reduction (for instance through reduction in void space, and further light-weighting). These further weight-reduction assumptions use a starting point for each material type and are scaled for each MS.
    - Note that this additional waste prevention may not be achieved solely through reduction in unit weights of packaging items, it could be through other reduction in the number of items needed. However, by modelling it as a reduction in unit weights, the net impact is a reduction in material demand for production, without modelling any impact on consumer demand for the products packaged.
- Sector-specific product switches from single-use to multi-use packaging, initially based on a set of sector-specific switches assumed necessary for the modelling of measure 8a (voluntary reuse targets), and scaled up for each MS proportionally to meet the remainder of the waste prevention target.

The apportionment of impacts for reporting purposes is built up sequentially – the impact of each separate type of intervention is the *marginal* change when added to the impact of the measures earlier in the waste hierarchy. Therefore, the impact of reuse measures takes into account the reduced quantity of single-use packaging arising due to waste prevention targets. The impact of increasing recyclability is then applied to the lower volumes of packaging waste available for recycling due to both waste prevention and increased reuse, etc. The impacts of the later measures are therefore reduced compared to if they have been enacted as stand-alone measures.

The logic flow of the model is shown in Figure 10-1.

Figure 10-1 CBA Model Options Building Logic Flow



An updated options table has been provided by the Commission, which is shown in its entirety in Appendix A, and contains the baseline scenario (Option 1) and three policy options. Table 10-1 shows the measures that make up each policy option that include a quantitative aspect that is built into the CBA model i.e. only measures that directly impact the waste flows or result in quantifiable environmental impacts.

Table 10-1 Policy Options with Quantitative Results

Areas of intervention	Option 2. Better standardisation and clearer Essential Requirements	Option 3. Mandatory targets and stricter requirements	Option 4. Far-reaching legal requirements
Prevention and reuse	M5: Minimization of empty space in packaging in selected sectors, including e-commerce	M2b Mandatory target of 5% reduction of packaging waste per capita by 2030 M8b Mandatory targets to increase the reuse of packaging by 2030/2040 in selected sectors M5 Minimization of empty space in packaging in selected sectors, including e-commerce M7 Phase out avoidable / unnecessary packaging	M2c Mandatory target of 10% reduction of packaging waste per capita by 2030 M8c Mandatory targets to increase the reuse of packaging by 2030/2040 in selected sectors (higher ambition) M3 Banning by 2030 of heaviest packaging for selected items based on existing lighter alternatives + M5, M7
Recyclable and compostable	M21 Update of Essential Requirements: all packaging to be reusable or recyclable by 2030; and all reusable packaging to be recyclable by 2035 M29a: Allowing both compostable and/or conventional plastics for selected packaging types	M22b – Definition on recyclable packaging – based on Design for Recyclability M29d Mandatory compostability for certain out of the selected plastics packaging types and the remaining ones can be produced with compostable and/or conventional plastics. M21 Update of Essential Requirements: all packaging to be reusable or recyclable by 2030; and all reusable packaging to be recyclable by 2035 M22a Qualitative definition of recyclable packaging	M29b Mandatory compostability for selected plastics packaging types + M21, M22a
Recycled Content, including biobased		M35em Product-based recycled content targets for plastic packaging to achieve carbon neutrality by 2050	M35eh Higher ambition product-based recycled content targets for plastic packaging Mw Targets for Bio-based content in plastics packaging, integrated into the recycled content targets
Enabling Measures		Ma&b Mandatory Deposit Return Systems for certain packaging types	Ma&b Mandatory Deposit Return Systems for certain packaging types

10.1 Updates to Modelling Assumptions

The same CBA model was used as in the PPWD Impact Assessment study for continuity. There were only two changes to the baseline scenario: an update of the carbon costs and an update of the DRS status of the Member States.

Damage Costs

The damage costs associated with the emissions of GHGs were calculated for each Member State for the years 2018-2050, by multiplying the GHG emissions associated with each process by damage cost assumptions shown in Table 10-2.[207]

Table 10-2 Climate Change Avoidance Cost of GHGs, € per tonne $CO2_e$

Timeframe	€ per tonne $CO2_e$
Up to 2030	100
2031 onwards	269

DRS Baseline

The baseline was also updated to include DRSs that have been recently implemented by Member States. Countries with schemes are presented in Table 10-3, including additional countries added who have implemented schemes in 2022. These were modelled in the baseline using a similar approach as described in Appendix B of the previous PPWD Impact Assessment study.

Table 10-3 Countries with DRSs Included in the Baseline

Member State	Implementation date (if later than baseline year)
Croatia	-
Denmark	-
Estonia	-
Finland	-
Germany	-
Latvia	2022
Lithuania	-
Malta	2022
Netherlands	-
Slovakia	2022
Sweden	-

Financial Assumptions

The financial impact of reduction in material use or material switching is expanded to include assumptions for all raw material prices – see Table 10-4. Whilst most of these are volatile and will certainly change over time, prices are included to give an indication of the magnitude of the costs/savings.

[207] As provided by the Commission, in line with DG CLIMA

Table 10-4 Raw material costs

Material	Euro/tonne
Plastics	1,000
Compostable plastics	1,500
Aluminium	2,000
Steel	500
Glass	800
Wood	200
Paper/Card	500

Social Assumptions

The assumption related to the number of jobs generated per million reuses of b2b packaging is reduced from 39 to 12. This is due to assuming improved optimisation of vehicle transport for the returned packaging from increased use of back hauling and foldable packaging designs so fewer trips are required. The lower requirement for transportation also translates to corresponding lower environmental impacts associated with reuse systems.

10.2 Mass flow impacts

Firstly, we discuss the impacts of the preferred option on the mass flows of packaging in the EU. These impacts relate to changes in overall waste generation, consumption and waste generation by packaging type, and the final destinations of packaging waste – recycling, landfill and incineration and are presented as variations to the 2030 baseline.

10.2.1 Waste generation

Table 10-5 shows how measures reduce the overall waste generation for packaging under Option 2, 3 and 4 relative to the baseline waste generation of 92.4Mt for 2030 and 106.6Mt by 2040.The measures under intervention areas for compostability, recycled content and DRS do not affect waste generation and are therefore excluded from the table.

Table 10-5 Changes in waste generation relative to the baseline, Million Tonnes

Measure	Option 2		Option 3		Option 4	
	2030	2040	2030	2040	2030	2040
M2b (M5, M8b)	-	-	-14.3	-27.8	-	-
M2c (M5, M8c)	-	-	-	-	-15	-28.5
M5	-1.5	-1.9	-	-	-	-
M7	-	-	-3.4	-4.1	-4.1	-4.7
M3	-	-	-	-	-2.5	-2.7
Total	**-1.5**	**-1.9**	**-17.7**	**-32**	**-21.6**	**-35.9**
% change	**-2%**	**-2%**	**-19%**	**-30%**	**-23%**	**-34%**

Impacts of the options on waste generation and therefore consumption patterns (i.e. switches from one packaging type to another) are shown in Figure 10-2 and Figure 10-3. To increase the clarity of the graphs, packaging groups with less than a 50 ktonne change not shown, however full results table can be found in the tables in Appendix B.

Interpretation of these results should also take the following into account:

- When *measures* M2b, M5 and 8b (and M2b, M5 and 8c) are combined as part of an *option* there are potential crossovers (i.e. waste prevention targets can be achieved, in part, by increasing reuse). Because of this, these measures are shown together in order to avoid the potential for double counting of impacts.
- It has not been possible to take into account the product-specific targets of the Member States; since M2b and M2c (reduction targets) are defined as reductions compared with 2018 levels, all Member States will have to undertake the same reduction efforts but can choose to meet the targets differently.
- M29d specifically targets carrier bags and therefore the result is a direct switch between conventional carrier bags under category *"P - Other mono/multi polymer/layer flexibles (excl. film)"* to the category of *"P - Compostable Films"*. Note that measures associated with consumption reduction also reduce the requirement for category *"P - Other mono/multi polymer/layer flexibles (excl. film)"* further than the measure(s) on compostability.

Figure 10-2 Change in waste generation in Option 3 relative to baseline (2030), thousand tonnes (packaging groups with greater than a 50k tonne change)

