REGULATING HIGH-RISK PLASTIC PRODUCTS

GLOBAL MEASURES TO ELIMINATE, REDUCE, CIRCULATE AND SAFELY MANAGE HIGH-RISK PLASTIC PRODUCTS

TOWARDS A TREATY TO END PLASTIC POLLUTION

World Wide Fund for Nature (WWF)

One of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by conserving the world's biological diversity, ensuring the sustainable use of renewable natural resources, and promoting the reduction of pollution and wasteful consumption.

Eunomia Research and Consulting

Eunomia was founded in 2001 with the aim of working with clients to develop credible, intelligent solutions that support a more sustainable future. Over the past 20 years they have worked with hundreds of prominent public and private sector organisations in the UK, Europe, North America and beyond to make a positive impact. Their experienced consultants work in partnership with clients, offering a deeply personal service based on their specific requirements, seeking to create long-term partnerships which drive genuine change.

Acknowledgements

WWF: Huy Ho Huu, Silje Woxholth Sørfonn, Eirik S. Lindebjerg, John Duncan, Elena Khishchenko.

Eunomia Research and Consulting: Daniel Stunell, Ayesha Bapasola, Tom Crick, Cassidy McLean-House, Steve Watson, Nicola Ainger

Design by

Ender Ergün & Hakan Lokanoğlu

To quote this report, please use the following reference: WWF, 2023. Regulating high-risk plastic products.

Published in May 2023 by WWF.

WWF International
Rue Mauverney 28
1196 Gland
Switzerland
www.wwf.panda.org

Eunomia Research & Consulting Ltd
37 Queen Square
Bristol
BS1 4QS
United Kingdom
www.eunomia.co.uk

CONTENTS

EXECUTIVE SUMMARY 4

1. INTRODUCTION 8
   - OBJECTIVE 8
   - METHODOLOGY 9
2. CLASS I & CLASS II: PRODUCT GROUPS AND CONTROL MEASURES 10
3. CONTROL MEASURES TO ELIMINATE AND SIGNIFICANTLY REDUCE 14
   - 3.1. BANS 16
   - 3.2. PHASED REDUCTIONS 17
   - 3.3. PRODUCT STANDARDS 18
   - 3.4. ECONOMIC INSTRUMENTS 19
4. CONTROL MEASURES FOR SAFE CIRCULATION AND MANAGEMENT 20
   - 4.1. TARGETS 24
   - 4.2. ECONOMIC INSTRUMENTS 25
   - 4.3. STANDARDS AND MINIMUM REQUIREMENTS 26
   - 4.4. EXTENDED PRODUCER RESPONSIBILITY 33
   - 4.5. DEPOSIT RETURN SYSTEMS 35
5. ADDITIONAL SUPPORTIVE TREATY MEASURES 38
6. CONCLUSIONS 41

EXECUTIVE SUMMARY

The UN Environment Assembly's decision, in March 2022, to start international negotiations on a plastic pollution treaty marked a watershed moment. Following a successful first session of the Intergovernmental Negotiation Committee (INC), states and other stakeholders are now committing to paper what the new treaty should contain. As states prepare for the INC's second session in Paris, France, the key questions are exactly what the new treaty should regulate — and how.

The significance of these questions cannot be overstated. Too often, efforts to negotiate multilateral environmental agreements have resulted in little more than vague statements of intent. To shape the new treaty on plastic pollution into an effective instrument of international law, states and other stakeholders will have to identify, adopt, and implement a set of specific control measures targeting the most important drivers of such pollution.

The objective of this research — commissioned by WWF and conducted by Eunomia — is to identify and prioritize plastic product groups with the highest pollution risk, and the control measures that would be most suitable to address them. This research thus aims to provide a deep dive into one core component of the treaty.

This research contributes with the following assessments:

- Plastic products are placed in groups based on their properties, uses and pathways to the environment, and assessed against criteria of pollution probability and impacts.
- The prioritized high-risk product groups are classified into Class I and Class II, based on an assessment of the feasibility for elimination or reduction in the use of plastic products within each product group.
  - Class I contains product groups with high feasibility of elimination, or at least significant reduction in use, according to available evidence at the time of assessment.
  - Class II contains product groups that cannot be targeted for significant reduction or elimination at the time of assessment. Control measures will need to ensure and maximize the responsible circulation of these plastic products, and the plastic they contain, throughout the plastic chain, and the responsible management and disposal when further safe and non-toxic circulation is not possible.
- A range of control measures, following the hierarchy of elimination, reduction, safe circulation, and safe management, are assessed to identify those that are best suited to tackle different Class I and Class II product groups: preventing, reducing and controlling the direct or indirect introduction of these plastic products into the environment and the resultant harms.

The research results are presented in two reports. **Report One,** titled **'Breaking Down High-Risk Plastic Products'**, identifies high-level product groups — groups with distinct descriptions that can be used for the purpose of regulation, across the range of plastic products in circulation. Pollution risks and the feasibility of pursuing a significant reduction or elimination strategy by 2035 are assessed, based on current knowledge, to identify and finalise these product groups, and place them in either Class I or Class II. **Report Two,** the current report, identifies the potential control measures available for Class I and Class II objectives and considers the suitability of these approaches for each product group.

Together, the reports provide both:

- A framework for assessing the urgency, need and feasibility of control measures, and what those control measures could be; and
- An assessment, based on current evidence, of how product groups can be treated within that framework to guide negotiators.

FINDINGS AND RECOMMENDATIONS

Controls for specific product groups have the potential to be a core part of the global treaty to prevent plastic pollution. This study shows that it is not only feasible, but also desirable to break the plastic pollution problem into specific categories for regulation, enabling the new treaty to establish the most effective regulatory approach for each category. The complex global problem of addressing plastic pollution can be overcome by systemically dividing and tackling specific plastic categories with global regulations.

The suitable regulatory approaches for different product groups, as assessed by the study, should be considered as core obligations and control measures in the treaty. They include bans and phase-outs, reduction targets, economic instruments, standards and requirements, extended producer responsibility schemes and deposit return schemes. The study's identification and prioritization of the product groups, meanwhile, provide early inputs to what the associated annexes of those measures should include.

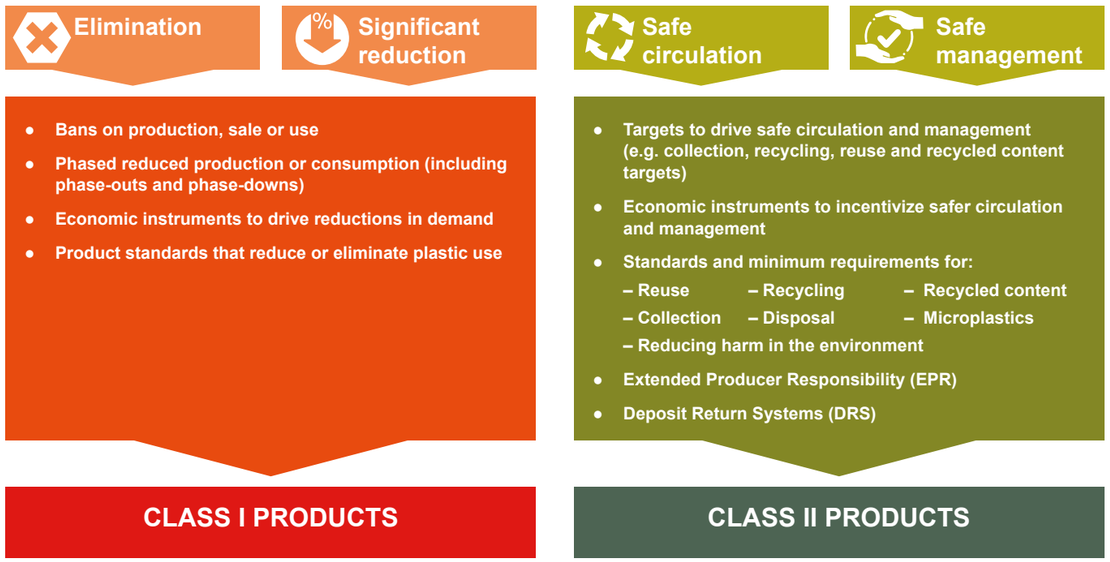
As further evidence emerges in future, additional control measures may be warranted, focused on additional plastic product groups. Similarly, as new solutions emerge, the ability to act aggressively to eliminate, reduce, circulate, or manage plastics may justify additional actions. The new treaty's ability to evolve by amending annexes and adding protocols could be crucial for the global community's long-term efforts to tackle plastic pollution.

Product controls will not be the only component of the treaty, and its overall impact will be determined by not simply the range and ambition of agreed measures, but how they fit together with each other and with other aspects of the treaty. Bans and phase-outs of certain types of polymers and additives, general obligations related to total plastic production and consumption, as well as supporting measures such as a strong financial mechanism, will be crucial complementary elements to product-specific controls.

KEY CONCLUSIONS OF REPORT TWO

Measures identified and considered in this study are outlined below. All are considered specifically in relation to individual product groups, and all of the prioritized product groups have one or several product-controls connected to them.

Figure 2-1: Elimination, Reduction, Circulate & Safely Manage



For Class I products, not all are feasible to eliminate at once. But three product groups stand out, which report recommends banning in their entirety to avoid any loopholes. Since prohibition is both a priority and feasible, no other measures are included for these product groups:

- **2b. Characteristic-specific products: Single-use short lived - Fibres/non-woven – Other (non-necessary):** This includes products such as wet wipes, cigarette butts, disposable vacuum filters or plastic tea bags.
- **2d. Characteristic-specific products: Other single-use short-lived items – Other (non-necessary):** This includes products such as plastic balloon, cutlery/plates/cups, ear bud sticks, disposable e-cigarettes, etc.
- **4a. Primary microplastics: In application or intentionally added microplastics:** This includes microbeads in personal care products, antifouling application on ship hulls, microplastics used in industrial applications, microplastic coatings surrounding fertiliser granules, etc.

For other product groups not up for immediate bans, phased reductions (including phase-outs and phase-downs) is still a priority measure to be considered. Additionally, a combination of measures would be necessary to ensure effective intervention at the speed and scale needed to end plastic pollution. This is particularly the case with Class II, where multiple requirements can target all stages of the plastics chain to deliver the changes needed.

Overall, this analysis identifies starting priorities and deliverable product controls for a draft treaty for 2024, with a focus on what can be eliminated or significantly reduced. The case for further elimination and significant reduction of more product groups will in time surely be strengthened and raise ambition for Class I and the connected annexes.

© Steve Morgan / WWF-UK

DEFINITION OF KEY TERMS

Please note that the following definitions are specific to this research and its purposes, and do not follow the definitions contained in the UNEP Glossary of Terms for Negotiators of Multilateral Environmental Agreements.[1]

Category – a set of plastic product groups, sharing some common features and treated together for the purpose of analysis.

Class – a set of plastic product groups, with membership determined by whether reducing or eliminating their production, consumption and trade would result in significant negative consequences.

Compostable and biodegradable – there is no agreed definition for these terms, therefore the requirements for it are discussed in 'Reducing harm in the environment' under **Section 4.3.**

Disposal – this research uses the term 'disposal' to mean the landfilling and incineration of waste. This is distinct from the Basel Convention definition of disposal, which includes recovery operations, including recycling.

Environmentally sound waste management – as defined by the Basel Convention, waste management is environmentally sound when it takes all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.[2]

Essential use – uses that are necessary for the health, safety or functioning of society (encompassing cultural and intellectual aspects), and where there are no available technically and economically feasible alternatives or substitutes that are acceptable from the standpoint of environment and health.[3]

Microplastics –plastic particles less than 5 mm in diameter, including nano-sized particles.[4]

Plastic pollution – details of how this term is defined for this research are in **Report One,** titled **'Breaking Down High-Risk Plastic Products'**. In summary, it is defined firstly by the introduction of plastic into the environment and secondly by the negative effects resulting from this.

Pollutant – a substance or a group of substances that may be harmful to the environment or to human health on account of its properties and of its introduction into the environment.[5]

Plastic – plastic is a solid material which contains as an essential ingredient one or more high-molecular mass polymers, and which is formed (shaped) during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic[6]**.**

Plastic product – in this research, we see a plastic product as a plastic item that is manufactured for sale, including plastic packaging and single-use items, as well as items designed to have longer use-phases.

High-risk plastic products – details of how this term is defined for this report are in in **Report One,** titled **'Breaking Down High-Risk Plastic Products'**. In summary, 'high-risk plastic products' are defined as those product groups most likely to be directly or indirectly introduced into the environment, and to cause resultant negative effects.

Product group – a set of plastic products sharing intended functions, characteristics and patterns of use.

Recycled content – in this research, 'recycled plastic content' means post-consumer recycled (PCR) content, meaning plastic that has been recycled from plastic products placed on the market. This is distinct from post-industrial recycled (PIR) content, which is plastic that has been recycled from plastic waste arising during the plastic manufacturing process.

Safely managed – plastic products are considered to be safely managed at end-of-life when they are captured and treated by waste management systems in such a way that they are neither directly nor indirectly introduced into the environment, and that any potential negative effects resulting from their management are avoided. This definition aligns with the Basel Convention's definition of 'environmentally sound waste management',[7] but focuses more on preventing plastic products from being lost to the environment and generating plastic pollution.

