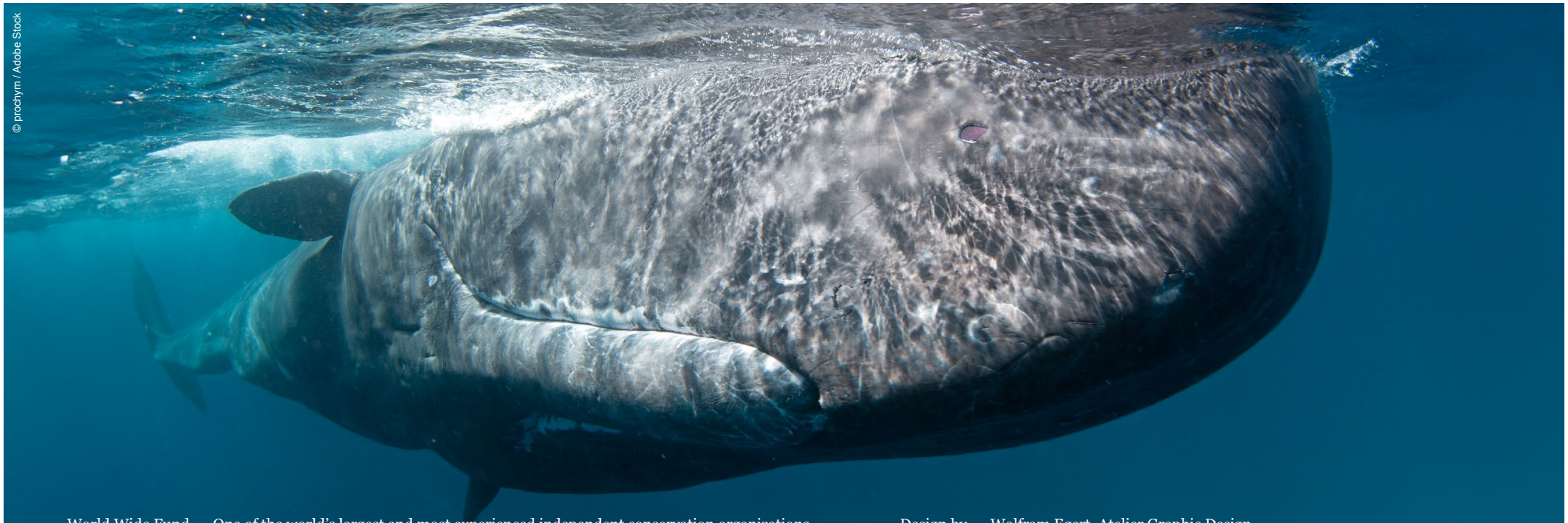
UNPACKING REUSE IN THE PLASTIC POLLUTION TREATY

A historic opportunity for scaling up reuse

TOWARDS A TREATY TO END PLASTIC POLLUTION



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EXECUTIVE SUMMARY

The international community has started negotiations on a global treaty to end plastic pollution. The treaty is focused on the plastic pollution across the lifecycle of plastic, arising from the over-use and mismanagement of plastic products. The treaty will contain a range of provisions to tackle these issues across the product life cycle. A key area of opportunity is the promotion of reuse, and particularly a transition from single-use to reusable products. Reuse has the potential to reduce material use (as one item can substitute for multiple single-use items) and the leakage of material into the environment (both by placing fewer longer life items into circulation, and directly incentivising the responsible return of those items into reuse systems). It also offers additional environmental co-benefits, most notably in terms of potential emissions savings. Identifying the most promising reuse applications, and the ways in which a global treaty can facilitate positive systemic change, is the purpose of this report.

WHAT DO WE MEAN BY REUSE IN THIS REPORT?

This report identifies **two different approaches** to reuse:

- **Return (& reuse):** where the user returns the product to the supplier for reconditioning and repreparation between uses.
- **Reuse (& retain):** where the user retains the product between uses, undertaking any reconditioning (e.g. cleaning) themselves. This approach is usually called 'refill' in the context of packaging, but reuse and retain can apply to a wider range of products.