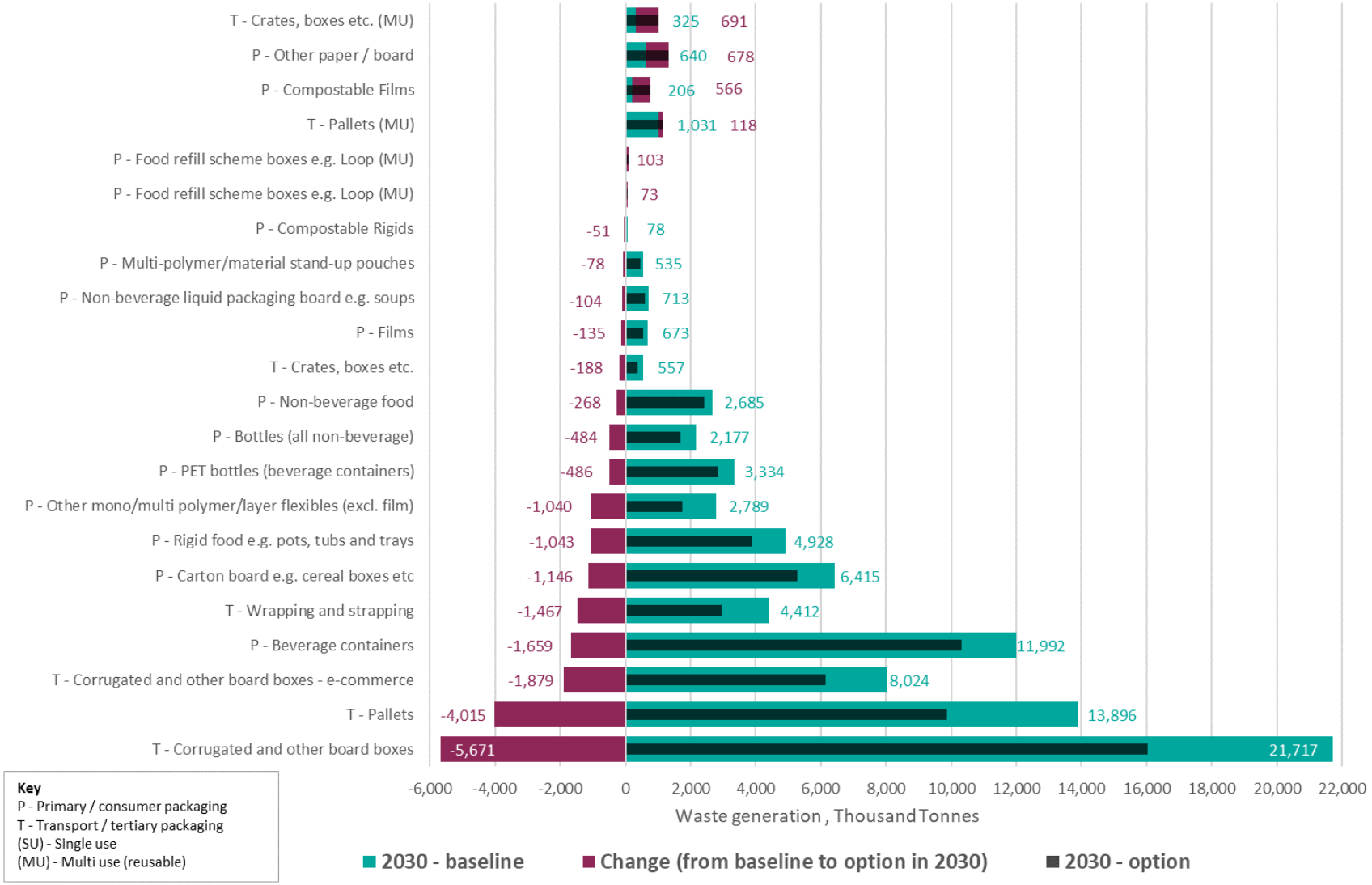


Figure 10-3 Change in waste generation in Option 4 relative to baseline (2030), thousand tonnes (packaging groups with greater than a 50k tonne change)

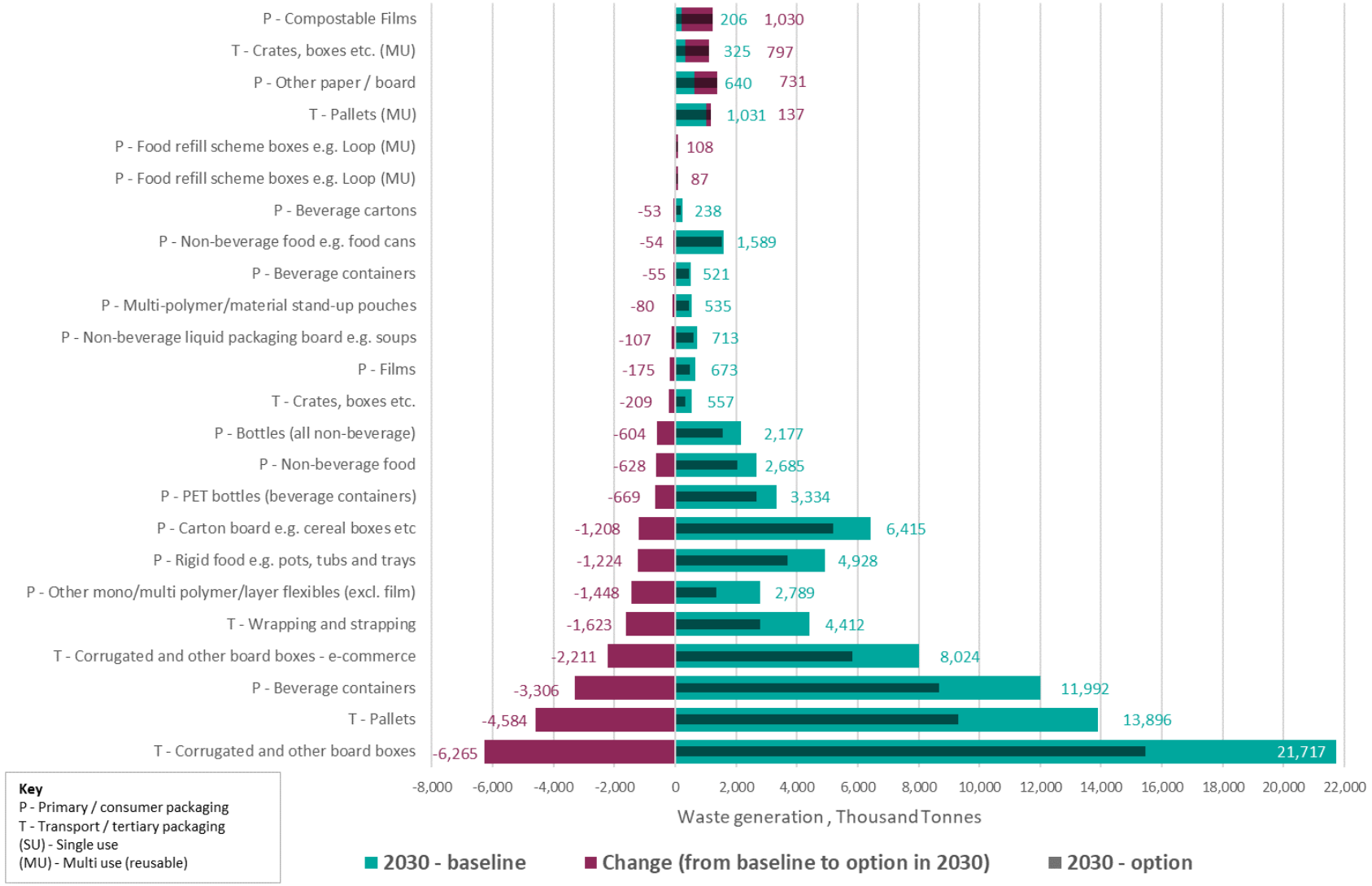


Table 10-6 Change in Waste Generation by Material Type (2030)

Material	Baseline (ktonnes)	Option 3			Option 4		
		Result (tonnes)	Change (ktonnes)	% Change	Result (ktonnes)	Change (ktonnes)	% Change
Glass	14,873	12,970	-1,903	-12.8%	10,969	-3,904	-26.2%
Steel	2,674	2,687	13	0.5%	2,690	17	0.6%
Aluminium	999	909	-90	-9.0%	896	-102	-10.2%
Paper / board	37,747	29,576	-8,172	-21.6%	28,635	-9,112	-24.1%
Plastic	20,982	17,374	-3,607	-17.2%	16,940	-4,042	-19.3%
Wood	14,927	11,030	-3,897	-26.1%	10,480	-4,446	-29.8%
Other	204	204	0	0.0%	204	0	0.0%
Total	**92,405**	**74,749**	**-17,656**	**-19.1%**	**70,815**	**-21,590**	**-23.4%**

10.2.2 Recycling rates

Final destinations of packaging waste are presented in Table 10-7 for both Option 3 and Option 4.

Table 10-7 Change in final destinations of packaging

Waste Route	**2018**	**2030**					**2040**				
		Baseline	**Option 3**	**Option 3 change**	**Option 4**	**Option 4 change**	**Baseline**	**Option 3**	**Option 3 change**	**Option 4**	**Option 4 change**
Recycling	66.5%	69.6%	72.9%	+3.3pp	73.1%	+3.4pp	69.1%	74.3%	+5.2pp	76.8%	+7.6pp
Incineration	14.7%	20.4%	17.9%	-2.6pp	17.9%	-2.5pp	24.5%	19.8%	-4.6pp	17.7%	-6.7pp
Landfill	18.7%	9.9%	9.1%	-0.8pp	9.0%	-0.9pp	6.3%	5.8%	-0.6pp	5.4%	-0.9pp
Litter	0.1%	0.1%	0.1%	-	0.1%	-	0.1%	0.1%	-	0.1%	-

10.3 Economic impacts

Economic impacts of Option 2, Option 3 and Option 4 are summarised in the following tables which show the contribution from measures from each intervention area. The impacts are associated with the costs as a result of implementing the measures as part of each option and do not include the wider administrative burden that will result for some measures.

Table 10-8 shows a summary of all options with comparison to the baseline. The Negative values indicate a reduction in costs (i.e. a saving) or a reduction in producer revenue relative to the baseline. To contextualise the economic impacts, the environmental externalities (from Section 10.4 are also shown).

Table 10-8 Economic Impacts by Intervention Area in all options relative to baseline (2030), Million €

		Baseline	Changes Relative to Baseline		
			Option 2	Option 3	Option 4
	Biowaste contamination (a)[1]	-	-	-122	-188
	DRS schemes (b)	2,299	-	523	783
	Capex and Opex of reuse schemes (c)	2,029	-	4,090	4,765
Packaging Producers	**Raw Material Costs**	61,385	-860	-10,228	-12,645
	Waste Management Costs[2]	19,242	-71	-4,207	-4,929
	Current Producers' Revenue change	354,691	-1,473	-63,620	-76,567
	Alternative Producers' Revenue Change[2]	-	201	13,597	16,875
	Net Revenue Change (d)	354,691	-1,619	-51,961	-59,693
Net Financial Cost (a+b+c+d)[3]		**359,019**	**-1,619**	**-47,255**	**-54,333**
Externalities (Env Impacts Million €)		**24,283**	**-967**	**-6,389**	**-8,306**
Net Impacts (Million €)		**383,302**	**-2,586**	**-53,594**	**-62,639**

1. No figures are available for the costs associated with biowaste contamination in the baseline, but these are not zero.
2. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting
3. 'Alternative producers' are those businesses that are likely to receive a revenue increase as a result of material or product switching.
4. Assumes all business costs/savings will eventually be passed through to consumers/EU citizens. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting.

Table 10-9 Economic Impacts by Intervention Area in Option 2 relative to baseline (2030), Million €

		Prevention and Reuse	Recyclable and Compostable			Total
		M5	M21	M22a	M29a	
Packaging Producers	**Raw Material Costs**	-961	40	60	1	-860
	Waste Management Costs[1]	-225	63	91	-	-71
	Current Producers' Revenue change	*-1,186*	*-28*	*-260*	*1*	*-1,473*
	Alternative Producers' Revenue Change[2]	-	*201*	-	-	*201*
	Net Revenue Change (d)	-1,186	-174	-260	1	-1,619
Net Financial Cost (=d)[3]		**-1,186**	**-174**	**-260**	**1**	**-1,619**
Externalities (Env Impacts Million €)		-403	-223	-337	-4	-967
Net Impacts (Million €)		**-1,589**	**-397**	**-597**	**-3**	**-2,586**

1. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting.
2. 'Alternative producers' are those businesses that are likely to receive a revenue increase as a result of material or product switching.
3. Assumes all business costs/savings will eventually be passed through to consumers/EU citizens. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting.