1. INTRODUCTION

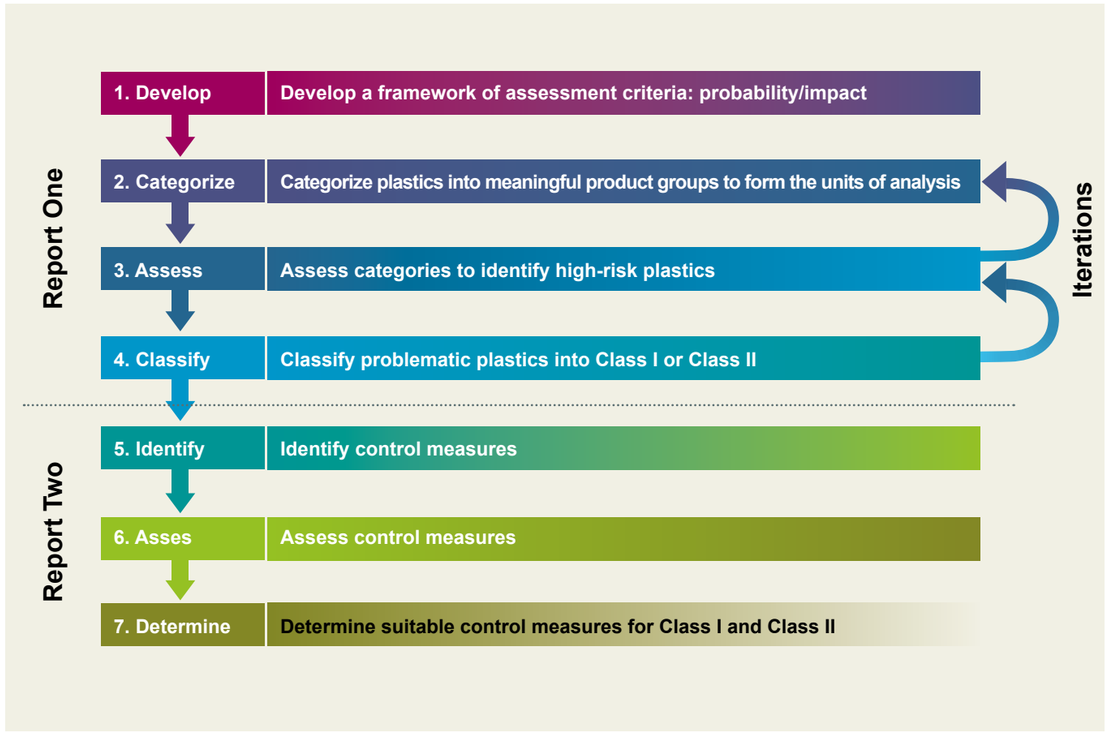
OBJECTIVE

The intergovernmental negotiation to develop an international legally binding instrument to end plastic pollution, including in the marine environment (referred to as 'the treaty' for the rest of this report) is currently underway and expected to conclude by the end of 2024.

The objective of this research — commissioned by WWF and conducted by Eunomia — is to identify the specific plastic products that most urgently require international interventions, and what the most suitable interventions for those products would be. Together, these elements can be considered for the development of specific, binding measures and the associated annexes of those measures in the new global. The research thus aims to contribute initial inputs to aid the development of one of the core components of the treaty.

The results are presented in two connected reports. **Report One,** titled **'Breaking down high-risk plastic products',** provides a framework for identifying and prioritizing plastic product groups that require urgent interventions, through assessments of their pollution risks. Product groups are then classified into Class I and Class II, by assessing the feasibility for elimination and significant reduction of these groups. This Report, titled **'Regulating high-risk plastic products'** and referred to as **Report Two**, identifies concrete control measures that are most suitable to tackle those two classes of plastic products.

Figure 1-1: Diagram of the Methodology



METHODOLOGY

The research employs the following methodology, shown in **Figure 1-1**. Steps 1 to 4 are conducted in **Report One** to identify, prioritize and classify high-risk plastic product groups into Class I and Class II. To identify the most suitable measures to tackle product groups in Class I and Class II, steps 5 to 7 are conducted in this report, detailed below.

5. A long list of policy measures that can be used to either eliminate or reduce certain plastic products (in the case of Class I) or safely circulate and manage the plastics that are produced (in the case of Class II) was first established. Through an iterative process, the list was reconfigured to group measures in such a way that makes sense in the context of the global treaty.
6. The resulting list of measures within each class was then assessed against each plastic product group within that class, to determine the most likely appropriate measures. The assessment considered the reasons behind the high pollution risk of the product groups, as well as the strengths and weaknesses of each measure and the evidence regarding previous experiences with such policies. In this way, the measures were tested for feasibility, effectiveness and level of confidence.
7. Based on the assessment results, suitable control measures for product groups within each class were determined, using a simple yes/no tick system for Class I, and an additional 'possible' rating for Class II. The results were summarized in a matrix, and further elaborated to ensure that key considerations around the specific design of control measures, and the potential national policies to implement them, were captured.

Note that wider supportive implementing measures (like capacity building, data reporting and verification systems) are not within the scope of the study and therefore are not listed or assessed, though some initial considerations around implementation are included in **Section 5**. The same applies to control measures that regulate beyond specific product groups, some of which might make product-specific measures more effective.

2. CLASS I & CLASS II: PRODUCT GROUPS AND CONTROL MEASURES

Report One provided a framework for identifying and prioritising high-risk plastic products, and placing them into one of two classes, depending on whether the group was deemed feasible for elimination or significant reduction:

- Class I encompasses plastic product groups for which production, consumption and trade could be *either* significantly reduced *or* eliminated without significant negative consequences. For the purposes of this analysis, significant reduction or elimination *within the first decade of the treaty's life* (i.e., by or before approximately 2035) is used as the benchmark. Further product groups, or individual products, may be added to Class I over time, within and beyond this timeline.
- Class II encompasses plastic product groups for which production, consumption and trade could not be restricted without significant negative consequences.

This report sets out suitable control measures for reducing and eliminating product groups in Class I, and for increasing the circularity of, or otherwise ensuring the safe management of, Class II product groups. Across both classes the treaty should prioritise following the waste hierarchy, seeking first to eliminate or reduce plastic use, then looking at measures to ensure plastic products circulate in a responsible fashion, and finally looking at responsible management to ensure plastic pollution does not occur at or after end-of-life. Except where products are wholly eliminated, all these stages are likely to play a necessary part in effective controls to tackle plastic pollution.

Table 2-1: Classification of high-risk plastic product groups into Class I & II

*Note: refer to Chapter 2, Report One, 'Breaking down high-risk plastic products', for explanation of 'necessary/other' packaging subgroup

PRODUCT GROUP		EXAMPLE PRODUCTS IN GROUP	CLASS I	CLASS II
 PACKAGING	**1a. Packaging:** contact sensitive - single-use food and beverage (necessary/other)*	Beverage bottles, takeaway containers, crisp packets, sachets and pouches, nets and wraps for fruit and vegetables, very lightweight plastic carrier bags used as primary packaging for loose food items[8], EPS fish boxes	☑	☑
	***1b. Packaging:** contact sensitive - multi-use food and beverage*	Reusable beverage bottles, containers and cups	*Not currently assessed as a priority high-risk plastic product group-*	
	1c. Packaging: contact sensitive - cosmetics and personal care (necessary/other)*	Toothpaste tubes, perfume spray bottles, shampoo and soap bottles, pots and tubs of creams, lotions and scrubs, beauty products like lipstick and mascara tubes		☑
	1d. Packaging: contact sensitive - pharmaceutical and medical	Medication bottles, blister packs for pills, protective casings and inserts for medical devices, IV bags, test tubes		☑
	1e. Packaging: other contact sensitive	Packaging for animal feed, veterinary devices, children's toys, hazardous products		☑
	1f. Packaging: non- contact sensitive	Packaging for products not listed above – household goods, stationery, electronics, plastic carrier bags, etc., including secondary or shipping/ transport packaging where relevant	☑	☑
 CHARACTERISTICS-SPECIFIC PLASTIC PRODUCTS	**2a. Characteristics-specific plastic products:** single-use short lived - fibres/non-woven – necessary	Some absorbent hygiene products (AHPS) such as nappies, sanitary pads, incontinence pads or tampons), PPE, or filters in engineering systems		☑
	2b. Characteristics-specific plastic products: single-use short-lived - fibres/non-woven – other (non-necessary)	Wet wipes, cigarette butts, disposable vacuum filters or plastic tea bags	☑	
	2c. Characteristics-specific plastic products: Other single-use short-lived items – necessary	Contact lenses, bin bags, plastic PPE	☑	☑
	2d. Characteristics-specific plastic products: Other single-use short-lived items – other (non-necessary)	Balloons, plastic cutlery/ plates/ cups, ear bud sticks, disposable e-cigarettes, etc.	☑	
	2e. Characteristics-specific plastic products: longer life – cause significant secondary microplastic release	Tyres, synthetic textiles, paint	☑	☑
	2f. Characteristics-specific plastic products: Longer life – other longer-life items	Furniture, white goods, durable toys	*Not currently assessed as a priority high-risk plastic product group*	
 SECTOR-SPECIFIC PLASTIC PRODUCTS	**3a. Sector-specific plastic products:** marine, aquatic and terrestrial – marine/ aquatic – fishing and aquaculture	Nets, lines, pots and trawls, plastic mesh, PVC piping, fishing aggregated devices (FADs)[9]		☑
	3b. Sector-specific plastic products: marine, aquatic and terrestrial – terrestrial – agriculture / agricultural plastics applied directly	Mulch film, plastic silage wrap, greenhouse tunnels. [10]		☑
	3c. Sector-specific plastic products: - other	Electrical/ electronic equipment, construction materials, automotive components, household products	*Not currently assessed as a priority high-risk plastic product group*	
 PRIMARY MICROPLASTICS	**4a. Primary microplastics:** – in application or intentionally added microplastics	Microbeads in personal care products such as toothpastes, skin care and scrubs, antifouling application on ship hulls, microplastics used in industrial applications such as printer inks, paints, spray paints, injection mouldings and abrasives, microplastic coatings surrounding fertiliser granules	☑	
	4b. Primary microplastics: – pre-production	Plastic resin pellets, flakes or powders		☑

While some plastic products could be wholly eliminated, for others, significant reductions may be the more appropriate option within the decade following the treaty's adoption — the timeline benchmark in the current assessment. These two related but distinct goals imply some differences in the control routes available within Class I.

The most obvious means of reducing and eliminating plastics are bans (i.e., outright prohibitions against manufacturing, importing, exporting, distributing, selling and purchasing products etc.), and phased reduction (i.e., obligations to achieve gradual elimination or certain percentage of reduction in a given timeframe). Another key too to drive reductions is mandatory product standards designed to eliminate, reduce, or optimize the plastic use or product use cases for a product group, rather than targeting the product per se.

Some of the measures discussed for Class II products (primarily focused on reducing plastic pollution and the scale of harms it creates) may also have 'dual benefits' by also contributing to reductions in use. Class II controls may also be helpful in reducing the *harms* from Class I products, during the time when those products are being phased out.

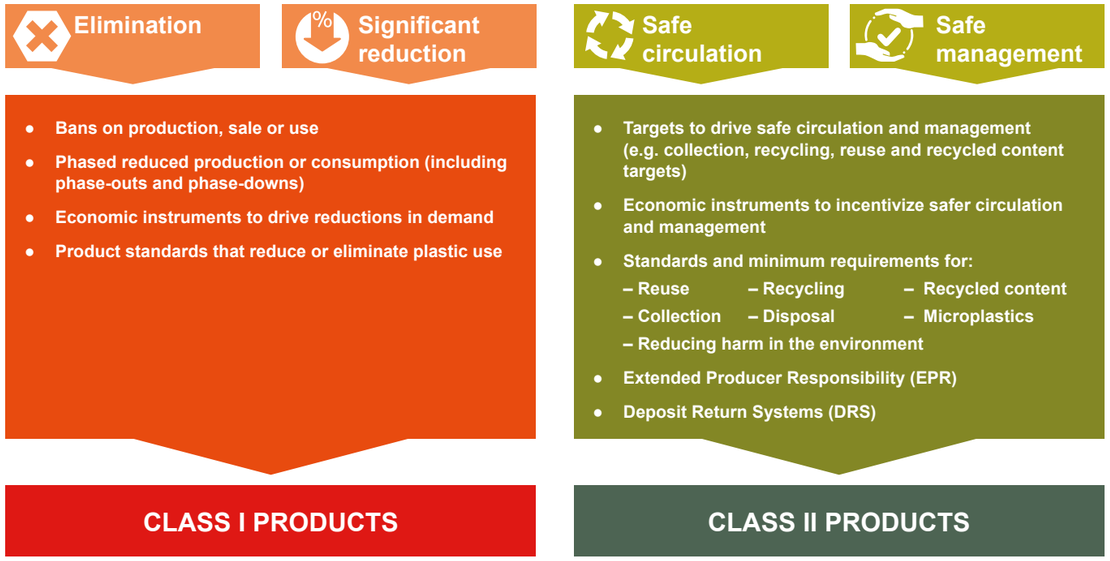
A key implementation concern for Class I controls is the risk of loopholes, as businesses or individuals may find ways to avoid bans or reductions by seeking to reclassify given plastic products. This is one reason why the product group categories in this report are relatively broad, outlining the range of products that should be regulated. Providing detailed legal specifications, as well as lists of example products, for these product groups in the treaty will help states avoid the risk that sellers or producers deliberately evade obligations by minor design changes. Effective product group and product definitions will be critical to ensuring effective implementation across both Class I and Class II products.

For Class II plastic product groups, the waste hierarchy should still apply. While reduction is a primary aim for Class I, opportunities to achieve or reinforce this via Class II measures should not be ignored. In addition, however, Class II controls should ensure that plastic products, and the plastic they contain, are circulated safely and efficiently, and managed safely at end-of-use or end-of-life. Class II control measures could also include prohibitive elements. Design for recycling guidelines, for example, require the elimination of specific polymers and additives from certain products, to ensure safe circulation. Taken together, Class II control measures should reduce or eliminate the risks of plastic pollution, and — as a last resort — minimize the potential harms when plastic pollution does occur.

Class II controls can apply across the product life cycle. Improving circulation can cover a range of outcomes, often within one measure, so it is not always possible to match an individual control measure to a specific stage in the plastics value chain or stage of the waste hierarchy. For example, targets may relate to material collection, recycling, or recycled content — and while these appear as 'downstream' interventions, they should also result in the displacement of virgin plastic. Economic incentives may be used to encourage more sustainable practices within the value chain, but their impact on overall prices could also reduce demand and thus production, in a similar way to economic measures used for Class I products. Enabling greater reuse can reduce the total amount of material used in a system, as well as reducing the number of items that might escape as plastic pollution, and the chances that they do so relative to single-use equivalents.

Lastly, Class II controls may relate to either product or process, of which standards and requirements will be necessary. There are several measures (especially around safe collection and management) that can apply across all product groups, while others will need to be relatively tailored to each specific product group.

Figure 2-1: Control measures for Class I and Class II plastic product groups



Deep Dive

EFFECTIVE CONTROLS ON PACKAGING REQUIRE A BROAD SET OF CONTROL MEASURES.

Packaging poses particular challenges in terms of Class I and Class II categorization, and it is likely that controls for these product groups will need to be relatively diverse. Control options may range from tailored measures for specific products, to those that are applicable across multiple packaging product groups (e.g., criteria tests for packaging necessity, or Extended Producer Responsibility schemes).

Even where a product group or product cannot be eliminated per se, certain problematic *features* or *applications* of packaging could be eliminated:

- Specific polymers in specific applications or contexts[11]
- Specific additives in specific applications or contexts

Reduction is a realistic objective and could be achieved in four ways, combining explicit Class I reduction obligations, and control measures designed to ensure responsible circulation and management of plastics. Reduction can be achieved by:

- Eliminating products in specific applications or contexts, potentially via a combined product-plus-application control (e.g., a use ban on single-use takeaway packaging), or via a packaging 'necessity test' (e.g., to require the loose selling of fresh fruit and vegetables, without packaging that is not considered necessary)
- Reducing material use per package – for example through rules on light-weighting or void space
- Moving packaging systems from single-use to reuse – for example by reuse targets and strict standards to ensure 'reusable' packaging can be, and is in fact, reused
- Substituting plastic for other materials – though this must be approached carefully. The risk of unintended environmental consequences in this regard was a key finding in **Report One** analysis.

As identified in **Report One**, the product group approach is a helpful step in thinking about control measures for packaging, but given the high volume, short life, and design features of packaging, this is an area where negotiators may wish to consider controls that apply across product groups, or specifically target products within a product group. For example, Deposit Return Systems for drinks containers, or targeted reductions in single-use plastic bags (whether used for food or more broadly) are proven policy measures that would be suitable at the global level. Overall, packaging is a key area that negotiators will need to work on given its importance and complexity.

3. CONTROL MEASURES TO ELIMINATE AND SIGNIFICANTLY REDUCE PLASTIC PRODUCTS

This section describes potential control measures for Class I plastic product groups. These are policy tools that will directly drive the elimination of specific product groups, or significant reductions in the number of plastic products produced and/or consumed within a product group. Treaty negotiators, and states party to the treaty, could also use these policy tools to target specific products within product groups where appropriate.

Immediate global bans of entire product groups have been specified for those where elimination is feasible at the time of assessment. Phased-reductions, including phase-downs and potentially eventual phase-out, are suitable for most other groups in Class I, but will potentially require additional measures, either in the treaty or at national level, to ensure that they are achieved. Product standards and economic instruments are also useful tools to support prohibitions and phased reduction obligations.

National implementation should consider whether it is only the plastic or plastic-containing version of a product that the country wants to regulate, or whether regulation should be expanded in scope at the national level, to avoid unwanted and unnecessary substitution with non-plastic products: for example, global bans and phase-outs may be applied at the national level to all single-used products in a product group, not simply plastic ones.

Lastly, the treaty ambition is expected to increase over time, and more ambitious Class I actions become more feasible, as the treaty starts to drive change in the plastic value chain across a wider range of products. In this scenario, more product groups might move from Class II to Class I, and more Class I product groups, or products within those groups, might be considered suitable for prohibitions.

Table 3-1 summarizes the results of the assessment of the measures against the product groups in Class I. Details on each of the measures are elaborated from Section 3.1 to Section 3.4.

Table 3-1: Class I product groups and corresponding control measures & summary rationale

*Note : For the purposes of this table, 'bans' refers to control measures that place prohibitions on product groups as a whole. Additional control on specific products, within broader groups may be considered.
** Note: Refer to 'Effective controls on packaging' in **Section 2** for explanation of 'necessary/other' packaging subgroups.

	PRODUCT GROUPS IN CLASS I	BANS*	PHASED REDUCTION (PHASE-OUTS & PHASE-DOWNS)	PRODUCT STANDARDS	ECONOMIC INSTRUMENTS	SUMMARY RATIONALE
 PACKAGING	1a. Packaging: contact sensitive - single-use food and beverage (necessary/other**)		☑	☑	☑	Large volumes and high propensity for leakage. Global bans assessed as low feasibility or socioeconomically acceptable across product groups, reduction at product/application level suitable and phase-out/phase-down recommended. Standards to further strengthen reduction.
	1c. Packaging: contact sensitive – cosmetics and personal care (necessary/ other**)		☑	☑	☑	Large volumes and high propensity for leakage. Global bans assessed as low feasibility. Reduction at product/application level assessed as suitable.
	1f. Packaging: non-contact sensitive		☑	☑	☑	Large volumes and high propensity for leakage. Bans assessed to be less socioeconomically acceptable.
 CHARACTERISTICS-SPECIFIC PLASTIC PRODUCTS	2b. Characteristics-specific plastic products: single-use short lived – fibres/non-woven – other (non-necessary)	☑		☑		Waste management and recycling lacking, leakage common. Alternatives widely available. Bans supported by standards.
	2c. Characteristics-specific plastic products: other single-use short-lived items – necessary		☑	☑	☑	Alternatives currently lacking. Reductions desirable and phase-outs/downs feasible. Economic instruments to incentivize behaviour change, standards to enforce it.
	2d. Characteristics-specific plastic products: other single-use short-lived items – other (non-necessary)	☑	☑	☑	☑	Waste management/recycling lacking, leakage common. Use of plastics in items non-essential. Alternatives widely available. Bans supported by economic instruments due to widespread nature of use.
	2e. Characteristics-specific plastic products: longer life – cause significant secondary microplastic release		☑	☑	☑	Bans assessed as less feasible or socioeconomically acceptable. Standards to reduce volume and leakage through design. Targets to support effectiveness. Economic instruments to encourage consumer behaviour change.
 PRIMARY MICROPLASTICS	4a. Primary microplastics – in application or intentionally added microplastics	☑	☑	☑	☑	Alternatives available with associated economic cost of R&D and consumer satisfaction. Bans appropriate.

3.1. BANS

Product bans involve a legal prohibition against certain products. They can target whole product groups, or specific products within a product group. Prohibitions on specific *features* or *applications* of a product are dealt with under product standards (see Section 3.4) and under design for recyclability (see Section 4.3.4), though some of the design features discussed here may be relevant to making those measures effective.

KEY CONSIDERATION FOR THE TREATY

The prohibitions can target different stages in the products' value chain, including the production, sale, use and trade of the products.[12] They could, for example, cover the sale of specified products to consumers, as well as the free distribution of these products, including as part of composite products. Bans could also target economic actors higher up the value chain by prohibiting products from being placed on the market by manufacturers and importers. A connection to trade controls is an important feature of the treaty in relation to bans, as this would help minimize the risks that national restrictions are illegally circumvented. The value of trade controls as part of prohibition measures is discussed briefly in **Section 5.**

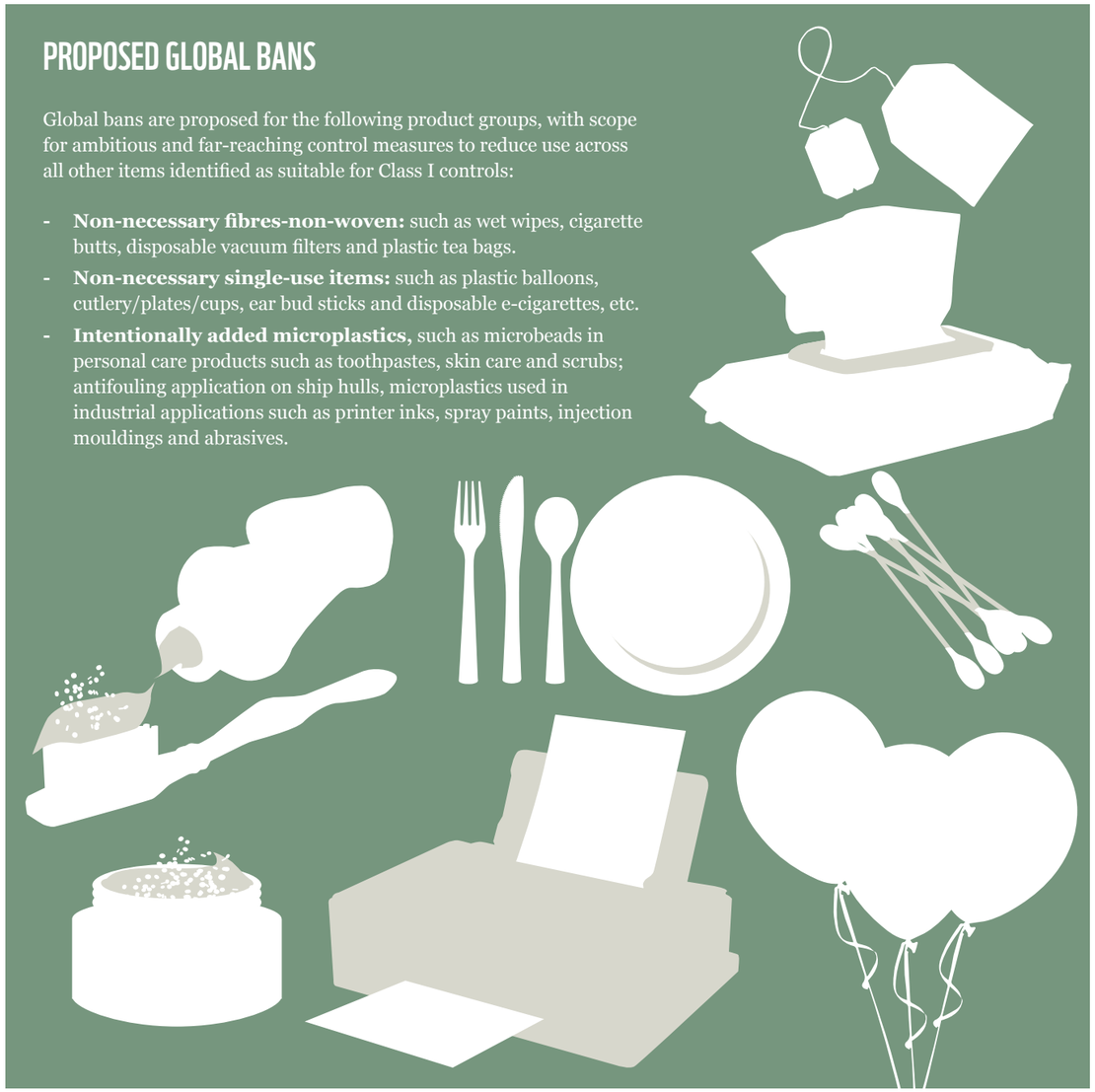
As with all control measures, specifying the scope is critical for bans. For example, the EU Single-use Plastics Directive introduces market restrictions on the basis of both product types and polymer types (e.g., food containers made of expanded polystyrene).[13] Bans may be an area where targeting specific products within a group is desirable, with potential to expand to the rest of the group at a later date as viable alternatives or practices develop. Exemptions for some products or product groups (for example, for certain medical or social care applications) could also be considered.

Monitoring and enforcement activity would play a significant role in ensuring the effectiveness of bans. Another important consideration for prohibition measures is the unintended consequences — due to adoption of non-plastic single-use alternatives — that the treaty obligation, or national implementation approach to that obligation may lead to. Lastly, effective bans may also require complementary product requirements; for example, standards for reuse can help ensure that prohibited single-use products are not simply relabelled as 'reusable' to escape regulation with no meaningful change in design or use.

PROPOSED GLOBAL BANS

Global bans are proposed for the following product groups, with scope for ambitious and far-reaching control measures to reduce use across all other items identified as suitable for Class I controls:

- **Non-necessary fibres-non-woven:** such as wet wipes, cigarette butts, disposable vacuum filters and plastic tea bags.
- **Non-necessary single-use items:** such as plastic balloons, cutlery/plates/cups, ear bud sticks and disposable e-cigarettes, etc.
- **Intentionally added microplastics,** such as microbeads in personal care products such as toothpastes, skin care and scrubs; antifouling application on ship hulls, microplastics used in industrial applications such as printer inks, spray paints, injection mouldings and abrasives.



3.2. PHASED REDUCTIONS

Phased reductions set obligations to achieve gradual elimination (phase-outs) or certain reduction levels in production and/or consumption (phase-downs), in a given time frame. Through specified level of reduction and set date for achievement, the measure ensures action commences promptly and progress can be judged in the interim. It also allows the treaty to increase ambition overtime, through increasing reduction levels and shortening target timeframe.

KEY CONSIDERATIONS FOR THE TREATY

Phased reductions of Class I product groups may target the production, sale, or use, or all three, of each product group. Controls on import or export of targeted items should also strengthen the effectiveness of phased reduction measures. There are instances of governments already implementing phased reductions. For example, the EU Plastic Carrier Bags Directive requires that EU Member States either ensure that lightweight plastic carrier bags are not provided for free at the point of sale (effectively a sales ban) or meet specified consumption reduction targets (90 bags per capita by 31 December 2019, and 40 bags per capita by 31 December 2025).[14]

Reduction levels can be defined in several ways. These include an absolute material use or product number target 'ceiling' that must not be exceeded, or a normalized target (e.g., consumption per capita). However, the option of per capita targets that does not require a baseline might not be preferable, as they could prove overly easy to achieve for some countries due to unequal patterns of global consumption. It is also possible to specify reductions from a baseline (e.g., a 90% decline from a defined start point), but this is dependent on that baseline being known, and specifying targets this way could lead to potential delays in effective implementation at national level. One solution to this constraint would be to explicitly require countries to calculate and report baseline performance within a specified period, right after the treaty comes into force.

For phase-outs, besides the reduction level reaching zero by a set date, intermediate reduction levels — corresponding to intermediate set dates — could help to ensure progress is made gradually towards eventual elimination. The detailed specification of mandatory reduction levels and schedule, for phase-downs and phase-outs, can help reduce the prospect of disruption, creates clear expectations for producers and users of products, and ensures that clear progress starts to be made on short timelines.

Even when elimination is considered unfeasible for some product groups *at the time of assessment*, phased reductions of these groups enable the international community to *already start the journey now and immediately* towards minimizing their pollution risks. Where elimination is pursued, exemptions for specific applications (such as use of single-use items that are considered essential in some specific medical or social care settings) could be considered until sufficient alternative products or practices are developed.

Similar to bans, mechanisms for monitoring and reporting at both national and, ultimately, international level, would be essential for phased reductions. Crucially, the achievement of phased reductions at national level will depend on a

range of national measures being taken to ensure delivery. States would be free to choose what tools to use, and in practice a selection of the measures described in the rest of this section might be applied. Both Class I and Class II control measures may play a part in phase-outs and phase-downs achievement.