Table 10-10 Economic Impacts by Intervention Area in Option 3 relative to baseline (2030), Million €

		Prevention and Reuse		Recyclable and Compostable				Recycled Content	Enabling Measures	Total
		M7	M2b (M5, M8b)	M21	M22a	M22b	M29d	M35em	Mb	
	Biowaste contamination (a)	-	-	-	-	-	-122	-	-	-122
	DRS schemes (b)	-	-429	2	3	8	-	-	939	523
	Capex and Opex of reuse schemes (c)[1]	852	3,238	-	-	-	-	-	-	4,090
Packaging Producers	**Raw Material Costs**	-2,346	-8,732	39	58	-193	380	231	-51	-10,228
	Waste Management Costs[2]	-1,244	-2,977	55	65	-27	-79	-		-4,207
	Current Producers' Revenue change	*-17,360*	*-44,364*	*171*	*256*	*-853*	*-807*	*-2,318*	*-51*	-63,620
	Alternative Producers' Revenue Change[3]	*1,980*	*7,526*	-	-	-	*1541*	*2,550*	-	13,597
	Net Revenue Change (d)	-15,380	-36,838	171	256	-853	734	231	-51	-51,961
Net Financial Cost (a+b+c+d)[4]		**-14,528**	**-34,029**	**173**	**259**	**-861**	**612**	**231**	**888**	**-47,255**
Externalities (Env Impacts Million €)		-997	-2,665	-199	-312	-1,022	-175	-710	-309	-6,389
Net Impacts (Million €)		**-15,525**	**-36,694**	**-26**	**-53**	**-1,833**	**437**	**-479**	**579**	**-53,594**

1. "DRS Schemes" includes financial flows from both producer fees and unredeemed deposits. It excludes income from material sales which is assumed to substitute existing demand for material/recyclate in the overall market. Waste prevention measures result in savings for consumers by reducing unredeemed deposits.
2. Waste management costs are the costs to business associated with full cost recovery EPR
3. 'Alternative producers' are those businesses that are likely to receive a revenue increase as a result of material or product switching. For M29d and M35em this is a switch in the material supply value chain rather than a change in packaging producer.
4. Total assumes all business costs/savings will eventually be passed through to consumers/EU citizens. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting.

Table 10-11 Economic Impacts by Intervention Area in Option 4 relative to baseline (2030), Million €

		Prevention and Reuse			Recyclable and Compostable				Recycled Content	Enabling Measures	Total
		M7	M3	M2c (M5, M8c)	M21	M22a	M22b	M29b	M35eh	Mb	
Biowaste contamination (a)		-	-	-	-	-	-	-188	-	-	-188
DRS schemes (b)		-	-162	2	-	3	8	-	-	932	783
Capex and Opex of reuse schemes (c)[1]		852	-	3,913	-	-	-	-	-	-	4,765
Packaging Producers	**Raw Material Costs**	-1,489	-2,038	-9,348	39	58	-710	542	301	-	-12,645
	Waste Management Costs[2]	-1,299	-129	-3,424	46	53	44	-171	-	-49	-4,929
	Current Producers' Revenue change	*-13,265*	*-2,169*	*-55,256*	*170*	*255*	*-1,407*	*-1,831*	*-3,015*	*-49*	*-76,567*
	Alternative Producers' Revenue Change[3]	*1,980*	-	*8,799*	-	-	-	*2,779*	*3,317*	-	*16,875*
	Net Revenue Change (d)	-13,265	-2169	-44,477	170	255	-1,407	948	301	-49	-59,693
Net Financial Cost (a+b+c+d)[4]		**-12,413**	**-2,331**	**-40,562**	**170**	**258**	**-1,399**	**760**	**301**	**883**	**-54,333**
Externalities (Env Impacts Million €)		-1,347	-560	-2,995	-161	-250	-923	-546	-1,225	-299	-8,306
Net Impacts (Million €)		**-13,760**	**-2,891**	**-43,557**	**9**	**8**	**-2,322**	**214**	**-924**	**584**	**-62,639**

1. "DRS Schemes" includes financial flows from both producer fees and unredeemed deposits. It excludes income from material sales which is assumed to substitute existing demand for material/recyclate in the overall market. Waste prevention measures result in savings for consumers by reducing unredeemed deposits.
2. Waste management costs are the costs to business associated with full cost recovery EPR
3. 'Alternative producers' are those businesses that are likely to receive a revenue increase as a result of material or product switching. For M29b and M35eh this is a switch in the material supply value chain rather than a change in packaging producer.
4. Total assumes all business costs/savings will eventually be passed through to consumers/EU citizens. Raw material and waste management costs are included in revenue and therefore are not summed to avoid double counting..

10.4 Environmental impacts

Greenhouse gas (GHG) impacts of Options 2 to 4 are shown in the following tables which show the contribution from measures and intervention area across the lifecycle stages.

Table 10-12 Changes in GHGs on Option 2 relative to the baseline, 2030, million tonnes CO2e

	Prevention and Reuse	Recyclable and Compostable			Total
	M5	M21	M22a	M29a	
Manufacturing	-0.7	0.1	0.1	-	-0.5
Transport	-0.3	-	-	-	-0.3
Collection and Sorting	-0.1	-	-	-	-0.1
Recycling	-	-0.5	-0.8	-0.01	-1.31
Incineration & Landfill	-0.2	-0.3	-0.5	-0.01	-1.01
Reuse (Transport and Washing)	-	-	-	-	-
Total	**-1.3**	**-0.8**	**-1.2**	**-0.02**	**-3.32**

Table 10-13 Changes in GHGs on Option 3 relative to the baseline, 2030, million tonnes CO2e

	Prevention and Reuse		Recyclable and Compostable				Enabling Measures	Recycled Content	Total
	M7	M2b (M5, M8b)	M21	M22a	M22b	M29d	Mb	M35em	
Manufacturing	-2.6	-9.4	0.1	0.1	0.3	-0.3	-	-1.6	-13.4
Transport	-0.7	-2.6	-	-	0.1	-	-	-	-3.2
Collection and Sorting	-0.2	-0.7	-	-	-	-	-	-	-0.9
Recycling	0.7	2.9	-0.4	-0.7	-2.2	0.2	-0.9	-	-0.4
Incineration & Landfill	-0.3	-1.2	-0.3	-0.4	-1.4	-0.2	-0.1	-3.4	-7.3
Reuse (Transport and Washing)	-	2.3	-	-	-	-	-	-	2.3
Total	**-3.1**	**-8.7**	**-0.6**	**-1.1**	**-3.2**	**-0.3**	**-1**	**-5.1**	**-22.9**

Table 10-14 Changes in GHGs in Option 4 relative to the baseline, 2030, million tonnes CO2e

	Prevention and Reuse			Recyclable and Compostable				Enabling Measures	Recycled Content	Total
	M7	M3	M2c (M5, M8c)	M21	M22a	M22b	M29b	Mb	M35eh	
Manufacturing	-3.0	-1.9	-9.9	0.1	0.1	0.6	-0.7	-	-3.4	-18.1
Transport	-0.7	-0.4	-2.8	-	-	0.1	-	-	-	-3.8
Collection and Sorting	-0.2	-0.1	-0.7	-	-	-	-	-	-	-1
Recycling	0.6	0.9	2.9	-0.4	-0.6	-2.2	0.5	-0.9	-	0.8
Incineration & Landfill	-0.7	-0.1	-1.1	-0.3	-0.4	-1.1	-0.4	-0.1	-5.4	-9.6
Reuse (Transport and Washing)	-	-	2.6	-	-	-	-	-	-	2.6
Total	**-4**	**-1.6**	**-9**	**-0.6**	**-0.9**	**-2.5**	**-0.6**	**-1**	**-8.8**	**-29.1**

Changes in externalities from GHG and Air Quality impacts for Options 2-4 are shown in the following tables.

Table 10-15 Changes in externalities (GHG and AQ) on Option 2 relative to the baseline, 2030, Million €

	Prevention and Reuse	Recyclable and Compostable			Total
	M5	M21	M22a	M29a	
Manufacturing	-327	28	42	-	-257
Transport	-79	5	7	-	-67
Collection and Sorting	-20	1	2	-	-17
Recycling	59	-185	-279	-2	-407
Incineration & Landfill	-36	-72	-109	-2	-219
Reuse (Transport and Washing)	-	-	-	-	-
Total	**-403**	**-223**	**-337**	**-4**	**-967**

Table 10-16 Changes in externalities (GHG and AQ) on Option 3 relative to the baseline, 2030, Million €

	Prevention and Reuse		Recyclable and Compostable				Enabling Measures	Recycled Content	Total
	M7	M2b (M5, M8b)	M21	M22a	M22b	M29d	Mb	M35em	
Manufacturing	-1,075	-3,639	7	10	33	-221	-	-537	-5,422
Transport	-207	-687	-	-	-	-	-	-	-894
Collection and Sorting	-52	-172	-	-	-	-	-	-	-224
Recycling	366	1,433	-147	-228	-743	103	-296	-	488
Incineration & Landfill	-29	-217	-59	-94	-312	-57	-13	-173	-954
Reuse (Transport and Washing)	-	617	-	-	-	-	-	-	617
Total	**-997**	**-2,665**	**-199**	**-312**	**-1,022**	**-175**	**-309**	**-710**	**-6,389**

Table 10-17 Changes in externalities (GHG and AQ) on Option 4 relative to the baseline, 2030, Million €

	Prevention and Reuse			Recyclable and Compostable				Enabling Measures	Recycled Content	Total
	M7	M3	M2c (M5, M8c)	M21	M22a	M22b	M29b	Mb	M35eh	
Manufacturing	-1,312	-928	-4,039	27	40	30	340	-	-957	-6,799
Transport	-207	-126	-797	5	7	-	20	-	-	-1,098
Collection and Sorting	-52	-31	-199	1	2	-	5	-	-	-274
Recycling	366	545	1,545	-140	-216	-731	-802	-287	-	280
Incineration & Landfill	-142	-20	-198	-54	-83	-222	-109	-12	-268	-1,108
Reuse (Transport and Washing)	-	-	693	-	-	-	-	-	-	693
Total	**-1,347**	**-560**	**-2,995**	**-161**	**-250**	**-923**	**-546**	**-299**	**-1,225**	**-8,306**

N.B the implementation of M22c is not modelled to start until 2030.