Finally, consideration of unintended consequences is critical to Class I. This research shows that feasible alternatives, that do not cause unintended negative consequences, do exist for product groups placed in Class I (so do the cases of products that are not necessary and do not need to be replaced by any sort of alternatives).

3.3. PRODUCT STANDARDS

Product standards specify how products must be designed and manufactured, and on the materials they can contain. Standards can help achieve plastic reductions even in cases where product groups or products are not targeted as items for bans and phased reductions, by ensuring products are used only when necessary and are as material efficient as possible. Products that do not meet standards are effectively prohibited from the market. Standards can be applied at the point of production or at various points along the supply chain, including at the point of import / export. A significant advantage of setting minimum standards in a global treaty (as with bans) is that it reduces the risks that standards are circumvented through illicit activity.

Standards can drive reduction by applying:

- 'Necessity' tests on an application: even where a product cannot be eliminated, certain applications of that product may be unnecessary. This determination may be context specific, but standards for making this determination could be required;
- Requirements to maximize material efficiency within a product;
- Requirements to ensure product longevity, reducing net material demand and waste over time;
- Requirements to regulate the use of plastic within predominantly non-plastic products (e.g., microplastics added to products as an ingredient).

KEY CONSIDERATIONS FOR THE TREATY

Specifying standards may be more complex than specifying other Class I measures, but ideally Class I controls for given product groups will align to be mutually supportive, making compliance easier for both economic actors and states.[15] Standards may need to be tailored to the specific product group in question. According to the product groups assessed in this research, there is particular potential for packaging, characteristic-specific products and microplastics.

Standards to deliver reductions in plastic use are currently most developed in relation to plastic packaging. There is no question that these controls could be applied to the Class I packaging product groups; however, there may also be scope to apply them to all packaging product groups, as well as other sub-groups. For example, they also offer a way to regulate plastic and microplastics used as an ingredient (i.e., in spray paint).

Potential options for standards to deliver packaging reductions include:

- Eliminating packaging items that are not necessary, via standard tests to be applied by producers on whether the packaging item is serving a necessary function in each specific application and context;
- Reducing material used in packaging by:
  - Applying standard tests (similar to above) on packaging weight or quantity to ensure material use is optimized;
  - Regulating the use of 'void space' (unnecessary empty space within packaging).

Reuse can deliver further reductions in overall material use for packaging (and other single-use applications), as described in **Section 4.3.2**.

Characteristic-specific products may benefit from some of the same standards as packaging. Standards around durability and repairability may also be particularly salient, which should extend the lifespan of items and reduce plastic use, and waste arising, over the medium term.

Microplastic controls to deliver elimination or reduction, can also be delivered via product standards.

- This can involve regulation of products containing microplastics, rather than the microplastics themselves. For example, the U.S. Microbead-Free Waters Act of 2015 prohibits the manufacturing, packaging and distribution of rinse-off cosmetics containing plastic microbeads.
- Minimum requirements for the design of products to limit the amount of secondary microplastic release during use are also in development (e.g., the proposed EU Euro 7 standard for vehicles includes requirements around tyre and brake wear to reduce microplastic and particulate emissions).

Microplastic controls are also discussed in relation to Class II measures in **Section 4.3.7.**

3.4. ECONOMIC INSTRUMENTS

Economic instruments are fiscal incentives and disincentives targeting organisations or individuals, with the aim of influencing their behaviour. A key feature of these instruments is that they aim to incorporate consideration of environmental costs into decision-making. This can either avoid the need to directly legislate for those outcomes or provide a significant complementary measure to drive changes. In the context of Class I, the focus is on reducing use of specific product groups by changing the economic incentives for use. Economic instruments are also discussed in Class II control measures, in relation to incentivizing changed practices when products are being used.

KEY CONSIDERATIONS FOR THE TREATY

Economic instruments include fiscal incentives, such as subsidies, and disincentives, such as taxes, levies and charges. The latter approach is of most relevance to elimination and significant reduction. Economic instruments can be incorporated at national level to deliver reductions required by the treaty. Treaty negotiators could require economic instruments to be applied at national level as part of the package of control measures needed to deliver treaty outcomes.

Examples might include consumer charges on single-use packaging, or taxes on overall tonnage of plastic packaging used by retailers. Class I economic instruments will encourage actors in the supply chain to use the products in ways that reduce demand. As such, economic instruments will seldom achieve a 100% reduction, but can generate significant change, and might be a useful instrument to deploy in the early stages of a total product phase out, or as a way to spur innovation and the identification of alternative solutions enabling a full phase out at a later date.

Where economic instruments are targeted at producers, the environmental costs associated with the production and/or consumption of a product (e.g., the harms caused by plastic pollution) should be borne by those responsible for producing the product. Economic instruments thus provide a way of 'internalizing negative externalities.[16] There are therefore some similarities with the principles used for EPR schemes (discussed in **Section 4.4**).

Where they are targeted at consumers, the same principle generally applies. However, the cost of alternatives is likely to be a key consideration that helps drive behavioural shifts.[17] In such cases, costs only need to increase enough to make an alternative cheaper to generate change, and there is no need to calculate and attribute the level of externality to be incorporated in the price.

In the context of the treaty, states may agree to general obligations on the introduction of economic instruments at the global level, while operationalization (e.g., rate and modalities) could be determined at the national level in the implementation of the general obligation. In applying economic instruments nationally, states will need to calculate the level at which per-item charges need to be set to change consumption preferences and deliver desired behaviour changes — i.e., reductions in use for targeted product groups or products. States also need to consider an administratively proportionate way for such charges to be levied. This is one reason levies retained by vendors or donated to charity are sometimes preferred to taxes.

Economic instruments can also target wider practices across the plastics value chain, rather than simply product group reductions in demand, and these features are highlighted under Class II controls. Economic instruments across both Class I and Class II could also apply independently of product-specific controls, for example per tonne of plastic, or to specific polymers or additives.

4. CONTROL MEASURES FOR SAFE CIRCULATION AND MANAGEMENT

This section describes potential control measures to safely circulate and manage Class II product groups. Safe circulation of material can relate to all stages of the plastics value chain, by ensuring that the plastic products remain in use for as long as possible, ideally across multiple lifecycles. Measures needed for safe management ensures that those products are collected, recycled where possible, and responsibly disposed of where not. Some measures should be used to further reduce plastic use within product groups either directly (e.g., reuse) or indirectly (e.g., economic instruments, EPR).

The measures with widest applicability are standards and minimum requirements for design, reuse, recycling, collection and disposal, which apply to all Class II product groups. A definite benefit of agreeing to these standards and requirements internationally is that it ensures consistency of actions, reduces operation and compliance costs for companies, and minimizes potential value chain frictions in a global circular economy (e.g., products imported from elsewhere meet a country's standards for reusability and/or recyclability).

The product groups for which the greatest number of measures apply are packaging products, where most measures are assessed as necessary. In part, this reflects the complexity of these product groups, and the likelihood the treaty may need to apply some control measures to all packaging, some to specific packaging subgroups, and some to specific packaging products.

SAFE CIRCULATION AND SAFE MANAGEMENT

The focus of control measures for Class II plastic product groups is that the plastic products within these groups should be safely circulated for as long as possible, and when this is no longer possible they should be safely managed at end-of-life. Safe circulation and management in this case is defined together as all the steps from design onwards that results in the capture and treatment of plastic products, or plastic contained within products, in a way that preserves them within the economy such that they are reused or recycled into new products, and that potential negative effects resulting from their management are avoided. These overlapping areas of safe circulation and management are not completely covered under the Basel Convention's draft technical guidelines for plastic[18] and the definition of 'environmentally sound waste management' and are thus defined specifically for the purpose of this research.

Table 4-1 summarizes the results of the assessment of identified measures against Class II product groups. Where measures are deemed suitable for product groups based on current evidence, these have been marked with a tick. Measures that are currently less proven, but nonetheless likely to be effective in reducing plastic pollution, are marked as 'possible', which indicates that while the measure has potential, establishing best practice in relation to a particular product group or specific product may be challenging at present.

Table 4-1: Class II product groups and corresponding control measures

CLASS II PRODUCT GROUP	TARGETS	ECONOMIC INSTRUMENTS	CIRCULARITY STANDARDS/MINIMUM REQUIREMENTS						STANDARDS TO REDUCE HARM IN ENVIRONMENT	EPR	DRS	RATIONALE
			REUSE	RECYCLING	RECYCLED CONTENT	COLLECTION	DISPOSAL	MICROPLASTIC CONTROLS				
1a. Packaging: contact sensitive – single-use food and beverage (necessary/other)	☑	☑	☑	☑	☑	☑	☑	☑	Possible	☑	☑	All identified measures can be applicable to single-use food and beverage packaging. They are all relevant to this group and have been used successfully for products in this category.
1c. Packaging: contact sensitive – cosmetics and personal care (necessary/other)	☑	☑	☑	☑	☑	☑	☑	☑		☑	Possible	Almost all the identified measures can be applicable to these groups of packaging. These product groups are less likely to enter the environment than single-use food and beverage packaging.
1d. Packaging: contact sensitive – pharmaceutical	☑	☑	☑	☑	☑	☑	☑	☑		☑	Possible	
1e. Packaging: contact sensitive – other	☑	☑	☑	☑	☑	☑	☑	☑		☑	Possible	
1f. Packaging: non contact sensitive	☑	☑	☑	☑	☑	☑	☑	☑		☑	Possible	
2a. Characteristics-specific plastic products: single-use short lived – fibres/non-woven - necessary	Possible	Possible	☑	☑		☑	☑	Possible	Possible	Possible		Some items may be suitable for measures indicated, though approaches such as DRS are less tested for products within this category. Economic instruments risk incentivizing illegal disposal behaviours.
2c. Characteristics-specific plastic products: single-use short lived – other non-packaging – necessary			☑	☑		☑	☑		Possible			Not all measures will apply to this category and economic instruments may be redundant. Measures like EPR and DRS are not well tested.
2e. Characteristics-specific plastic products: longer-life items of concern – causing significant secondary microplastic release						☑	☑	☑		☑		Products in this group are not suitable and well-tested for DRS measures. High-risk stage is the use stage of the life cycle.
3a. Sector-specific plastic products: marine, aquatic and terrestrial – marine/ aquatic	☑	Possible	Possible	☑	Possible	☑	☑	Possible	Possible	☑	☑	Products suitable for collection and recycling targets, but not possible for all. DRS would be relevant for return of potentially lost fishing gear and/or terrestrial plastic applications.
3b. Sector-specific plastic products: marine, aquatic and terrestrial – terrestrial	☑	Possible	Possible	☑	Possible	☑	☑	Possible	Possible	☑	☑	
4b. Primary microplastics: pre-production		Possible				☑	☑	☑				Standards for management of pre-production pellets in existence throughout the supply chain in some countries. Easily incorporated into health and safety requirements in production.

4.1. TARGETS

Targets, when coupled with other needed control measures, provide a simple way to drive improved national performance and create shared expectations on outcomes internationally. Targets for safe circulation and management specify the levels of performance on circular economy and management systems, that must be achieved within a given timeframe. They can cover collection, recycling, recycled content and reuse, focusing on specific intermediate stages of the plastic value chain.

KEY CONSIDERATIONS FOR THE TREATY

The design of targets needs to ensure that they are feasible, both to implement and to achieve, and that they are effective, time-bound and measurable. For example, requiring a reduction in 'plastic pollution' from particular product groups is not likely to be a good control measure, since data on the current levels is not accurate and the monitoring of all the possible pathways and sources of pollution could be unfeasibly burdensome.

Instead, targets should focus on the safe circulation and management of plastic products — or the plastic materials in the products — in specific intermediate stages of the value chain. Such targets, instead of simply stating the expected end goal (reduced pollution), specifically inform states of the key expected changes in the value chain that must be achieved, in order to fix systemic failures that lead to pollution. These targets can apply to every product group (or particular products within the groups), or to plastic more generally, or even to the entire waste stream (with many countries setting overall recycling rates across materials).

To stop plastic products from escaping into the environment at end-of-life, targets for collection are perhaps the most relevant to Class II product groups: by driving the responsible capture of a greater amount of material, they will reduce the amount entering the environment and causing harm. Collection is also a necessary step in enabling material to be recovered for recycling. However, collection targets alone do not guarantee that collected material is subsequently recycled. Therefore, for all plastic products that can be reused and recycled, targets for reuse, recycling, and the use of recycled content are crucial to drive more beneficial environmental outcomes, and facilitate circulation of products, or the plastic that they contain.

For example, the EU has set targets specifically addressing plastic beverage bottles composed of PET, requiring that 77% be collected by 2025, increasing to 90% by 2029, and that they should contain 25% recycled content by 2025. The EU's proposal for a revised Packaging and Packaging Waste Regulation (PPWR)[19] includes additional recycled content targets for plastic packaging, differentiating between contact-sensitive and non-contact-sensitive packaging, and using only recycled content recovered from post-consumer plastic waste.[20]

Formal packaging reuse policies are also beginning to appear, and national legislation has been adopted in Europe,[21] Chile,[22] and Australia.[23] Some of these regulations contain explicit targets. For example, France has reuse targets of 5% by 2023 and 10% by 2027.[24] On a European level, concrete and ambitious reuse and refill targets have been put forward in the new PPWR proposal.[25] For example, from 1 January 2030 onwards, 20% of beverages are supposed to be made available in reusable/refillable packaging.

Four key areas the treaty could set Class II targets for are outlined below.

- **Reuse targets** can both reduce material used (where reuse models are more material efficient over time) and reduce the risks of plastic pollution occurring on a per item basis (by displacing high numbers of single-use items). Reuse targets could support the shift away from single-use consumption models, especially suitable for high-volume low-value products like packaging. Incentives should be in place to ensure high return rates and circulation, and reuse models need to be implemented at scale to ensure ease of use.
- **Recycling targets** can help optimize recycling systems after the point of collection: they should only measure material that is both collected *and* subsequently recycled; i.e., collection rates alone should not be presented synonymously with recycling rates. This will lead to lower but more accurate reported levels of recycling, by excluding contamination and process losses which previously may have inflated totals. Targets could also encourage recycling practices that maintain a certain material yield and quality (best-case closed-loop), and enables material to be recycled multiple times, to prevent downcycling and the use of recycled materials in applications that cannot themselves be subsequently recycled. Additionally, recycling targets can be defined to encourage the use of recycling processes that have minimal impact on the environment in terms of energy consumption and emissions.
- **Recycled content targets** are designed to drive demand for recycled material, incentivizing collection and provision of higher-quality recycled material suitable for more closed-loop applications. The targets should also focus on recycled material that originates from post-consumer sources, to maximize the circularity of plastics, since the post-consumer plastic waste stream is currently much less circular than the post-industrial or pre-consumer plastic waste stream.
- **Collection targets** can help eliminate plastic pollution for any product group by diverting waste from mismanagement. However, they are most often applied to products or product groups that can also be recycled in an effort to aid circulation, and to incentivize for not just collecting but subsequently managing the collected material responsibly. Generally, collection targets are set as a percentage of either items or material thrown away.