The following tables summarises the externalities for Option 3 and 4 compared with the baseline and out to 2040.

Table 10-18 Change in externalities (GHG and AQ) in Option 3 relative to baseline, Million €

	Baseline	2030	2040
Manufacturing	33,473	-5,422	-13,532
Transport	4,681	-894	-1,622
Collection and Sorting	1,169	-224	-405
Recycling	-17,010	488	2,037
Incineration & Landfill	1,609	-954	-5,636
Reuse (Transport and Washing)	361	617	898
Total	**24,283**	**-6,389**	**-18,259**

Table 10-19 Change in externalities (GHG and AQ) in Option 4 relative to baseline, Million €

	Baseline	2030	2040
Manufacturing	33,473	-6,799	-14,966
Transport	4,681	-1,098	-1,821
Collection and Sorting	1,169	-274	-455
Recycling	-17,010	280	1,796
Incineration & Landfill	1,609	-1,108	-6,286
Reuse (Transport and Washing)	361	693	970
Total	**24,283**	**-8,306**	**-20,762**

Change in water use is calculated at:

- Option 3: -1,081 thousand m3 relative to the baseline by 2030, and -3,344 by 2040;
- Option 4: -1,440 thousand m3 relative to the baseline by 2030, and -3,635 by 2040.

This is predominantly a result of the decreased weight of packaging placed on the market, associated with a decrease in water requirements during manufacture.

10.5 Social impacts

This increase in employment would be equivalent to an increase in employment of approximately 0.04% for Option 3 and 0.07% for Option 4 across the EU, based on 2020 data.[208] The total figures are presented in the following tables.

Table 10-20 Change in employment on Option 3 relative to the baseline, thousand FTEs

	Baseline	Prevention and Reuse		Recyclable and Compostable				Enabling Measures	Recycled Content	All Measures
		M7	M2b (M5, M8b)	M21	M22a	M22b	M29d	Mb	M35em	
Manufacturing	2,746	-125	-283	-1	-2	-7	12	-	-	-406
Recycling (incl. collection)	194	-7	-24	2	3	10	1	1	22	8
Residual Treatment (incl. collection)	20	-1	-3	-	-	-1	-	-	-2	-7
Reuse	132	-	424	-	-	-	-	-	-	424
DRS	51	-	-3	-	-	-	-	13	-	10
Total	**3,143**	**-133**	**111**	**1**	**1**	**3**	**13**	**14**	**20**	**29**

Table 10-21 Change in employment on Option 4 relative to the baseline, thousand FTEs

	Baseline	Prevention and Reuse			Recyclable and Compostable				Enabling Measures	Recycled Content	All Measures
		M7	M3	M2c (M5, M8c)	M21	M22a	M22b	M29b	Mb	M35eh	All
Manufacturing	2,746	-125	-	-346	-1	-2	-6	19	-	-	-461
Recycling (incl. collection)	194	-7	-3	-25	2	3	10	2	1	33	16
Residual Treatment (incl. collection)	20	-1	-	-3	-	-	-1	-	-	-3	-8
Reuse	132	-	-	496	-	-	-	-	-	-	496
DRS	51	-	-	-4	-	-	-	-	13	-	9
Total	**3,143**	**-133**	**-3**	**118**	**1**	**1**	**3**	**21**	**14**	**30**	**52**

[208] Eurostat (2020) *Employment and activity by sex and age - annual data [lfsi_emp_a]*, Accessed 24th March 2022, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi_emp_a&lang=en
This data relates to total employment (not FTEs), so in practice the increase in FTEs is likely to be greater given that some employment is part-time.

Appendices

Appendix A Policy Options List

The following updated options table has been provided by the Commission, which contains three policy options.

Table 10-22 Policy Options

Areas of intervention	Option 2. Better standardisation and clearer Essential Requirements	Option 3. Mandatory targets and stricter requirements	Option 4. Far-reaching legal requirements
Prevention and reuse	M10a: Revision of CEN standard for defining reusable packaging M19: providing clarity on the definition of reuse activity versus a "preparing for reuse" activity M1: Update of Essential Requirements to minimize over-packaging M5: Minimization of empty space in packaging in selected sectors, including e-commerce	M10a+M19+ M10b: Definitions and mandatory requirements for reusable packaging formats set in EU legislation and standard for some formats +M10c: Definition and mandatory standards for reuse systems, in terms of incentives, infrastructure, logistics, required reporting etc., set in legislation and standard M8b Mandatory targets to increase the reuse of packaging by 2030/2040 in selected sectors combined with minimum requirements for reuse systems M1+M5+M2b: Mandatory target of 19% reduction of packaging waste per capita in 2030 compared to option 1 M7: Phase out avoidable / unnecessary packaging	M10a+M19+M10b+M10c M1+M5+M&+M2c: Mandatory target of 23% reduction of packaging waste per capita in 2030 compared to option 1 M3: Banning by 2030 of heaviest packaging for selected items based on existing lighter alternatives M8c: Mandatory high level targets to increase the reuse of packaging by 2030/2040 in selected sectors combined with minimum requirements for reuse systems
Recyclable and compostable	M21a: All packaging shall be reusable or recyclable by 2030- clarification of Essential Requirements and recyclability definition M21b: All reusable packaging must be recyclable as of 2030 M22a: Qualitative definition of recyclable packaging M28: Updates of Essential Requirements and EN 13432: clarifying biodegradability and compostability concepts. M29a: Allowing both compostable and/or conventional plastics for selected packaging types	M23: Harmonisation of EPR Fee Modulation Criteria M21a+M21b+M22a+M22b*: Definition of recyclable packaging based on design for recycling (DfR) criteria complemented by the recyclability assessment procedure and a negative list of non-recyclable packaging characteristics M28+M29d*: Mandatory compostability for certain out of the selected plastics packaging types and for the remaining ones conventional plastics mandatory	M21a+M21b+M22a+M23+ M22c: Quantitative definition of recyclable packaging M28+M29b: Mandatory compostability for all selected plastics packaging types
Recycled Content,	M37: Definition of Recycled Content and measurement method	M37+M35em*: Broad targets (medium ambition) for plastic packaging based on contact-sensitivity for 2030 and 2040	M37+M35eh: Higher ambition, broad targets for recycled content in plastic packaging

Areas of intervention	Option 2. Better standardisation and clearer Essential Requirements	Option 3. Mandatory targets and stricter requirements	Option 4. Far-reaching legal requirements
including biobased			based on contact-sensitivity for 2030 and 2040 +M34b: Mandatory reporting requirement for recycled content for all packaging
Enabling measures	M31: Update of definitions concerning hazardous substance M32a: Expanding the information on hazardous substances Mx: Update of current material-based labelling: Removal of alphanumeric codes for waste sorters	M31+M33a: Restrictions of substances under REACH M32b: Notification of substances of concern in packaging Ma&b: Mandatory DRS and minimum requirements for all DRS M42b: Harmonization of EPR reporting system M40b: Mandatory minimum GPP criteria for packaging of priority products and services MPCB: Extended reporting obligation on PCB Mx+M12-u: Harmonised, mandatory labelling for reusable packaging M38-j: Labelling criteria for Recycled Content M27c-y: Labelling criteria to facilitate consumers´ sorting (advanced Nordic pictograms system) for packaging Mk: Restrictions on use of confusing labels	M31+M33b: Restrictions of substances under the reviewed PPWD M32c: Notification of all substances in packaging M42b+Ma&b+Mc: Prioritized use of recycled packaging from DRS M26cc: Waste collection targets for certain packaging types M40c: Mandatory minimum GPP criteria for packaging of all products and services MPCB+Mx+M12-u+M38-j+M27c-y+Mk

Appendix B Mass Flows

The following tables provides detailed mass flow results for each packaging type with the relative change between the baseline and the option for the year 2030.

Table 10-23 – Mass flow (ktonnes) results by packaging type (OPTION 3)

Material	Packaging Type	2030 - baseline	2030 – option 3	Change
Paper / board	T - Corrugated and other board boxes	21,717	16,046	-5,671
Wood	T - Pallets	13,896	9,881	-4,015
Paper / board	T - Corrugated and other board boxes - e-commerce	8,024	6,145	-1,879
Glass	P - Beverage containers	11,992	10,332	-1,659
Plastic	T - Wrapping and strapping	4,412	2,945	-1,467
Paper / board	P - Carton board e.g. cereal boxes etc	6,415	5,269	-1,146
Plastic	P - Rigid food e.g. pots, tubs and trays	4,928	3,884	-1,043
Plastic	P - Other mono/multi polymer/layer flexibles (excl. film)	2,789	1,748	-1,040
Plastic	P - PET bottles (beverage containers)	3,334	2,848	-486
Plastic	P - Bottles (all non-beverage)	2,177	1,693	-484
Glass	P - Non-beverage food	2,685	2,417	-268
Plastic	T - Crates, boxes etc.	557	369	-188
Plastic	P - Films	673	538	-135
Paper / board	P - Non-beverage liquid packaging board e.g. soups	713	608	-104
Plastic	P - Multi-polymer/material stand-up pouches	535	457	-78
Plastic (compostable)	P - Compostable Rigids	78	27	-51
Paper / board	P - Beverage cartons	238	189	-49
Steel	P - Non-beverage food e.g. food cans	1,589	1,542	-47
Aluminium	P - Beverage containers	521	476	-45
Aluminium	P - Semi rigids e.g. food trays	219	182	-37
Plastic	P - Other rigids (non beverage, non-food) e.g. blister packs	262	242	-20
Plastic	P - Mono-polymer stand-up pouches	112	96	-16
Steel	P - Other (non-food, non-beverage) e.g. paint tins	857	849	-8
Aluminium	P - Other rigids e.g. aerosol sprays, food cans	166	160	-6
Glass	P - Other (non-food, non-beverage)	42	36	-5
Steel	P - Beverage containers	220	215	-4
Plastic	T - Drums (MU)	37	34	-3