There are strong synergies between targets for the circulation and management of material, and minimum standards for doing so. Simply setting a target at global or national level will not ensure that the target is met without additional implementation and monitoring.

4.2. ECONOMIC INSTRUMENTS

Economic instruments can drive more sustainable practices throughout the plastics value chain, incentivizing better choices for safe circulation and management. As with economic instruments for elimination and reduction, described in see Section 3.3, economic instruments for safe circulation and management promote or discourage certain behaviours in order to achieve desired environmental outcomes, while avoiding the need to directly legislate for those outcomes.

KEY CONSIDERATIONS FOR THE TREATY

Economic instruments for safer circulation and management could encourage or discourage practices within the plastic value chain. This might inclyde discouraging the use of certain polymers or additives (for example, in the cases where these make recycling harder or lower quality, but a ban is not preferred), or encouraging the use of recycled content (through either tax or subsidy). As such, the instruments may drive better circulation and management, as well as promote reduction as a cost-efficient response.

Economic instruments can be targeted towards a product group or individual products, or directed at plastic materials in general. Currently, economic instruments to deliver better circulation and management have most frequently been applied to packaging, given its high volume, rapid circulation, and relative ease of more responsible practices around recycling and collection.

The following give some specific examples of how economic instruments can be applied to aid safe circulation and management. General principles relating to economic instruments remain the same as for Class I.

- At the highly targeted level, taxes per item can be used to encourage a shift to better practices for circulation and management. For example, Norway applies a container tax to drinks containers that do not achieve a collection rate of 95% – this directly incentivizes producers to participate in the country's deposit return system (DRS). These two measures are therefore highly complementary.[26]
- The UK has introduced a much broader measure in the shape of a plastics tax – a charge designed to deliver higher levels of recycled content. The Plastic Packaging Tax imposes a £200 charge per tonne on certain plastic packaging which does not contain 30% or more recycled plastic content, effectively introducing a target and a penalty for non-achievement within the same measure. The tax is also set to increase over time (current increase planned for April 2023 in line with inflation).[27]
- Economic instruments are also seen in the shape of waste taxes. These may target plastics specifically (as with the EU levy on non-recycled plastic packaging waste introduced in 2021) or take the form of more generalized landfill or incineration taxes (common in a number of countries). In both cases the aim is to discourage material from these treatment routes and towards recycling instead.[28]

Increasing tax rates over time can be an effective way to incentivize change, as seen with landfill taxes in many jurisdictions. The cost is low at first, and thus not too punitive while economic operators adapt, and knowledge increases over time and encourages innovation. However, there is a risk that overly high taxation levels may incentivize illegal disposal behaviours without adequate enforcement, and they may be hard to levy. These

policies will work best, and best avoid unintended consequences, when waste and recycling systems have channels set up to deal with diverted material.

4.3. STANDARDS AND MINIMUM REQUIREMENTS

Standards and minimum requirements are essential components for increasing safe circularity and ensuring safe management. Standards can be applied at the point of production or at various points along the supply chain, including at the point of import/export. Products that do not meet standards are effectively prohibited from a market.

These measures will be critical to ensuring that plastic products that cannot be eliminated are designed to be circular (reusable or recyclable) and that systems exist to enable them to be circulated responsibly in practice. Where products cannot be effectively recycled and/or reused, minimum standards and requirements also need to be put in place to ensure they are being managed in an environmentally sound manner, such that the risk of plastic pollution associated with these items is minimized. The options for Class II standards are wide ranging and complex. They should interact positively with a range of Class II control measures, as well as their combined effect with Class I controls.

Minimum standards or requirements set a legally binding expectation on performance and can apply to products or systems. Standards driving reduced plastic use directly were identified and discussed under Class I. This section focuses on those that primarily drive safe circulation or management, though several have dual benefits and may also contribute to reduction.

Key areas where standards could be set are as follows, with subsequent sections of the report looking at each in turn.

- Reuse and refill;
- Recycling;
- Recycled content;
- Collection;
- Disposal;
- Microplastics controls; and
- Reduce harm in the environment when plastic pollution does occur.

There is a positive relationship between product standards and performance requirements on systems and infrastructure, as the extent to which products can be circulated depends on both elements.

Standards can and should be raised over time. Such rolling improvements in minimum requirements can be aligned with other control measures, such as economic instruments or EPR (see **Section 4.4**). For example, modulated fees under EPR, or other economic instruments, could encourage further changes in product design. Class II control measures are often complementary in this way: targets and economic instruments will be integral to making standards and minimum requirements work in a national context, and vice versa.

AN EXAMPLE OF CLASS II CONTROLS WORKING TOGETHER

To encourage the recycling of a particular plastic product, a recycling target may initially be set. This is likely to be supported by harmonized standards for the definition, calculation and reporting of recycling. In addition, to support the attainment of the target, design for recyclability standards may be developed to ensure that manufacturers of plastic products bear in mind the technologies available to collect, sort and recycle them at the end-of-life. As an incentive to meet these standards, EPR fees may be modulated based on the recyclability of products in accordance with the aforementioned standard. Waste disposal taxes could further penalize products that are not recycled. Finally, minimum standards may also be introduced for the recycling system in question to increase the quantity and quality of recycled outputs.

4.3.1. REUSE AND REFILL

Reuse and refill systems are widely recognized as a critical part of reducing our material consumption footprint, extending the life cycle of products in use, and ensuring that they are managed safely at end-of-life.[29]

- **Reuse** includes any operation by which products, or product components, are used again for their original intended purpose – this can apply to packaging, but also other products that are typically made of single-use plastics, like nappies, menstrual products, cutlery, straws, etc.
- **Refill** usually only refers to plastic packaging and is a system wherein a consumer can fill their own container with a product as part of a commercial transaction, repeating this multiple times.

KEY CONSIDERATIONS FOR THE TREATY

In the context of the treaty, reuse and refill deliver two beneficial outcomes. They are more material efficient than single-use alternatives, reducing plastic use, but can also displace large amounts of single-use items. Because ensuring the product is returned is integral to effective reuse systems, the per-item probability of plastic pollution occurring is also lower.

Some reusable or refillable items are retained by an individual citizen or business and simply used directly multiple times. Large-scale reuse systems will frequently involve a return system (such as DRS – discussed also for single-use containers in **Section 4.5**), which includes commercial scale collection, cleaning, and redistribution of products. A wide range of examples of such models already exist, though 'at scale' versions are usually limited to specific beverage products in specific countries. Clear standards can both provide the push needed for significant increases in the extent of reuse and ensure that reuse systems generally result in better environmental outcomes.[30] When done well, reusable items (and the systems in which they circulate) are environmentally superior to single-use plastic alternatives – but this depend on certain performance parameters, such as a minimum number of reuse cycles per container, efficient cleaning and transport logistics, and design for recycling at end-of- life.[31,32]

Reuse standards also deliver a compliance benefit for the treaty, as they help avoid scenarios where economic operators simply rename single-use items as 'reusable' to avoid regulation, with no actual change in design or use.

When designing standards for reusable products and systems, consideration must be given to the following components:

- **Number of trips** – Life-cycle assessments[33] should determine the number of times a product needs to be reused to result in environmental benefits. This in turn informs the requirements for the design of the reusable product (in terms of durability, repairability, etc.) as well as the reuse system in which it can function.
- **Minimum requirements for products** – Minimum standards should include a requirement for the composition of the product, including its polymer, additives, chemicals, to ensure safe reuse. Harmful chemicals that make reuse unsafe must be, by effect, prohibited. They should also include requirements recyclability at end-of-life, so that the materials within them can be reclaimed in a circular economy.
- **Minimum requirements for systems** – Refill and reuse systems must be accessible and convenient for consumers. They should also be designed with the value chain in mind – smaller players might be at a competitive disadvantage to set up systems for takeback and reuse of their own products, so systems should be harmonised and interoperable. As a minimum, systems should be designed to facilitate returns (e.g., through the use of deposits) to ensure that reusable products don't end up being dumped or discarded as litter.
- **Minimum requirements for labelling** – Reusable products and systems should be easily identifiable, so that consumers can make the most use of them. To maximize the traceability and track the number of circulations , the use of digital marking systems (like QR codes) could also be considered.

Objective standards of reuse have already been developed to prevent packaging products being presented as multi-use when they are not (see an example in the box below). These are likely to become more central to regulation as this packaging type becomes more prevalent. Standards to harmonize definitions of reuse, methods for calculating the effects of reuse on overall plastics consumption, and the labelling of reusable products to ensure their impacts are maximized should also be considered as part of any minimum requirements to be specified at international level. This will both ease the burden on national governments seeking to implement international commitments and provide certainty for industry seeking to develop reuse systems at scale.[34]

AN EXAMPLE OF STANDARDS ON REUSE

California Plastic Pollution Prevention and Packaging Producer Responsibility Act includes the following requirements for reuse and refill:[35]

"Reusable" or "refillable" or "reuse" or "refill," in regard to packaging or food service ware, means either of the following:

(1) For packaging or food service ware that is reused or refilled by a producer, it satisfies all of the following:

(A) Explicitly designed and marketed to be utilised multiple times for the same product, or for another purposeful packaging use in a supply chain.

(B) Designed for durability to function properly in its original condition for multiple uses.

(C) Supported by adequate infrastructure to ensure the packaging or food service ware can be conveniently and safely reused or refilled for multiple cycles.

(D) Repeatedly recovered, inspected, and repaired, if necessary, and reissued into the supply chain for reuse or refill for multiple cycles.

(2) For packaging or food service ware that is reused or refilled by a consumer, it satisfies all of the following:

(A) Explicitly designed and marketed to be utilised multiple times for the same product.

(B) Designed for durability to function properly in its original condition for multiple uses.

(C) Supported by adequate and convenient availability of and retail infrastructure for bulk or large format packaging that may be refilled to ensure the packaging or food service ware can be conveniently and safely reused or refilled by the consumer multiple times.


© Shutterstock

4.3.2. RECYCLING

Recycling[36] is the industrial reprocessing of waste materials so that they can be used again in new products. Standards can relate to the processes of sorting and reprocessing collected materials into new products, as well as the design of products to facilitate high-value end-of-life sorting and recycling. Standards and minimum requirements for recycling can be applied at various points along the value chain, from requirements around designing products to be safe and recyclable at end-of-life, to requirements around acceptable levels of contamination at the point of reprocessing, minimum efficiencies for sorting/ recycling systems, or harmonized methodologies for the calculation, verification and reporting of recycling. Collection standards are also an integral part of this chain.

KEY CONSIDERATIONS FOR THE TREATY

The treaty will need to define both 'recycling' and 'recyclability' as a precursor to setting out standards, and how various plastic product characteristics and recycling technologies relate to this.

Recycling often consists of two stages after the collection of waste – sorting, and reprocessing. While some sorting may have been carried out by households prior to collection, especially in the presence of collection standards, further sorting of plastics will be necessary given the varied polymers and applications currently in use. Some of these are not suitable for recycling, or require separate recycling processes. The effectiveness of sorting and reprocessing is thus highly impacted by the design of the products collected for inclusion in the process.

The first area the treaty can address is product group standards relating to design. These may include standards related to:

- The material composition and properties of the product group;
- The use of harmful or toxic substances and additives in a plastic product group

The treaty must ensure products and product groups contain plastics that can be easily sorted and recycled, and avoid disruptive design features, i.e., polymer-mix, size and colour. Another key feature of product design, that fundamentally determines the possibility for safe circulation of plastic products, is the use of toxic substances and additives that harm humans and the environment. Setting clear requirements on this issue will in practice mean a prohibition of these. Standards to restrict the use of certain groups and categories of substances that are known to have severe impacts on the environment and biodiversity in the terrestrial and marine environment (e.g., PoPs, PCBs)[37] should be a core part of the product standards.

These design standards are a key part of improving the safe and responsible circulation of plastic products. Some elements of design for recyclability can be specified internationally, such as restrictions on specific polymers or additives. These can be either placed on certain product groups, or for plastic as a whole. Requirements for product design might also facilitate the needed development of collection and reprocessing infrastructure at both international and national level.

The second area the treaty can address relates to recycling systems and processes. Minimum standards for the sorting collected plastic waste prior to recycling will have an important bearing on the effectiveness of any recycling system. This is because the efficiency of sorting systems and their ability to correctly identify and decontaminate targeted materials is crucial to ensuring that materials sent to recycling are of a high enough standard for recycling. The efficiency of recycling systems, in turn, has a bearing on the quantities and qualities of resulting recycled materials and the economic value that these materials can command on the market.

An additional consideration in defining minimum requirements for recycling systems is the relative environmental outcomes of different recycling processes. Minimum requirements could encourage recycling practices that maintains a certain material yield and quality (best-case closed-loop), and enables material to be recycled multiple times, to prevent downcycling and the use of recycled materials in applications that cannot themselves be subsequently recycled. This maximizes the environmental benefit of recycling by avoiding as much virgin material extraction and production as possible. Additionally, standards should encourage processes that have minimal impact on the environment in terms of energy consumption and emissions.

4.3.3. RECYCLED CONTENT

Standards and minimum requirements on recycled content specify the proportion

of products that should be composed of recycled material. To maximize environmental benefit, they should focus on the incorporation of recycled content from post-consumer plastic waste sources into new plastic products. Increased use of recycled materials drives market demand (supporting collection and recycling infrastructure as described above) as well as displacing virgin plastic that might otherwise have been used. Recycled content requirements will typically be most beneficial for product groups that support closed-loop recycling processes, meaning that material can make multiple trips round the loop.