Material	Packaging Type	2030 - baseline	2030 – option 3	Change
Aluminium	T - Kegs, tanks etc. (MU)	70	69	-1
Aluminium	P - Flexibles e.g. foils	22	22	0
Steel	T - Drums (MU)	8	8	0
Other	P - Miscellaneous (not included elsewhere)	204	204	0
Plastic	P - Non PET (beverage containers)	85	95	10
Plastic	P - Bottles (all non-beverage) (MU)	0	11	11
Plastic	T - Wrapping and strapping (MU)	0	11	11
Plastic	P - Beverage containers (MU)	26	37	12
Glass	P - Beverage containers (MU)	154	184	29
Steel	P - Food refill scheme boxes e.g. Loop (MU)	0	73	73
Plastic	P - Food refill scheme boxes e.g. Loop (MU)	0	103	103
Wood	T - Pallets (MU)	1,031	1,149	118
Plastic (compostable)	P - Compostable Films	206	772	566
Paper / board	P - Other paper / board	640	1,318	678
Plastic	T - Crates, boxes etc. (MU)	325	1,016	691

Table 10-24 Mass flow (ktonnes) results by packaging type (OPTION 4)

Material	Packaging Type	2030 - baseline	2030 – option 4	Change
Paper / board	T - Corrugated and other board boxes	21,717	15,452	-6,265
Wood	T - Pallets	13,896	9,312	-4,584
Glass	P - Beverage containers	11,992	8,685	-3,306
Paper / board	T - Corrugated and other board boxes - e-commerce	8,024	5,813	-2,211
Plastic	T - Wrapping and strapping	4,412	2,789	-1,623
Plastic	P - Other mono/multi polymer/layer flexibles (excl. film)	2,789	1,340	-1,448
Plastic	P - Rigid food e.g. pots, tubs and trays	4,928	3,704	-1,224
Paper / board	P - Carton board e.g. cereal boxes etc	6,415	5,207	-1,208
Plastic	P - PET bottles (beverage containers)	3,334	2,665	-669
Glass	P - Non-beverage food	2,685	2,057	-628
Plastic	P - Bottles (all non-beverage)	2,177	1,574	-604
Plastic	T - Crates, boxes etc.	557	348	-209
Plastic	P - Films	673	499	-175

Material	Packaging Type	2030 - baseline	2030 – option 4	Change
Paper / board	P - Non-beverage liquid packaging board e.g. soups	713	606	-107
Plastic	P - Multi-polymer/material stand-up pouches	535	455	-80
Aluminium	P - Beverage containers	521	466	-55
Steel	P - Non-beverage food e.g. food cans	1,589	1,535	-54
Paper / board	P - Beverage cartons	238	185	-53
Aluminium	P - Semi rigids e.g. food trays	219	180	-39
Plastic	P - Other rigids (non beverage, non-food) e.g. blister packs	262	243	-19
Plastic	P - Mono-polymer stand-up pouches	112	96	-16
Steel	P - Beverage containers	220	211	-9
Glass	P - Other (non-food, non-beverage)	42	34	-8
Steel	P - Other (non-food, non-beverage) e.g. paint tins	857	850	-7
Aluminium	P - Other rigids e.g. aerosol sprays, food cans	166	159	-7
Plastic	T - Drums (MU)	37	34	-3
Aluminium	T - Kegs, tanks etc. (MU)	70	69	-1
Aluminium	P - Flexibles e.g. foils	22	22	0
Steel	T - Drums (MU)	8	8	0
Other	P - Miscellaneous (not included elsewhere)	204	204	0
Plastic	P - Non PET (beverage containers)	85	90	5
Plastic	P - Bottles (all non-beverage) (MU)	0	12	12
Plastic	T - Wrapping and strapping (MU)	0	13	13
Plastic	P - Beverage containers (MU)	26	41	15
Glass	P - Beverage containers (MU)	154	193	39
Plastic (compostable)	P - Compostable Rigids	78	125	47
Steel	P - Food refill scheme boxes e.g. Loop (MU)	0	87	87
Plastic	P - Food refill scheme boxes e.g. Loop (MU)	0	108	108
Wood	T - Pallets (MU)	1,031	1,168	137
Paper / board	P - Other paper / board	640	1,372	731
Plastic	T - Crates, boxes etc. (MU)	325	1,122	797
Plastic (compostable)	P - Compostable Films	206	1,236	1,030

Appendix C 'Sustained Reduction' Definition – Country Summaries and Assumptions

This appendix presents summaries of the approaches being taken to consumption reduction policy and data collection with regards to lightweight plastic carrier bags, as well as current performance and projected performance for 2025, in the seven countries identified in section 8.2.4 as facing potential problems should the proposed definition of 'sustainable reduction' be implemented.

Bulgaria

Bulgaria does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. Its 2019 LPCB consumption figure is high, at 181 LPCBs per capita. While Bulgaria has banned <25 micron LPCBs under 390mm x 490mm as of 2022, with an exemption on VLPCBs, it is not clear whether this will reduce overall consumption enough to meet the target.

With only one data point for Bulgaria (total LPCB consumption for 2019) and no split between VLPCBs and 15<50 micron LPCBs, predicted future consumption is based on the fact that its 2022 ban is essentially removing a fifth of the permissible range of LPCB wall thicknesses, by effectively banning 15<25 micron LPCBs. In the absence of data, we can reduce the 2019 consumption figure by a fifth, which gives a projected 2025 consumption rate of 145 LPCBs per capita. As Bulgaria's charge has been in place since 2016, it is not expected to contribute to further consumption reduction in the absence of additional measures.

Greece

Greece's 2019 consumption rate for 15<50 micron LPCBs is already close to the target, at 45 LPCBs per capita, so if VLPCBs were exempted then only a small further decrease would be needed to meet the target. Greece has a mandatory consumer fee set at €0.07, but is not planning on introducing further measures. It is uncertain whether Greece can reduce consumption to below the target level by 2025 with further work; while it is possible that there may be further reductions as waste prevention behaviour becomes normalised among consumers, there is also a risk that the consumption rate will remain stagnant.

Due to this uncertainty, the projected 2025 15<50 LPCB consumption rate for Greece is 41 bags per capita, just above the target level.

Italy

Italy does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. Its 2019 LPCB consumption figure is high, at 111 LPCBs per capita. Italy's reduction measures have been in place since 2018 and it does not plan to introduce further measures to reduce consumption further. Therefore, there is a risk that enforcing the sustained reduction target could be problematic for Italy.

As Italy introduced a consumer charge at the start of 2018, its 2018 consumption figure reflects the first impacts of this measures. Usually, one would expect to see continuing reductions in further years, but Italy's 2019 consumption figure is in fact 21% higher than its 2018 figure. Therefore, with only these two data points and no clear evidence on which to project a future direction of travel, it is

assumed that consumption will continue to fluctuate, and a mid-point between 2018 and 2019 consumption is taken, giving a project 2025 LPCB consumption rate of 102 bags per capita.

Latvia

Latvia's 2019 15<50 micron LPCB consumption rate was 71 bags per capita, meaning it still has some way to go to meet the target even after VLPCBs are discounted from its overall consumption. It also has low consumer charges that are unlikely to reduce consumption enough to meet the target by 2025. Therefore, there is a risk that enforcing the sustained reduction target could be problematic for Latvia. However, it should be noted that from 2025 Latvia is banning 15<50 micron bags made with conventional plastic via a requirement that these bags be made from natural fibres (e.g. paper) or bioplastics. It is not clear what impact on consumption this measure will have.

As Latvia introduced a charge on LPCBs in 2019 – with an exemption on VLPCBs used as primary packaging for loose food items – its consumption figures for that year show the first impacts of this measure and one could reasonably expect to see further reductions. The projected 2025 15<50 micron LPCB consumption figure assumes that the rate of consumption reduction halves each year (from a 13% reduction in 2019 on 2018 consumption) from 2020 to 2022, and then remains constant until in 2025 the ban on conventional plastic 15<50 micron LPCBs reduces consumption by a further 20% on the 2024 level, giving a 2025 consumption figure of 51 bags 15<50 micron LPCBs per capita. The 20% reduction in 2025 assumes that the majority of substitution caused by the ban will be to bioplastic bags, which would still be counted against the consumption target, rather than paper or textile bags. Therefore, the true impacts of the ban will play a large part in determining whether Latvia would meet the target.

Lithuania

Overall consumption in Lithuania is very high, at 331 LPCBs per capita, but the majority of the consumption is VLPCBs (280 bags per capita). Lithuania's 15<50 micron LPCB consumption is only 12 bags per capita above the target, at 52 bags per capita. However, it does not have a mandated consumer fee level, and the typical fee level is very low at €0.01. Furthermore, it does not plan to introduce further consumption reduction measures. Therefore, without further efforts it is far from certain that 15<50 micron LPCB consumption will reach the target level, and is more likely to stagnate, meaning that the sustained reduction target could be problematic for Lithuania.

Lithuania's charge on LPCBs – with an exemption on VLPCBs – was introduced 31st December 2018, so 2019 shows a full year of the first impacts of the measure. Despite this, 2019 only saw a 2% reduction in 15<50 micron LPCB consumption on 2018 performance, perhaps not surprising given the very low fee level. The 2025 projection assumes that a 2% year on year reduction will be maintained, resulting in a 15<50 micron LPCB consumption rate of 47 bags per capita by 2025 – still some way from the target.

Spain

While Spain's overall LPCB consumption is 152 bags per capita, once VLPCBs are excluded 15<50 micron LPCB consumption is 53 bags per capita, only 13 bags above the target. Therefore, Spain has a strong chance of meeting the target by 2025 with further effort. In 2021, Spain introduced a ban on non-compostable LPCBs, following Italy's approach of promoting the use of compostable LPCBs as biowaste collection sacks. It remains to be seen whether this approach will serve to reduce

consumption of 15<50 micron LPCBs, or whether this may result in more of these bags being used (as biowaste sacks) and it is this which will most impact how problematic the sustained reduction target would be for Spain.

Spain saw a large reduction in consumption of 15<50 micron LPCBs in 2019 following the introduction of a consumer charge half-way through 2018 (a 41% reduction on 2018 consumption). It is likely that consumption will continue to fall, but at a more modest rate, and the projection assumes a further 20% reduction from 2019 to 2020, taking Spain to 42 15<50 micron LPCBs per capita by 2020. Consumption beyond this point will depend upon the effects of the ban on non-compostable LPCBs introduced 1st January 2021, and how the interaction between carrier bag policy and biowaste collection policy will influence consumption.