KEY CONSIDERATIONS FOR THE TREATY

Minimum requirements for recycled content set the standard for the use of recycled materials in plastic products. They must include consistent definitions and harmonized methodologies for calculating and reporting of recycled content in products (to ensure that any targets are being met consistently and can be monitored accurately). Negotiators should also consider standards for the verification (and potentially certification) of recycled content, as well as the labelling of any products incorporating recycled content (to ensure consumers are not misled).

Plastic packaging has typically been the focus of regulations to date. An example is the EU Single-use Plastics Directive (SUPD) which requires that PET beverage bottles incorporate a minimum of 25% recycled plastic by 2025. To support this target, harmonized standards around the definition of recycled plastic, how to calculate, report and verify the content of recycled plastic, and standards for the quality of recycled plastics have all been necessary. By helping to create an end market for recycled material, these types of requirements provide a strong incentive for circularity.

Standards for recycled content must consider the various ways in which such recycled materials can be produced and the sources of waste that are used to produce these materials. Careful consideration must also be given to approaches to verify the reported levels of recycled content in plastic products, otherwise there is a risk of fraud and misleading claims regarding the environmental benefits of products to consumers. Finally, the risk of legacy additives and chemicals, and of any hazards posed to human health due to the incorporation of recycled plastics into products must be properly assessed and managed.

Targets for recycled content and standards on recycled plastics must go hand in hand. For example, a target for incorporating recycled content into plastic beverage bottles will not be feasible if national legislation prevents the use of recycled plastics in all food-contact applications. Similarly, if targets are set in the absence of clear definitions and methodologies for calculation and verification, different actors will likely interpret the requirements in different ways, and compliance will not be possible to enforce.

4.3.4. COLLECTION

Effective waste collection both reduces the prospects of plastic pollution arising from mismanaged waste and is a critical stage in high-quality recycling system to circulate plastic products and the plastic they contain. Separating waste correctly at the point of collection makes the recycling process more efficient and will increase the quality and quantities of recycled products. Collection improvements will often be most effective, and most efficient, when applied across multiple product groups simultaneously.

KEY CONSIDERATIONS FOR THE TREATY

Collection is important in two ways. Firstly, the more plastic material that is collected responsibly, the lower the volume of plastic waste at risk of escaping to the environment. Secondly, how products are collected at end-of-life affects how they can subsequently be treated within the waste and resource management system and the degree of circularity that can be achieved. For example, collecting different materials separately reduces material contamination, allowing for improved efficiencies in sorting and recycling and the production of higher quality recycled material that can be used in circular applications. Standards and minimum requirements on collection are therefore essential to a well-functioning waste and resource management system.

Collection requirements typically specify the range of materials that should be collected and the degree to which they should be collected separately from one another, and work in tandem with collection or recycling targets to ensure a minimum level so that these targets can be met. Minimum requirements and standards for collection should be an important component of the control measures set out by the treaty:

- Standards for collection should, as a minimum, include requirements to ensure the availability of and access to waste collections for all households. This may take the form of requirements for specific collection points and associated capacities for these (door-to-door systems, community collection points, availability of public litter bins, etc.). Standards should also consider the minimum level of infrastructure necessary to ensure that the system works well and that waste is collected regularly (e.g., availability of bins/receptacles, procurement of appropriate vehicles, setting a minimum frequency for collection, etc.).
- Minimum requirements will also need to specify standards for the separate collection of plastics, so that they are segregated from organic materials, and possibly other recyclable materials, to maximize their value for recycling.
- Standards around the labelling of plastic products are important to ensure that consumers are aware of how they are meant to dispose of the products correctly, and the options for waste collection. A common route to labelling may be preferable.

The above requirements can also help address issues associated with the collection of all types of waste, not simply plastic – this is a significant co-benefit of the treaty.

The diversity of operating contexts within and between countries will require varying levels of investment. The mix of public and private actors, and the roles of the formal and informal waste sector, will also vary widely in current practice. Where the informal sector, and informal waste workers, play a key role in the collection, sorting and recycling of plastics, in-depth consultations to ensure their inclusion in the development of standards and plan for new infrastructure should be prioritized when the treaty implementation commences. Inclusive and meaningful consultations with this stakeholder group would be essential to a just transition of waste management practices, as well as to the effectiveness of the measure in local contexts.

Other control measures recommended for Class II product groups here, most notably economic instruments and EPR, may be used as key mechanisms to fund improvements in waste management, including collection. In return, standards on collection also help ensure that EPR follows shared expectations on the level of service that should be funded with national EPR jurisdictions (read more in **Section 4.4**).

4.3.5. DISPOSAL

Where Class II plastic products cannot be reused or recycled, minimum standards for their disposal must be identified. Standards and minimum requirements on disposal typically concern the operation of incinerators and landfill sites, to ensure that they are run safely to minimize the associated negative environmental impacts. In the context of the treaty, preventing the escape of products or plastic material after the end-of-life is central. At this stage, it is a mixed waste stream that must be contained, and differentiated product groups are likely less relevant for regulation.

KEY CONSIDERATIONS FOR THE TREATY

Disposal relates to the collection, processing, and deposition of waste materials that do not get separated into recycling collections. However, even at this late stage in the plastics chain, there are still actions that can be taken to reduce the risks of plastic pollution occurring.

One source of plastic pollution is leakage from the waste management system, with both legal and illegal dumpsites being a potentially significant source of leakage. This can occur either where plastic escapes during normal disposal activities, or where previously disposed of rubbish is subsequently released to processes like coastal erosion or flooding (meaning that legacy waste disposal is a challenge, as well as current practice).

An aim for the treaty will be to ensure the provision of adequate disposal infrastructure in countries where this is currently lacking. Standards and requirements on disposal will be important in establishing safe and properly functioning infrastructure. The different national starting positions in terms of waste infrastructure may mean differentiated timelines for achievement.

Location of waste management facilities can matter in this context, with those near to coastlines or rivers potentially of more urgent concern. In these cases, minimum standards would revolve around design and management of existing sites, potentially prioritized by size and proximity to potential plastic pollution pathways such as watercourses and coasts. Location considerations could be required for new waste management facilities.

In terms of landfill disposal, key areas for the treaty could include:

- Landfills and illegal waste dumps that are located near rivers or coastlines, as these are associated with the highest risk of plastic pollution. Remote sensing technology (satellite data) can help to identify illegal dumpsites from space.
- Conversion of open dumps to sanitary landfills, and the remediation of landfills
- Minimum standards for new facilities
- Health and safety standards for waste pickers/staff working in landfills[38]
- Standards around the gathering of waste data to support the implementation of measures like landfill taxes (e.g., requirement for weighing/sampling of wastes entering landfills), as well as compliance monitoring for the treaty.

With regards to standards for the operation of landfills, there is significant scope for wider improvements in practice and reduction in environmental harms, not solely limited to plastic pollution. For example, the reduction of carbon emissions from landfills is related to the stabilization of biowaste rather than emissions from plastics.

Incineration is another treatment route that could be regulated, but caution is needed. While incineration could be presented as an easy way to reduce plastic pollution, it poses significant other environmental problems. There is a serious risk of adverse consequences in terms of air pollution and carbon emissions if the treaty directly or indirectly encourages incineration. Negotiators should make every effort not to transfer one form of pollution into another, which could, directly or indirectly, result in a net increase in potential harm to human health and the environment. The treaty could set minimum standards for incineration where it is applied, to ensure harms are minimized through processes like energy or heat recovery. It is critical, however, to ensure this is not seen as an endorsement for a treatment technology near the bottom of the waste hierarchy, with extreme negative carbon impacts.

4.3.6. MICROPLASTICS CONTROLS

Given serious concerns about the growing volume of microplastics present in the environment (including in food and drinking water) and the associated risks to human and animal health, standards and minimum requirements have been introduced to limit microplastic pollution. They have primarily focused on prohibiting the intentional addition of microplastics to products, alongside proposals for product standards to reduce microplastic shedding during use.

KEY CONSIDERATIONS FOR THE TREATY

Standards around microplastics must consider the source and applications of such microplastics to be effective. Often, the standard will relate to the use of a particular product, or material, which must be regulated in such a way that minimizes microplastic release, rather than being a standard for the microplastic itself. For pre-production pellets, the standard does not relate to the reduction or circulation of these pellets, but aims to prevent leakage into the environment best practices and certification (akin to collection standards for larger-size plastic products).

- Standards for the management of pre-production pellets throughout the supply chain already exist (although voluntary at present, such as Operation Clean Sweep, and PAS 510 in the UK). These are intended to be incorporated into industry health and safety requirements so that pellet spills in production sites, or during transport/warehousing are minimized and cleaned up before they enter drains or are washed or blown away into the environment.
- Microplastic standards can also take the form of product- or material-related requirements, such as the ban on the use of 'oxo-degradable' plastics as part of the EU's Directive on single-use plastics. These are conventional plastics that contain additives which promote oxidation so that they break down into smaller particles, and finally microplastics, but do not actually biodegrade in the environment.

4.3.7. REDUCING HARM IN THE ENVIRONMENT

Negotiators should also consider the need for standards that can help to reduce harms should plastic pollution occur. Such steps are a last resort and should not be prioritized over those that eliminate or reduce plastic pollution in the first place. Nonetheless, mitigation of harms after release may be a valid short-term solution while phase outs are planned, or infrastructure improvements are made.

KEY CONSIDERATIONS FOR THE TREATY

It will take time for control measures to take effect for some product groups, especially those where phase out is not imminent, and current disposal routes (such as disposal to sewer or watercourses) frequently result in plastic pollution occurring. As such, standards and requirements to reduce their harm are needed. At the same time, there is a risk that standards meant to reduce harms can be used to endorse misleading environmental claims around plastic and plastic products or suggest plastic pollution is harmless. The treaty should emphasize that this is not the case and that measures to reduce harm should be seen as transitional.

These measures may include standards related to:

- The material composition and properties of the product group;
- Misleading claims on products.

For example, requiring the use of 'compostable' or 'biodegradable' plastic alternatives – depending how these are defined, which is discussed in greater detail below – may be considered as an option to ensure that items that do end up in the environment break down within a reasonable time frame and without microplastic emissions.

The product standards already discussed to restrict the use - and thus the release to the environment - of certain substances that are known to have severe impacts on the environment and biodiversity in the terrestrial and marine environment (e.g., PoPs, PCBs)[39] is also a crucial part of reducing harm.

For 'compostable' alternatives to plastics, standards need to be established to ensure a clear pathway to composting infrastructure. When applied to plastics, the terms 'biodegradable' and 'compostable' only have meaning if used with additional reference to specific conditions under which they are designed to biodegrade, based on the collection, sorting and treatment infrastructure that is actually available for composting. Without such standards, simply requiring the use of 'biodegradable' or 'compostable' plastics will not be sufficient to achieve the aims of the treaty, which would also need to ensure that the residue of this process was environmentally safe, and not adding to microplastic pollution. For example, the use of oxo-degradable plastics should not be allowed within the scope of biodegradability, as seen in the Article 5 of the EU Directive on single-use plastics.

As defined by UNEP, 'biodegradation' is a biological process in which organic matter is completely or partially converted to water, CO_2/methane, energy and new biomass by microorganisms (bacteria and fungi), while 'compostable' means capable of being biodegraded at high temperatures reached under specific conditions and timescales, which are usually only achieved in industrial composting. [40] Because any given 'biodegradable' plastic is designed to biodegrade under specific conditions, determined by its chemical composition, there is no such thing as a generally 'biodegradable' or 'compostable' plastic product that will biodegrade under all conditions. There are no global standards on biodegradability and compostability, although various standards and labels (such as, in Europe, standard EN 13432 for compostable packaging and TÜV AUSTRIA certification), certify that plastic products biodegrade under a defined set of conditions.

Finally, the use of misleading labels that claim plastic products are 'flushable', 'biodegradable", 'water soluble', 'plastic free' etc. should be subject to standards and restrictions since these often lead to the misconception that products are environmentally benign when incorrectly disposed and potentially even encourage littering behaviour.

If the treaty includes requirements for 'biodegradable' and 'compostable' plastic products, it must carefully define exactly what is meant by these terms, specifically the conditions under which products were considered to be 'biodegradable' and 'compostable'. These terms should not be allowed to be coupled with labels that have the potential to encourage littering.

4.4. EXTENDED PRODUCER RESPONSIBILITY

Extended Producer Responsibility (EPR) is a policy approach where producers are held responsible for the costs of end-of-life collection, sorting and recycling or disposal of their products.[41] While it is usually a national level policy, a treaty could require that EPR is introduced for specific products and set standards EPR schemes must meet, helping to ensure high-quality implementation and compliance by both states and businesses.

KEY CONSIDERATIONS FOR THE TREATY

EPR may align well with standards for collection, recycling, and disposal, as clear expectations on provision of these services would also provide clarity on what producers might be expected to pay for. Setting certain standards for EPR under the treaty will guide national policymakers and create clear expectations for foreign firms operating in national markets, and helps international businesses navigate different regulatory regimes, optimizing their products to aid in-country responsibility.

The treaty should do the following:

- Require states parties to the treaty to set up EPR regulations that are mandatory for certain product groups (or even specific products within those groups)
- Set out minimum requirements for EPR schemes.

Both these approaches have already been pursued in the EU[42], and both should be pursued in the treaty to maximize effectiveness. Minimum requirements are standards negotiators agree should apply to all EPR schemes. These are likely to include general principles that apply across all product groups, and potentially some requirements specific to particular product groups.

Negotiators should pursue ambitious principles, in particular related to both the scope of products and scope of costs that an EPR system should cover. For example, EPR will offer an excellent opportunity to fund infrastructure and service improvements for the global standards set out for collection and recycling. More nuanced use of EPR may only become possible once these basic requirements are in place. Similarly, while EPR as defined in EU legislation is tightly restricted to end-of-life costs only, broader product stewardship approaches might see the inclusion of other environmental costs associated with production or use stages of a product.

Minimum standards for EPR in the treaty should consider the following features, applicable to any product group:

- **Full net cost recovery:** producers should be responsible for the full end-of-life costs of the products they place on the market. This should extend by default to the costs of litter and unmanaged waste disposal already seen in some jurisdictions already and is centrally linked to the objective of the treaty. Producers would be entitled to offset income from recycling and associated material value against their cost liabilities. Where infrastructure and services do not yet exist, producers will be expected to contribute to creating them.
- **Performance standards:** There should be a requirement for specified and rising performance standards over time, as a minimum in relation to recycling performance. Without this, systems may simply devolve to the cheapest route. While it may not be appropriate to specify national EPR targets in the treaty, any overall performance targets set in the treaty would ultimately need to be reflected in associated national EPR schemes.
- **'Necessary costs only':** This principle ensures producers are only charged via this mechanism to deliver clearly delineated costs for specific end-of-life management.
- **Fee modulation:** Fees should be modulated to incentivize eco-design. To maximize impact, the basis for such fee modulation should be harmonized (e.g., on the basis of the recyclability, so that producers of less recyclable products pay higher fees than those who produce highly recyclable ones).
- **Transparent reporting requirements:** Producers must report on products placed into a specific national market: in turn, there must be transparent reporting requirements on waste managed, and the calculation of costs associated with this. The EPR scheme can pay for these waste system management costs.
- **Fair and non-discriminatory treatment of producers:** This ensures a level playing field for both national and foreign firms, and large and small businesses. In EPR producers should take responsibility, and best practice usually sees producers own the management organization for the scheme, delivering against targets and requirements set by a national government or regulator. Fair and non-discriminatory treatment must therefore extend not just to regulation, but also governance of individual EPR schemes.
- **Secure the incorporation of existing informal sectors into EPR schemes.** Where the informal sectors, and informal waste workers, play a key role in the collection, sorting and recycling of plastics, in-depth consultations to ensure their inclusion in the schemes should be prioritized.

EPR schemes are also often required to spend a certain amount of income on communications to the public (to ensure collection systems are used properly). To aid this, EPR may also mandate labelling to assist citizen participation in schemes. Discussions around how to avoid free riding or exemptions for smaller operators are also common. These kinds of features would have to be specific to the product group, and the best solutions might vary. Local arrangements for collection, sorting and reprocessing are likely to vary significantly in terms of ownership and responsibility, and EPR does not presuppose any specific approaches. The treaty should clarify that states have the discretion to incorporate existing informal sectors into EPR activities, for example.[43]

4.5. DEPOSIT RETURN SYSTEMS

Deposit return system (DRS), also known as Container Return Schemes in some countries, is a form of EPR where producers ultimately pay for end-of-life collection, sorting and recycling. However, a unique feature of DRS is that the customer pays a deposit when they purchase an item, and the deposit is returned only when the item is returned. DRS might be chosen by producers obligated under EPR if they believe it will be a more effective delivery mechanism. DRS is also associated with very high levels of material capture.

Deep Dive

EXTENDED PRODUCER RESPONSIBILITY SCHEMES (EPR)

EPR, is defined by the OECD as *"An environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle"*. It is often used synonymously with 'product stewardship',[44] which is defined as *"the act of minimizing the health, safety, environmental, and social impacts of a product and its packaging throughout all lifecycle stages, while also maximizing economic benefits".*[45]

The core principle of EPR is that producers must fund end-of-life costs, in line with the 'polluter pays' principle. An EPR system means that the costs associated with these end-of-life activities are shifted, away from citizens or general taxation and towards producers (and, if they pass these costs on, to their direct consumers). This directly incentivizes producers to take steps to minimize those costs.

Producers may take direct responsibility for waste management processes, either individually or collectively, or simply be financially obligated to cover end-of-life costs assigned subject to local or national frameworks. Regulations also often specify performance standards for EPR to prevent producers paying only low costs for low quality outcomes. The costs are usually defined as 'net costs', meaning that any income from, for example, sales of recycled material is offset against producer contributions. In some jurisdictions, this responsibility has been extended to costs of anti-litter measures, whether prevention or clean up, especially in the case of packaging.[46]

EPR can further vary fees to additionally incentivize or penalise particularly good or bad product design or composition[47][48], so that products that are cheaper to manage at end of life equals a lower fee. In some waste systems, and especially when EPR is new, such granular costs may not be available, but provision can still be made to improve cost granularity over time. Specific to the objectives of the treaty, additional fee variation (or modulation) could be a relevant tool to encourage compliance, improvement and innovation.

EPR schemes in Europe typically include mandatory performance targets for recycling – this ensures that producers cannot simply pay the costs for the cheapest route, but must pay the costs for better systems, including, potentially, continual improvements over time. Other performance requirements could be imposed (such as on waste generation). Once they are financially liable, producers will usually want to take collective responsibility for delivering targets and supporting the system, as a way to ensure that this is done as efficiently as possible.

EPR is already well established as an approach for dealing with packaging (including plastic) in many jurisdictions,[49] and EPR is also applied to products containing plastic in European jurisdictions (in particular end-of-life vehicles[50] and waste electricals).[51] Extension to other product classes containing plastic (e.g., textiles[52] [53]) is also established in Europe.

One additional co-benefit is that EPR will have potential to be applied to product groups irrespective of what they are made of, which is currently the most common EPR approach in countries that have regulations. This would help mitigate the risk of unintended consequences from material switching by producers. Making clear that states can and should do this would be important to capture these co-benefits, given that materials beyond plastics are also regularly littered or mismanaged in waste streams.

© Shutterstock

KEY CONSIDERATIONS FOR THE TREATY

As with EPR, an international treaty can both require states to create DRS requirements for certain product groups (or products within those groups) and set out minimum DRS requirements. Both are currently features of draft EU regulations.[54] As with EPR, the intention in setting minimum standards is not to set low standards, and negotiators should pursue ambitious product coverage and performance expectations. States should be able, and encouraged, to exceed these standards where national circumstances allow.

DRS offers interesting possibilities for countries with less developed waste collection infrastructure, as incentivized return through a dedicated system may bypass the limitations in current services.

DRS is often aligned with other policy measures at national level. For example, economic incentives like a container tax, from which producers are exempt if their recycling rate is sufficiently high, provide powerful incentives for producers to create and participate in DRS in Europe.

DRS is an increasingly common model for drinks containers, with some form of legislated system in place in over 40 countries around the world.[55] It is therefore possible to set out minimum standards for a DRS for single-use drink containers, as best practice is well established. Setting of minimum DRS standards for other packaging products or other product groups might face more difficulties at this time. Minimum standards for a DRS for *drinks containers* could include:

- **Similar requirements to those for EPR as a whole** (see **Section 4.4**). These would help ensure a shared set of expectations in a wider international context and are likely to be applicable to both drink containers and wider DRS applications.
- **Specification of products in scope.** A smaller list could be initially agreed and eventually expanded.
- **A requirement to set performance targets for container collection.** High targets are likely to only be achievable via a DRS; in such a case, governments do not necessarily need to legislate so much detail for the system, though they may choose to do so. It is important performance obligations are clear and minimize the risk of unintended consequences. There might also be an advantage to setting requirements for subsequent recycling to ensure that a DRS policy is connected to wider waste management outcomes.
- **A definition of a 'deposit'.** This is as a mechanism, not in terms of its value. Given the huge disparities in global income, specifying a deposit level in an international treaty would not be appropriate.

EU draft legislation additionally sets out obligations on states to set a minimum deposit level, sufficient to meet the performance target; a requirement on the nature and ownership of national DRS operators; requirements around scheme communication; an expectation on which organisations must be willing to charge and return deposits and the grounds for potential exemptions from this; a restriction on states' ability to charge VAT on deposits; and expectations around governance and reporting. As with EPR, reporting and transparency of costs are likely to be critical for both governments and businesses to have trust in the system. EU minimum standards are not dissimilar from those set out by private sector organizations with experience in operating such schemes.[56] The scope should also drive innovation. The EU draft regulation, for example, provides an exemption from the requirement to deliver a DRS aligned with the minimum standards if similar or better collection performance is being achieved by other means.

While drinks containers as a specific product within the single-use food and beverage packaging product group could be a starting point for any international agreement on use of DRS, it is a promising mechanism to address other product groups or specific items. General EPR principles arguably should still apply but best practice for other items is not yet proven.

The DRS principle could be applied more broadly across product groups, although further investigation would be necessary. There is a range of other contexts where a deposit element could be a valuable element of an EPR system, encouraging users to return items. For example, DRS is highly relevant for return of fishing gear and several terrestrial plastic applications, to reduce the risk of these products being lost in the environment. However, no deposit return applications in the marine and aquaculture industry have been identified to date.[57]

5. ADDITIONAL SUPPORTIVE TREATY MEASURES

This section focuses on supportive measures that will enable better product regulations to prevent plastic pollution – a core component of the proposed treaty. The treaty as a whole may also contain wider provisions, not linked to product controls; these are out of scope for the current research.

Additional treaty features that will support effective and efficient global rules and national implementation of product controls to address plastic pollution include:

- Harmonized and reliable approaches to data reporting, monitoring and verification;
- Harmonization of terminology/methods for calculation, minimum standards for waste management systems, etc.,
- Trade requirements,
- Capacity building,
- Financial and technical support; and
- Awareness raising.

To ensure sufficient capacity and resources to implement and enforce treaty provisions in all countries, the treaty should include a strong financial support mechanism. While harmonized and common global rules are likely to ease implementation in developing countries, due to the effect on global production patterns and decreased risk of illegal flow of products across borders, there will still be a significant need for knowledge gathering, implementation and enforcement capacity, and continuous national and international policy development.

The infrastructure change needed may be particularly challenging for certain countries, requiring significant financial investments, or levels of national or local state capacity that do not currently exist. EPR has significant potential to address this, in contrast to the mechanisms for financial and technical knowledge exchange more normally considered in international environmental treaties. EPR has typically been introduced in countries with established waste management systems, to ensure that producers cover the costs associated with operating these systems effectively, but the principle should cover initial investment too, where this is required (a situation likely to be encountered around the world where EPR is applied to products that lack waste management infrastructure currently). Producers may of course transfer EPR costs to their consumers, and phasing EPR in relation to large infrastructure investments may be appropriate in some cases. EPR also ensures producers have a long-term interest in effective and efficient collection, sorting, recycling and waste infrastructure. Nonetheless, even with an ambitious EPR in place, additional capacity building and knowledge transfer will be needed if the treaty is to achieve its aims quickly and effectively. The sometimes overwhelming costs of waste infrastructure and the inability of EPR to cover these entirely is also an important reason for the treaty to include common product controls ensuring elimination, reduction and circulation of high risk plastic products.

A key element of this is **awareness raising** to enhance consumers' understanding of plastic pollution, and the role they play in its prevention, to enable behavioural shifts required to make the control measures successful. This could focus on measures related to the roll-out of improved waste management (particularly collections for recycling) but should also be incorporated into producer responsibility regarding the labelling of their products and the claims they make in relation to their environmental impacts. Awareness raising will also be necessary to ensure that any new policy measures are clearly understood by all stakeholders, and that consultation has taken place with these groups to elicit their buy-in, provide clear direction of upcoming policy, and avoid unnecessary market disruption.

Data and reporting have been mentioned in relation to a number of control measures. This will be important at a national level to understand treaty compliance, target measures effectively and, in the case of measures like EPR, ensure costs are calculated and distributed appropriately. However, there is also a strong case for greater international alignment in the measurement and reporting

© Yunaidi Joepoet / WWF

of plastic use, plastic management, and plastic pollution. The measures here – for example in the work needed to define targets – will help define the scope of such reporting and will mean states have an increasing and harmonized understanding of the challenge, and progress made, at national level. Sharing this information will not just help encourage treaty compliance but also foster a shared understanding of best practice and reduce the burden on national governments in having to develop unique guidance and interpretations. The need for improved data is not a rationale for delay. This report shows that for many products the nature and scale of the plastic pollution problem is more than sufficiently understood to justify action.

Many international environmental treaties include **trade controls** on regulated substances (e.g., the Basel Convention on Hazardous Wastes, or the Vienna Convention to Protect the Ozone Layer). This would undoubtedly support national application and compliance for many of the measures in this report. In particular, trade restrictions on Class I products where the intention is to eliminate them would hugely aid national regulation. However, restrictions on Class I and Class II products that fail to satisfy minimum standards would also be hugely beneficial and might help smaller states that feel they lack market power to control larger foreign firms to ensure both that compliance is achieved, and that they are not disadvantaged in terms of access to necessary plastic products. Both kinds of trade controls could also impact states that are not signatories to the treaty, encouraging them to meet certain standards, regardless of their formal legal obligation.

© Alamy

6. CONCLUSIONS

Global plastic pollution is pervasive and growing rapidly. This study shows that it is not only feasible, but also desirable to break the plastic pollution problem into specific categories for regulation, enabling the new treaty to establish the most effective regulatory approach for each category. The complex global problem of addressing plastic pollution can be overcome by systemically dividing and tackling specific plastic categories with global regulations. For the products analysed in depth here, there is a clear case to justify prioritized action now.

The control measures here may also be rendered more effective by wider provisions in the treaty – for example provisions relating to plastic overall, not simply in relation to product groups. Equally, there may be harms from plastic pollution that are not specific to product groups – for example, while polymer controls are discussed in this research in relation to recyclability, the treaty as a whole may also include overarching controls for polymers and additives of concern. A product group approach to plastic pollution as defined in this research is very much compatible with other approaches taken and ambitions for the treaty.

As new evidence emerges in future, additional product controls may be warranted, focused on additional product groups and subgroups. Similarly, as new solutions emerge, the ability to act aggressively to eliminate, reduce, circulate, or manage plastics will inevitably justify additional actions.

This research has identified opportunities to combine control measures to deliver safe circulation and management of plastic products during production, in use, for recycling, and at point of disposal. Over time, there is scope to move products from Class II to Class I as alternatives become more viable, and raise ambition within Class I, with more ambitious reduction objectives or more product groups scheduled for elimination over time. Similarly, negotiators may wish to further divide some product groups to enable specific additional targeting of products, or to apply some controls across multiple product groups.

The research has prioritized based on known and potential risks, and believes in a start-then-strengthen approach. The analysis identifies starting priorities and deliverable control measures for a draft treaty for 2024. Plastic pollution is an area where evidence of both prevalence and harms continues to evolve rapidly, and a treaty committed to a start-then-strengthen approach is likely to see further adaptation as progress is made. The framework presented in the current research across both reports allows for continual reassessment in light of new evidence on prevalence of plastic pollution, harms or the feasibility of controls, even as action progresses on the initial prioritized products and actions.

Endnotes

1 UNEP, 'Glossary of Terms for Negotiators of Multilateral Environmental Agreements' (2007), https://www.unep.org/resources/report/glossary-terms-negotiators-multilateral-environmental-agreements

2 UNEP, 'Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal' (1989), art. 2 (8), http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx

The secretariat notes that the definition in the Basel Convention is used for environmentally sound management of hazardous wastes or other wastes.