Providing that consumers do not increase 15<50 micron LPCBs in order to reuse these bags as biowaste sacks, it is predicted that Spain will achieve a target rate of 40 bags per capita by 2025. Given that 15<50 micron bags will remain charged for, while VLPCBs will be exempt, this seems possible. However, performance will likely be strongly dependent on the interaction will biowaste collection.

Norway

Norway does not collect disaggregated data on VLPCBs and 15<50 micron LPCBs, so it is not possible to say what consumption would be once VLPCBs were exempted. Norway's overall LPCB consumption is far above the target, at 139 bags per capita. A further complication is that Norway has implemented option b) via a voluntary retailer agreement, and as such has limited means of further reducing consumption under its current reduction measure. These issues mean that the sustained reduction target would likely be problematic for Norway. However, as Norway is not a Member State but rather an EEA country, clarity is needed on whether the target would be binding for Norway.

Norway increased the level of its consumer charge in 2020, and we can expect this to have some effect upon consumption. While any effect will ultimately be limited by the voluntary nature of Norway's measure and the fact that not all retailers are included, efforts have been made to include a greater number of retailers. The 2025 projection assumes that the charge increase will boost consumption reduction in 2020 to 10% on 2019 (up from 5% for 2019 on 2018), with the reduction rate then slowing (reducing by half) up to 2023, after which it stagnates. This results in a 2025 projection for all LPCBs of 114 bags per capita.

Impact Assessment Modelling

The above considerations were used to develop assumptions in respect of how consumption of bags by the affected EU Member States would likely change over time in the absence of the sustained reduction target. The data is considered in terms of the per capita consumption of bags for each country. From these data, a figure for the tonnage of plastic required to manufacture these bags in each country was developed based on population statistics and typical bag weights. Where the sustained reduction target is implemented, it is assumed that these countries all now meet the 40 bags per capita target by 2025.

In the baseline, impacts are calculated based on both the production of bags and the associated end of life impacts, including some quantification of littering. It was assumed that – were the policy to be

implemented - the single use bags would be displaced by a combination of fabric and reusable LDPE bags, each of which would be reused multiple times, prior to disposal or recycling.

Specific assumptions regarding the environmental, economic and social impacts were largely derived from the main impact assessment model used to quantify impacts for the other Measures assessed as part of the overall Impact Assessment. Outputs are modelled for 2025, the year by which the target is assumed to be met, according to current legislation.

Appendix D Stakeholder workshop report

Background and Objectives

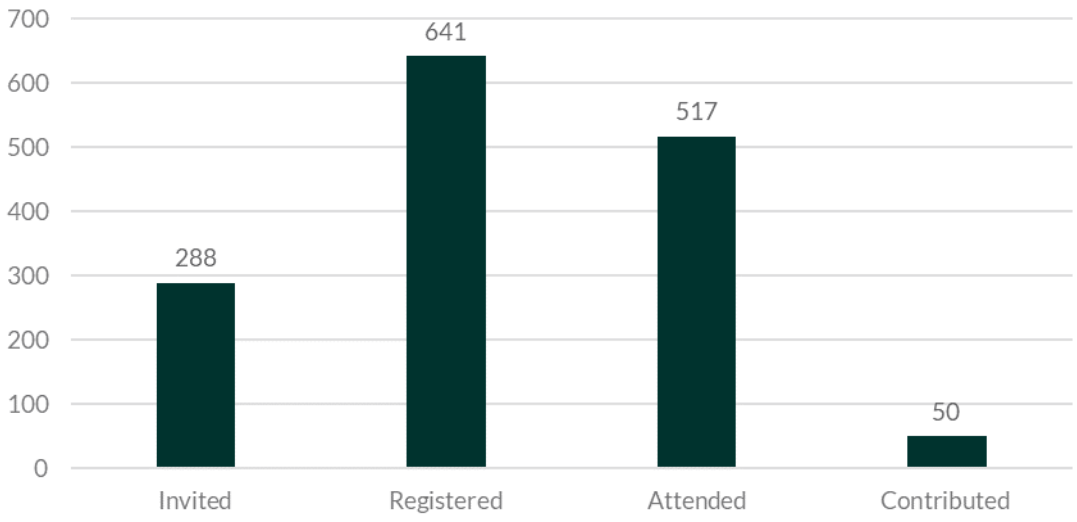
The workshop took place on Monday, 30th May. It was scheduled for 9 am-12 pm CEST but was extended by an hour to allow for more stakeholder interventions and finished at 1 pm. The workshop took place on GoTo Webinar. See Table 10-26 for the agenda of the workshop.

Table 10-25 Workshop Agenda

Start	End	Duration	Presenter	Description
9h00	9h15	15 min	Mattia Pellegrini	Opening remarks
9h15	9h45	30 min	Commission	State of play
9h45	10h45	60 min	All	Stakeholder interventions
10h45	10h55	10 min		Break
10h55	12h50	1h 55 min	All	Stakeholder interventions
12h50	12h55	5 min	Wolfgang Trunk	Closing remarks

See Figure 10-4 for the breakdown of the number of stakeholders who were invited, registered, attended, and made an intervention during the workshop. This represents individuals and not necessarily the total number of organisations as multiple individuals from the same organisations could attend.

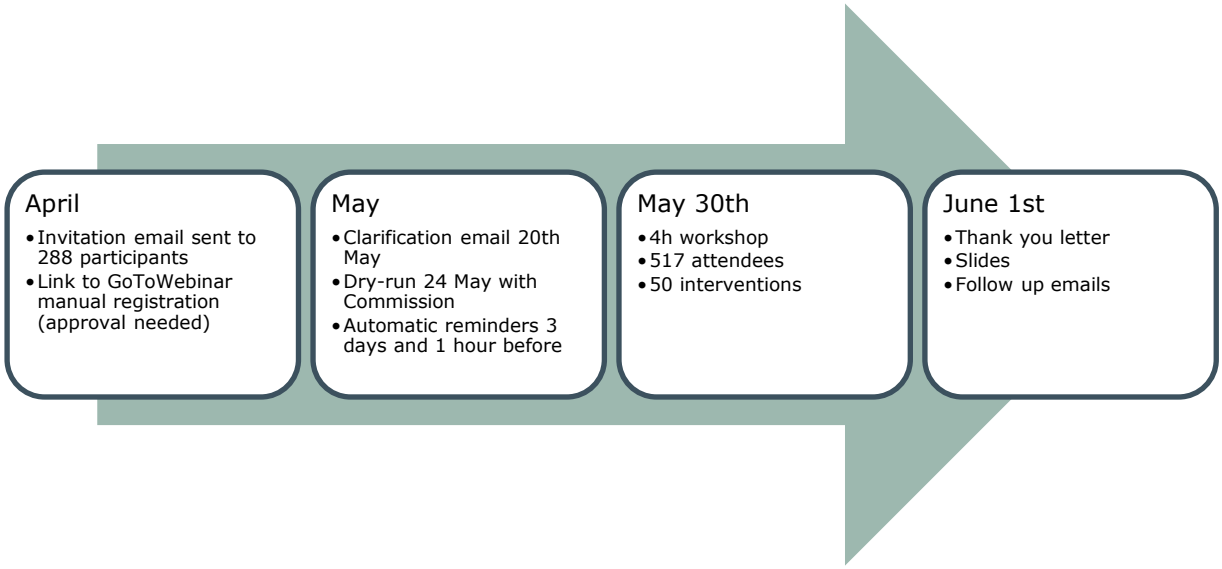
Figure 10-4 Breakdown of stakeholders



Workshop Preparation

GoToWebinar was selected due to the high number of attendees allowed (up to 1,000) and the controls it gives organisers and presenters. This includes the ability to mute/unmute participants and the use of the chat function which can be used to talk amongst themselves or broadcast messages to the participants.
A dry run took place on 24th May with Mattia Pellegrini and Wolfgang Trunk to share the inner workings of the platform GoToWebinar. The following actions were tested: video on/off, sound on/off including muting attendees, share screen, see participants' list including who had their hand raised, use internal chat to message individuals, organisers/presenters or all the participants, record. Housekeeping rules were agreed upon. This included asking participants to change their name to list their organization and asking participants to raise their hand if they had an intervention to make. Wolfgang Trunk was designated as the facilitator and would pick stakeholders to make their interventions.

Figure 10-5 Timeline of workshop preparation and follow up



Workshop

Introduction by the Commission

The timings are given in relation to the recording video, which is also including the first 10 minutes of preparation before the participants joined.

Table 10-26 Breakdown of the introductory session

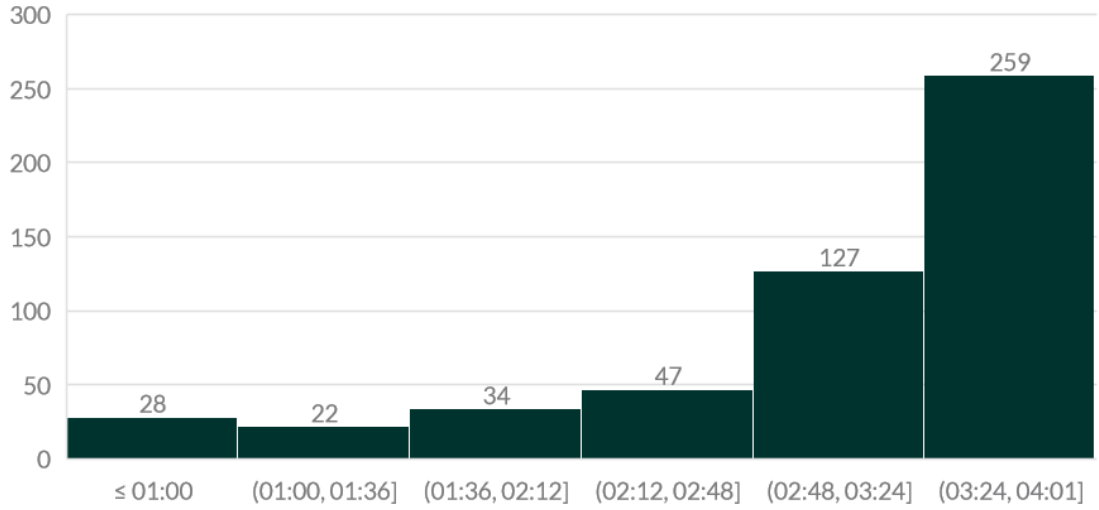
Timestamp	Presenter	Description
00h00	*All*	*Preparation before the participants joined*
00h11	Mattia Pellegrini	Welcome to the participants, housekeeping rules and timelines for the PPWD revision

Timestamp	Presenter	Description
00h17	Wolfgang Trunk	Problem areas for packaging, intervention logic
00h25	Glenn Orveillon	Prevention & reuse
00h32	Wolfgang Trunk	Recyclability & compostability
00h40	Wolfgang Trunk	Recycled Content
00h44	Wolfgang Trunk	Enabling measures
00h49	Wolfgang Trunk	Change from Directive to Regulation
00h51	Wolfgang Trunk	Invitation for stakeholders to speak

Stakeholder Attention

The attendance report provided by GotoWebinar shows the amount of time that each participant was connected to the webinar, or 'time in session'. The total webinar length was just under 4 hours. As shown in Figure 10-6, out of the 517 attendees, 50% were in session for more than 3 hours and 24 minutes, so practically the full workshop.

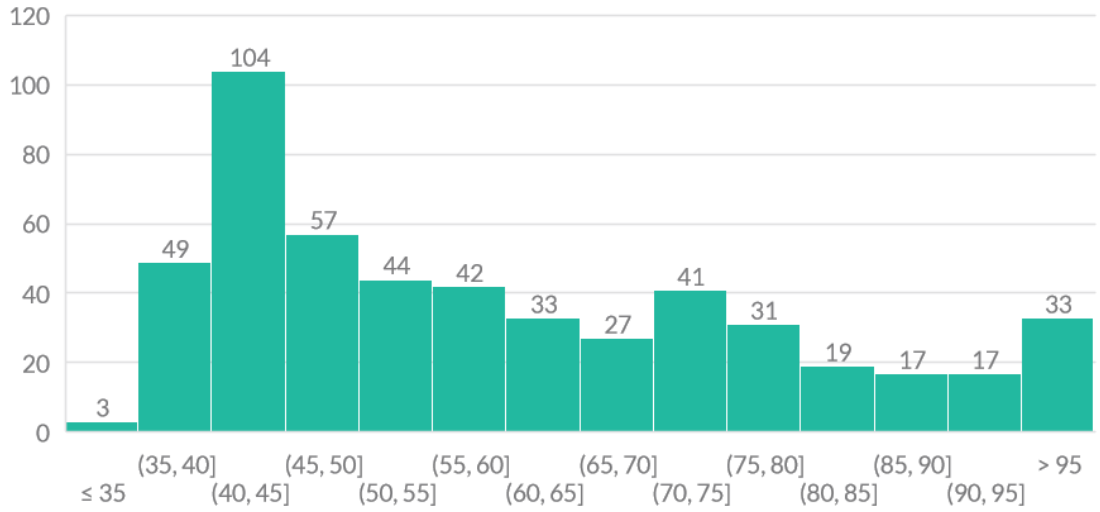
Figure 10-6 Time in session histogram



Asides from the time in session, GoToWebinar provides a KPI called Interest Rating, which is calculated based on a proprietary algorithm.[209] The score ranges from 0 low interest to 100 highest interest. Figure 10-7 below shows the breakdown for the 517 attendees, with 17% of the attendees scoring over 80, and barely any attendees scoring below 35. This data suggests a good level of engagement considering the length of the workshop.

[209] https://support.goto.com/webinar/help/how-is-the-attendee-interest-rating-calculated-g2w090036

Figure 10-7 Interest Rating histogram



Stakeholder Interventions

After the introductory session, the floor was opened for the stakeholders who wanted to intervene and share feedback / comments / concerns.

A total of 50 stakeholders intervened, as shown in Table 10-27 below. The 50 stakeholders were mostly EU-wide organisations, with 5 stakeholders representing national or regional organisations: France, Benelux, 2 x Germany, Benelux and Portugal. Figure 10-8 below shows the breakdown by type of organisation, with a strong presence of associations which represent the views of several companies.

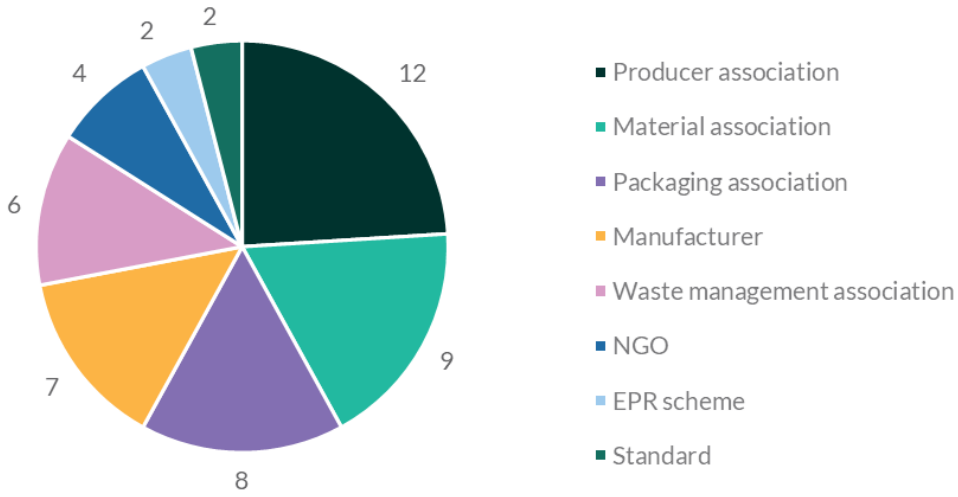
Table 10-27 List of stakeholder interventions

Name	Organisation	Type	Scope
Oliver Ehlert	Dincertco (TUV Reinhart) + CEN EN13430	Standard	EU
Vanessa Chesnot	FEVE	Material association	EU
Francesca Stevens	EUROPEN	Producer association	EU
Marie Delaperriere	Zero Waste Germany	NGO	MS
Sriman Banerjee	European pharmaceutical association/Takeda	Producer association	EU
Patricia Lopez	Food Drink Europe	Producer association	EU
Goetz Brandau	schwarz group/ Eurocommerce	Producer association	EU
Roberta Colotta	360 food service	Producer association	EU
Valentin Fournel	CITEO	EPR scheme	MS

Name	Organisation	Type	Scope
Delphine Close	UNESDA	Producer association	EU
Silvia Freni	EUPC	Waste management association	EU
Frank van Sluis	Europool System/Reuse Packaging Europe	Packaging association	EU
Larissa Copello de Souza	Zero Waste Europe	NGO	EU
Rob Buurman	Recycling Netwerk	Waste management association	MS
Deborah Cwajgenbaum	Cosmetics Europe	Producer association	EU
Isabell Schmidt	German Plastic Packaging Association	Packaging association	MS
Michela Vuerich	European Association for the Co-ordination of Consumer Representation in Standardisation (ANEC)	Standard	EU
Ulrich Lebrle	CEPI	Material association	EU
Achim Grefenstein	Constantia Flexibles	Manufacturer	EU
Paolo Campanella	European Waste Management Association (FEAD)	Waste management association	EU
Michael Hoffmann	European Paper Packaging Alliance (EPPA)	Packaging association	EU
Chaim Waibel	Plastic Recyclers Europe (PRE)	Waste management association	EU
Vanya Veras	Municipal Waste Europe	Waste management association	EU
Ermis Panagiotopoulos	Natural Mineral Water Europe (NMWE)	Producer association	EU
Maria Vera Duran	European Recycling Industries Confederation (EURIC)	Waste management association	EU
Antonello Romano	Stora Enso	Manufacturer	EU
Susana Fonseca	ZERO - Associação Sistema Terrestre Sustentável	NGO	MS
Joachim Quoden	EXPRA	EPR scheme	EU
Alexis van Maercke	APEAL	Packaging association	EU

Name	Organisation	Type	Scope
Maarten Labberton	European Aluminium	Material association	EU
David Carroll	Plastics Europe	Material association	EU
Eomonn Bates	Serving Europe	Producer association	EU
Majilinda Cobaj	AISE	Producer association	EU
Patrick Sparkes	Sterile Barrier/ Medtech/ Pharmaceuticals	Producer association	EU
Natividad Sanchez	Oceana	NGO	EU
Hasso von Pogrell	European Bioplastics	Material association	EU
Christian Crepet	PETCORE	Material association	EU
Mike Neal	CPME PET	Material association	EU
Krassimia Kazashka	FEFCO	Material association	EU
Petya Todorova	PCEP	Material association	EU
Sarah Cuvellier	Metal Packaging Europe	Packaging association	EU
Roman Doetkotte	Elanco Europe	Manufacturer	EU
Saba Sekulovic	Flexpack Europe	Packaging association	EU
Roeland Moens	Closed European Pooling Association	Packaging association	EU
Henk Vooijs	Novamont/ Bioplastics	Manufacturer	EU
Edmar Meuwissen	BEWI	Manufacturer	EU
Claudia Bierth	Ball Beverage Packaging	Manufacturer	EU
Massimo De Santis	Freepack Net	Manufacturer	EU
Annick Carpentier	Beverage Carton (ACE)	Packaging association	EU
Tatiana Dias	Medtech Europe	Producer association	EU

Figure 10-8 Breakdown of interventions by type of organisation



Summary of interventions

Stakeholder interventions were usually related to several topics, with some expressing common views (example: inability to meet 95% threshold on recyclability). The sections below summarise the number of interventions per topic, and the sub-topics discussed.

Recyclability

24 interventions, discussing the following:

- Many stakeholders voiced concern of the 95% recyclability threshold. Some stakeholders voiced support for the threshold, either believing the industry will follow due to investments in recycling capacity or that the EU should ensure Member States have sufficient infrastructure and access to meet the threshold.
  - Some stakeholders disagreed with the threshold targeting packaging indiscriminately and supported a threshold which is generic enough to apply to all materials, but with material-specific guidelines being developed.
  - Some stakeholders voiced concern that the threshold is impossible to achieve currently and could entirely shutdown sectors.
  - Suggestion to refer to Best Available Techniques for collection, sorting and recycling to evaluate the 95% threshold and ensure these are available across the EU.
  - Some stakeholders supported removing the quantitative threshold and using a qualitative one instead.
- Equilibrium must be reached between weight & recycled content and recyclability.
- Support for a qualitative & functional unit of packaging definition of recyclability.
- Support for both material-specific and material-neutral definitions from multiple stakeholders.
- Prioritisation of a recyclability target for food packaging.