3 UNEP, 'Decision IV/25: Essential uses, Fourth Meeting of the Parties of Montreal Protocol' (1992)

https://ozone.unep.org/treaties/montreal-protocol/meetings/fourth-meeting-parties/decisions/decision-iv25-essential-uses

4 UNEP, 'United Nations Environment Assembly resolution 2/11: Marine litter and microplastics' (2019), para. 1,

https://wedocs.unep.org/handle/20.500.11822/32238

5 UNECE, 'Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Kyiv Protocol)' (2009), art. II (6),

https://unece.org/fileadmin/DAM/PRTR_Protocol_e.pdf

6 UNEP, 'Amendment to the annex of the Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships (MARPOL), resolution MEPC.201(62): Revised MARPOL annex V' (2022), regulation 1.13, https://wedocs.unep.org/bitstream/handle/20.500.11822/40683/K2221529%20-%20UNEP-PP-INC.1-6%20-%20Advance.pdf

7 United Nations Environment Programme & Basel Convention, 'Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal' (1989), pp. 17, https://www.unep.org/resources/report/basel-convention-control-transboundary-movements-hazardous-wastes

8 It is important to note, however, that very lightweight plastic carrier bags are used in some cases as packaging for non-food items.

9 Other plastic products used in the fishing industry (floats, product storage) are not such a direct focus, though initiatives to tackle plastics in the sector may also address these where appropriate.

10 Other plastic products used in agriculture such as containers, storage tanks etc. are not such a direct focus as they are of less immediate concern to the risks focused on by this report.

11 Ellen Macarthur Foundation, 'Initial considerations for global rules in the international legally binding instrument to end plastic pollution' (2022), p.8, https://apps1.unep.org/resolutions/uploads/230105_ellen_macarthur_foundation_0.pdf This is an example of a non-exhaustive table with plastic types and items most frequently identified as unnecessary or problematic by relevant voluntary initiatives.

12 The Minamata Convention on Mercury, for example, stipulates that each Party shall not allow 'the manufacture, import or export of mercury added products listed in Part I of Annex A' of the Convention.

13 EU, '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' (2015), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015L0720

14 EU, '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' (2015), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015L0720

15 Eunomia Research and Consulting, 'A Comparative Assessment of Standards and Certification Schemes for Verifying Recycled Content in Plastic Products, Eunomia Research and Consulting' (2021), p.ix, https://www.eunomia.co.uk/reports-tools/a-comparative-assessment-of-standards-and-certification-schemes-for-verifying-recycled-content-in-plastic-products/

16 Encyclopedia Britannica, 'negative externality' https://www.britannica.com/topic/negative-externality

17 Eunomia Research and Consulting, 'Circular Taxation: A policy approach to reduce resource use and accelerate the transition to a circular economy' (2022), p.12, https://www.eunomia.co.uk/reports-tools/circular-taxation/

18 UNEP, Base Convention, Draft updated technical guidelines for the identification and environmentally sound management (ESM) of plastic wastes and for their disposal (version of June 2021), http://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/Draftoftechnicalguidelines(versionJun2021)/tabid/8881/Default.aspx

19 DG Environment, 'Proposal for a revision of EU legislation on Packaging and Packaging Waste' (2022), https://environment.ec.europa.eu/publications/proposal-packaging-and-packaging-waste_en

20 'Post-consumer plastic waste' means plastic waste that is generated from plastic products that have been placed on the market. This is in contrast with 'post industrial waste' or 'pre-consumer waste', which is plastic waste that arises during the plastic manufacturing process.

21 Proposal for a Directive of the European Parliament and the Council on the reduction of the impact of certain plastic products on the environment (Single-use Plastics Directive) (2021), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018PC0340&from=EN

22 Law No. 20.920 on Extended Producer Responsibility and Promotion of Recycling (2017). Chile Ministry of Environment, https://www.bcn.cl/leychile/navegar?idNorma=1075067

23 National Waste Policy (2018), Australian Government Department of Agriculture, Water and the Environment, https://www.environment.gov.au/protection/waste-resource-recovery/national-waste-policy

24 Circular Economy Package (2020), French Ministry of Ecological Transition https://www.ecologie.gouv.fr/sites/default/files/CIRCULAR_ECONOMY_PACKAGE_FR.pdf

25 Proposal for a Regulation of the European Parliament and of the Council on Packaging and Packaging Waste (2021) https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021PC0032&from=EN

26 TOMRA, 'Norway's deposit return scheme is world's recycling role model', (2022), https://www.tomra.com/en/discover/reverse-vending/feature-articles/norway-deposit-return-scheme

27 UK Government, 'Plastic Packaging Tax Guidance', (2021), https://www.gov.uk/guidance/check-if-you-need-to-register-for-plastic-packaging-tax

28 European Commission, 'Circular economy action plan', (2020), https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

29 PEW, Systemiq, 'Breaking the Plastic Wave' (2020), https://www.systemiq.earth/wp-content/uploads/2020/07/BreakingThePlasticWave_MainReport.pdf

30 Ellen Macarthur Foundation, 'Reuse: Rethinking Packaging' (2019), https://emf.thirdlight.com/file/24/_A-BkCs_aXeX02_Am1z_J7vzLt/Reuse-rethinking-packaging.pdf

31 Upstream Solutions, 'Reduce vs. Single-use: Environment' (Retrieved April 18, 2023), https://upstreamsolutions.org/reuse-vs-single-use-environment/

32 Rethink Plastic, 'Realising Reuse: The potential for scaling up reusable packaging and policy recommendations.' (2021) https://rethinkplasticalliance.eu/wp-content/uploads/2021/07/Realising-Reuse-Final-report-July-2021.pdf

33 Lifecycle assessments will need to include all environmental aspects, including end-of-life treatment, and pollution/litter.

34 Rethink Plastic, 'Realising Reuse: The potential for scaling up reusable packaging and policy recommendations' (2021), https://rethinkplasticalliance.eu/wp-content/uploads/2021/07/Realising-Reuse-Final-report-July-2021.pdf

35 California Senate, 'SB-54 Solid waste: reporting, packaging, and plastic food service ware' (2022), https://legiscan.com/CA/text/SB54/id/2600075

36 Key considerations are given on the basis of potential for mechanical recycling processes, as this assessment is not ready to conclude on other technologies, such as chemical recycling. More details can be found in WWF Position: Chemical Recycling Implementation Principles https://www.worldwildlife.org/publications/wwf-position-chemical-recycling-implementation-principles

37 Hahladakis JN et al., 'An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling' (2018), Journal of Hazardous Materials, vol. 344, pp. 179-199, https://www.sciencedirect.com/science/article/pii/S030438941730763X

38 UN Habitat, Norwegian Institute for Water Research, 'Leaving no one behind: How a global instrument to end plastic pollution can enable a just transition for the people informally collecting and recovering waste' (2022), https://unhabitat.org/leaving-no-one-behind-how-a-global-instrument-to-end-plastic-pollution-can-enable-a-just-transition

39 Hahladakis JN et al., 'An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling' (2018), Journal of Hazardous Materials, vol. 344, pp. 179-199, https://www.sciencedirect.com/science/article/pii/S030438941730763X

40 UNEP, 'Biodegradable Plastics & Marine Litter' (2015), https://wedocs.unep.org/bitstream/handle/20.500.11822/7468/-Biodegradable_Plastics_and_Marine_Litter_Misconceptions,_concerns_and_impacts_on_marine_environments-2015BiodegradablePlasticsAndMarineLitter.pdf.pdf

41 OECD, 'Extended Producer Responsibility' (2016), https://www.oecd.org/environment/waste/extended-producer-responsibility.htm

42 This is seen in both current and draft legislation (e.g. Waste Framework Directive, draft Packaging and Packaging Waste Directive, retrieved from https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en) and in additional studies not yet adopted as formal guidance (e.g. https://www.eunomia.co.uk/reports-tools/ec-waste-framework-directive-epr-recommendations-for-guidance/)

43 To help governments, the private sector and civil society stakeholders to develop effective EPR schemes, WWF has developed basic principles for effective EPR packaging schemes, see WWF, '15 BASIC PRINCIPLES: Establishing an effective extended producer responsibility (EPR) scheme for packaging' (2020), https://wwfint.awsassets.panda.org/downloads/wwf_15_basic_principles_2020_final_with_layout_1130.pdf

44 OECD, 'Extended Producer Responsibility' (2016), https://www.oecd.org/environment/waste/extended-producer-responsibility.htm

45 Product Stewardship Institute,'EPR Products', https://www.productstewardship.us/page/Definitions

46 Eunomia Research and Consulting, 'Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility' (2020), p.151, https://www.eunomia.co.uk/reports-tools/ec-waste-framework-directive-epr-study/

47 Ibid.,

48 OECD, 'Modulated fees for extended producer responsibility schemes (EPR): Environment Working Paper No. 184' (2021), https://one.oecd.org/document/ENV/WKP(2021)16/En/pdf#:~:text=EPR%20fee%20modulation%20is%20the,of%2Dlife%20costs%20by%20firms

49 EU, 'Consolidated text: European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste' (1994), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01994L0062-20180704

50 EU, 'Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles - Commission Statements' (2000), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32000L0053

51 EU, 'Consolidated text: Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) (Text with EEA relevance)' (2012), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704

52 EU, 'Questions and Answers on EU Strategy for Sustainable and Circular Textiles' (2022), https://ec.europa.eu/commission/presscorner/detail/en/QANDA_22_2015

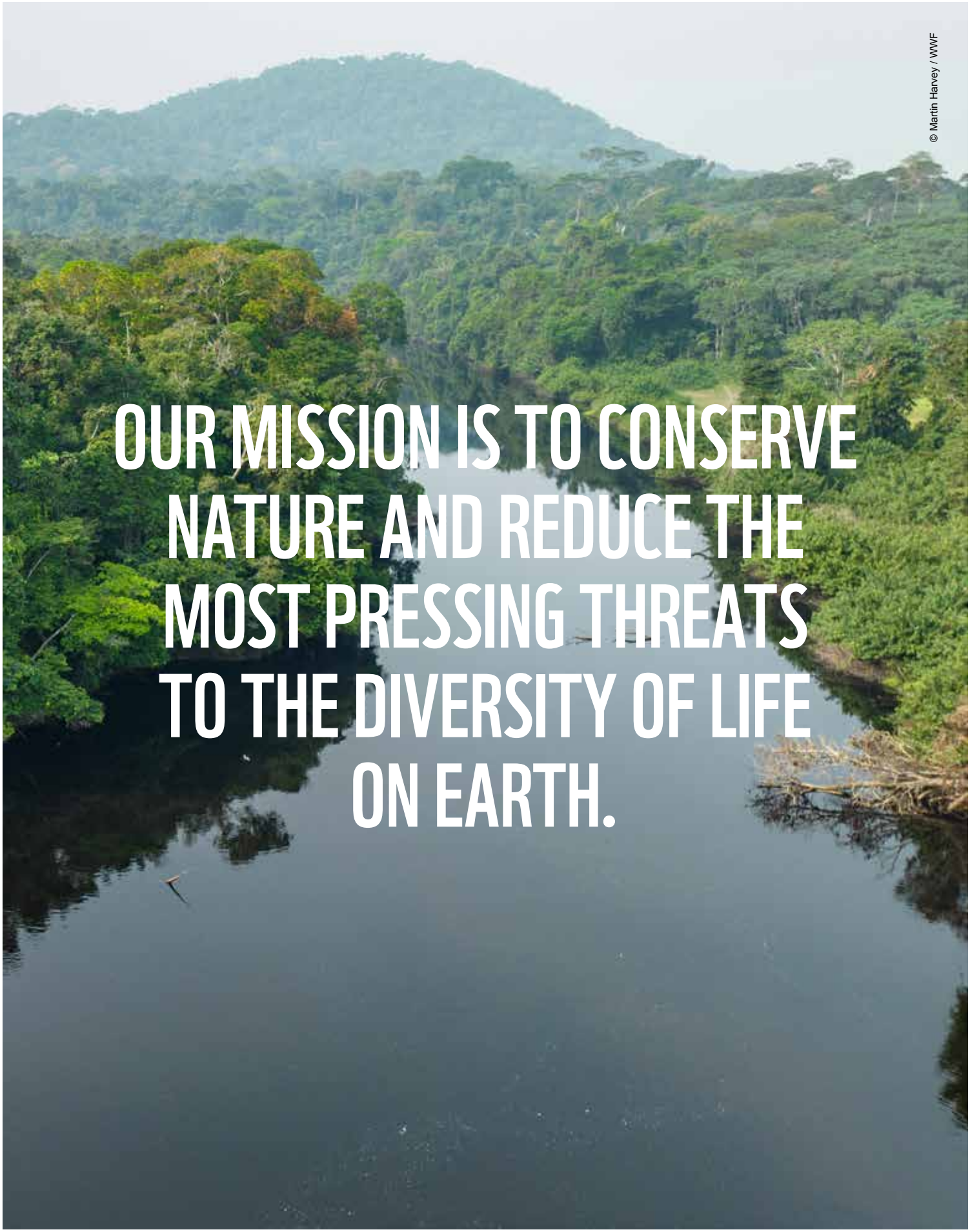
53 Eunomia Research and Consulting, 'Driving a Circular Economy for Textiles through EPR' (2022), http://changingmarkets.org/wp-content/uploads/2022/03/Driving-a-CE-for-Textiles-through-EPR-Final-Report-v2.0.pdf

54 DG Environment, 'Proposal for a revision of EU legislation on Packaging and Packaging Waste' (2022), https://environment.ec.europa.eu/publications/proposal-packaging-and-packaging-waste_en

55 Milette S, Wilcox J, 'Deposit Data' (2021), https://www.reloopplatform.org/wp-content/uploads/2021/05/Deposit-Data-Spring-2021-version.pdf

56 TOMRA, 'Rewarding Recycling, Learnings from the world's highest-performance deposit return systems' (2017), https://circular-economy.tomra.com/resources/drs-white-paper

57 OSPAR Commission, 'Scoping study to identify key waste items from the fishing industry and aquaculture' (2019), p.7, https://www.ospar.org/documents?v=41242



WWF

Working to sustain the natural world for the benefit of people and wildlife.

together possible™

panda.org