- Multiple stakeholders voiced concern about the risk of incongruency between what is proposed, the negative list, packaging characteristics and existing industry packaging recycling design guidelines.
- Concern of the risk of the negative list contradicting sector-specific guidance as some materials are recyclable with specific processes but not standard ones.
- Support for clear cut limits for hazardous chemicals or a general ban on substances of very high concern. Other stakeholders did not support the inclusion of hazardous chemical regulations due to existing comprehensive frameworks and guidelines.
- Distinguish between chemicals which are hazardous but get converted into non-hazardous substances during manufacturing and hazardous chemicals in the packaging.
- Inclusion of a definition for circular packaging to provide clarity on downcycling and closed-loop.
- Support for mandatory collection to support recyclability at scale and closed-loop circular economy systems. This should take into account existing work already carried out by the industry.

Legislation

23 interventions, discussing the following:

- Multiple stakeholders voiced support for translating the directive into a regulation to promote harmonisation.
  - Some stakeholders supported a caveat which states that Member States can't implement individual higher reduction targets.
  - Stakeholders mentioned that this could prevent issues with cross-border transport.
- Multiple stakeholders voiced concern that packaging innovation and obtaining regulatory approval is a slow process and the timeline is too short. Some stakeholders supported the current timeline and disagreed with extending it.
- Alignment of PPWD with other legislation including:
  - SUPD for recycled content calculations
  - revision of food contact directive to prevent migration of harmful substances in recycled content
  - WFD to increase harmonisation
  - Waste shipment regulations
- Support for a level-playing field across all Member States in terms of collection, sorting, recycling, and targets.
  - Some stakeholders supported the harmonisation of rules across all Member States first before going into concrete areas.
  - Some stakeholders supported a qualitative definition and a technical committee to consider specific cases to promote harmonisation.
- Consistent approach to products from third countries.
- More narrow definition of small packaging to support affected sectors.
- Support for enabling measures including:
  - Political support, investment and incentives for recycling infrastructure such as sorting and recycling facilities.

  - Increased targets for flexible packaging.

Reuse

17 interventions, discussing the following:

- Some stakeholders supported a wide definition of reuse to promote innovation and incentivise reduction. 1 stakeholder voiced support for minimum standardised criteria of reuse.
- Some stakeholders also supported a strong definition of reuse which would include definitions of measures for waste prevention and reuse packaging, such as reduction, expanded scope including throwaway beverage cups, collection infrastructure, reverse logistics, incentives to return packaging and minimum rotations and minimum requirements for a well-managed system.
- Clarity on which reuse sectors will be targeted and definitions to support how to set up and measure reuse targets. Huge sector so needs to be discussed in detail.
- Support for treating reuse targets separately with additional support with enabling conditions, otherwise targets may hinder reuse.
- Support from specific sectors such as cosmetics for reuse targets to be by product not sector.
- Support for reuse targets to be bound to qualitative or mandatory criteria by multiple stakeholders.
- Multiple stakeholders voiced support for a Life Cycle Assessment (LCA), scientific-based analysis and holistic and dynamic impact assessments to assess reuse targets and ensure no increased environmental, financial or administrative burden.
  - Consideration of packaging optimisation (recyclable one way, reusable another way), consumer awareness rising, Extended Producer Responsibility, harmonising waste collections, expansion and modernisation of collecting & sorting capacities and technologies and DRS to reduce burden and increase reuse.
- 1 stakeholder was against mandatory reuse quotas without defining systems.
- Support for countries to have the freedom to establish higher targets to enable future changes in legislation.
- 1 stakeholder voiced concern that a potential switch to bioplastics instead of reuse does not pose a solution as they are still single use e.g. marine pollution.
- Promotion reuse packaging production.
- Promotion of consumer awareness to ensure reuse systems are viable.
- Promotion of protection for circular reusable assets by defining legal recognition of reusable assets, legal obligation to return assets to owner and legal sanctions if it does not happen.
- Reverse logistics support and digitalisation of the supply chain could be an enabling condition which promotes reuse.
- Recognition that products such as mineral water have restrictions on refilling.

Recycled content

13 interventions, discussing the following:

- Consideration of the existing recyclability standard, EN13430, to ensure no potential conflicts.

- Multiple stakeholders raised concern of having enough recycled content which meet food-contact requirements to meet the targets. 1 stakeholder supported the targets and disagreed that there is not enough recycled content.
  - 2030 target for recycled content is not realistic.
  - The 200+ recycling technologies already approved by the Commission may not be able to meet the quantity of recycled content that will be needed.
  - Worry that it could reduce investment as it's not wise to invest in a packaging sector when you're not sure the recycled content needed will be available. This could cause a switch to other packaging which may be more environmentally harmful.
  - 1 stakeholder voiced support for keeping recycling options open for all materials and see what delivered good quality recycled content.
- Support for granular targets by plastic packaging type, split into contact-sensitive and non-contact sensitive targets, by plastic content or by polymer.
- Multiple stakeholders voiced support for equal access to recycled content covered under the mandatory target, so no product or sector is discriminated against.
- Support for increased enabling conditions including the regulation off chemical recycling to produce enough recycled content to meet the targets. Chemical recycling of PET has high recovery rates of over 90% unlike pyrolysis.
- Consideration by the Commission of imported goods which claim to have recycled content.

DRS & right of first refusal

9 interventions, discussing the following:

- Multiple stakeholders voiced support for priority access through right of first refusal (or other mechanisms) for what's Placed on Market. This could help SMEs which may struggle to access recycled content due to pricing and prevent downcycling. 1 stakeholder voiced concern that priority access for specific sectors could create a closed market.
- Multiple stakeholders voiced support for exemptions from minimum requirements for existing EPR & DRS schemes which could be assessed by the collection rate. This means they don't have to be re-designed.
- 1 stakeholder voiced disagreement with mandatory DRS but acknowledged it could be useful for specific waste flows. The concern of an increase in emissions due to collection was raised. Another stakeholder voiced support for mandatory DRS to enable closed-loop recycling but raised a 90% collection target for all beverage containers as a possible compromise.
- Support for EU-wide DRS with increased scope and no cross-subsidies. Other stakeholders voiced support for minimum scope to be decided by Member States.
- Support for including reuse packaging in DRS systems.
- Support for multiple deposit levels based on container size.
- 1 stakeholder voiced support for a Life Cycle Assessment to ensure inclusion of refillables in scope is environmentally beneficial.

Sector-specific topics

8 interventions, discussing the following:

- More specific definitions of what is considered food & drink packaging.
  - Some stakeholders supported specific reuse measures and targets for food & drink packaging.
- Some stakeholders supported an exemption for reuse food packaging from recycled content targets to prevent a potential switch to single-use packaging to meet them.
- Some stakeholders asked for an exemption from reuse and recycled content targets for the medical technology and pharmaceutical sector.
- European Medical Agency has already defined what is considered packaging and what is considered a medical device. More clarity is needed on what is considered packaging in the PPWD revision.
- Any legislation which mandates changes in packaging material and design should align with existing regulations on consumer safety for cosmetics, medical technology and pharmaceuticals as they are highly regulated industries.
  - Not all cosmetic packaging is suitable for reuse because of hygiene issues.
  - Recycled content is currently not high enough quality to be used for contact-sensitive medical technology and pharmaceutical packaging.
  - Bio-based materials in place of recycled content is welcome but it will still have to go through the lengthy regulatory process.
  - Some medical technology and pharmaceutical packaging can come into contact with chemical or biological reagents which are considered hazardous and so they would not be recyclable.
- It will take between 7-10 years to create packaging which complies with existing regulations. Deadline of 2025-30 is not achievable for the medical technology and pharmaceutical sector.
- 1 stakeholder voiced support for the medical technology, pharmaceutical and cosmetics industry to be included in recycled content targets.

Waste prevention

5 interventions, discussing the following:

- Consideration of mandatory non-material specific packaging waste targets per capita at a Member State level. Material-specific targets will ensure that all producers reduce waste for their own material and cannot switch to another material as a means of waste prevention.
- Multiple stakeholders raised the potential conflict of the use of light-weighting to reach reduction targets which may make packaging less recyclable. Equilibrium must be reached which allows for innovation.
- Important at EU level that there are enough descriptions of how waste prevention targets can be achieved.
- Support for setting clear and enforceable rules to define measurable and quantitative criteria to tackle excessive packaging.
  - Defining fit for purpose requirement packaging could solve the excessive packaging issue and prevent the need to have additional requirements.

Compostability

4 interventions, discussing the following:

- Multiple stakeholders voiced support for limiting the use of compostable packaging to specific applications or creating a shortlist. 1 stakeholder supported making certain compostable

packaging mandatory for certain items including lightweight carrier bags and small flexible packaging used for food which may become contaminated with food waste.
- Clarity on biodegradable and composable definitions to avoid confusion at a consumer level.
- No contamination between conventional recycling and compostable plastics as they can be sorted out, but lots of conventional plastic ends up in compostable facilities which needs to be stopped.
- Support for increased use of bio-based plastics.
- Industry standards have already been developed for compostable packaging to reduce consumer confusion.

Labelling

4 interventions, discussing the following:

- Multiple stakeholders raised the issue of ensuring collection systems are harmonised as well as labelling requirements to improve collection. This could be linked to the WFD revision.
- 1 stakeholder mentioned that their industry has already updated labelling to ensure recyclability e.g. soaps and detergents.
- Highly regulated products which are specified by sectoral regulations may conflict with the labelling requirements of the PPWD revision.

Other topics

10 interventions, discussing the following:

- Support for all thresholds and targets to be material-specific.
- Recognition of problematic greenwashing for consumers and industry and for the Commission to look at and address the problem.
- 1 stakeholder voiced support for including mass balancing in calculations and basing targets on verified mass flow modelling which allows for open-loop recycling. 1 stakeholder supported all measures to be assessed against Life Cycle Assessments.
- Administrative burden of Life Cycle Assessments could be high but coding on single/reuse packaging which confirms transportation rates and rotation data could be a solution.

Closing by the Commission

The session was closed by Wolfgang Trunk in around 3 minutes to thank the stakeholders for their contributions, a reminder of the timelines and explain that the slides would be shared after the event.

Post-workshop

As discussed earlier, an email was sent by Eunomia to all registered participants containing:

- A thank you letter by Mattia Pellegrini
- The slides presented during the workshop

After the workshop, stakeholders continued to reach out to Eunomia. When the slides are requested by stakeholders who did not participate in the workshop, these are sent anyway.

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