This report focuses primarily on return and reuse solutions, where the scope and need for government intervention to drive systemic change is arguably currently greatest, but there are useful measures around reuse and retain (specifically in relation to refill) that could already be applied too. A return and reuse solution has two key components. It requires both a reusable product and a system to ensure that the product can be returned and is then safely recirculated for reuse. Realising the full potential of reuse requires not just a commitment to reuse for specific products, but also ensuring those products – and the reuse systems designed to support their repeated circulation – meet minimum performance standards. Products must be both reusable and reused in practice, at good levels of performance to deliver meaningful change. If this is achieved, systems will be incentivised to chase further efficiencies and better performance through their own operational logic.

Reuse is a necessary complement to other measures likely to be in the treaty. For example, while some single-use items can simply be banned, in many cases there will be a need for alternatives. Defining the requirements of a reusable alternative will eliminate the risk of 'reuse in name only'. It may also reduce the risks of unintended consequences of material switching away from plastic – countries that specify what viable alternatives to single-use look like can maximise benefits and avoid downsides.

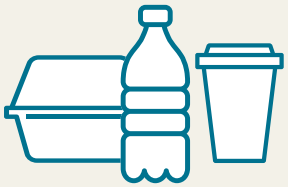
WHERE IS THERE SCOPE FOR THE GREATEST PROGRESS?

Reuse can reduce plastic material use (and thus plastic pollution associated with production), plastic waste generation (and thus opportunities for material pollution downstream) and plastic leakage (as reuse systems rely on and directly encourage responsible return). This study undertook a preliminary assessment of the scope for change across a full range of plastic product groups. The literature on reuse to date tends to focus on single-use packaging and other single-use items because these are prevalent items which have a high 'turnover' and therefore represent the greatest opportunity for increasing material resource efficiencies and waste reductions through reuse. More detailed analysis therefore focused especially on these product groups, as this is where standalone reuse solutions have most potential. In other cases, reuse may be one of a suite of measures to improve product sustainability in conjunction with measures improving longevity (such as design changes and repair systems).

In addition to environmental effectiveness, our assessment also considered technical feasibility and social, economic, and health aspects in order to provide a red-amber-green assessment of each product group. The assessment focused on the potential for change in the first ten years of the treaty's life, out to 2035. The assessment was constrained by the relatively limited data on large-scale reuse systems at scale, and these uncertainties are reflected in the selection of priority products for inclusion. However, in a dynamic treaty regime, it will also be possible to add to and adapt this assessment as knowledge and options improve over time. It is also anticipated that action on the shortlist of products suggested here will have significant transferable insight to other products now and in future.

This assessment builds upon the proposal for product regulation.[1] In the specific case of reuse, product and context are key. Nevertheless, for certain product groups harmonization of product and system requirements at a global level are both possible and, more importantly – crucial enablers for scaling up reuse.

Five product and context combinations were identified as the most promising:



- **Prefilled beverages in plastic bottles**
- **Takeaway food and plastic beverage containers**
- **On-site single-use plastic products**
- **Consumer delivery plastic packaging**
- **B2B plastic packaging in closed-loop operations**

Our approach was to select the five most promising products to show that measures on reuse are both desirable and realistic for the treaty. This list should not prevent additional products being added now or in the future, as appropriate.

The analysis "Unlocking a reuse revolution: scaling returnable packaging" by the Ellen MacArthur Foundation and Systemiq has modelled that **reuse has significant potential to reduce plastic pollution.** Ensuring reuse systems deliver these benefits in practice is one reason why reuse measures in the treaty will need to specify standards or performance requirements, not simply ask for 'reuse' in the abstract. High reuse performance is a prerequisite for achieving positive outcomes from reuse systems.

How can the treaty accelerate and drive change?

Transitioning from single-use to reuse systems at meaningful scale is a significant challenge in the absence of regulatory intervention for several reasons. For example, supply chain processes based on single-use packaging systems have been optimized over years, and lack incentives to change. In contrast, reuse systems disrupting the status quo may face significant start-up costs and will, at first, lack economies of scale. Capacity and funding to undertake this transition is also unequally distributed internationally.

A global treaty can therefore drive change further and faster than countries and businesses operating within them are likely to commit to alone. Additionally, common minimum requirements in a global treaty are likely to make changes more efficient and effective, and encourage the international community towards greater alignment over time, offering specific benefits and incentives to countries with smaller or more geographically isolated markets. Global action should also ensure a level playing field for businesses of different sizes. However, elements of solutions will need to be tailored to national circumstances, accounting for differing levels of infrastructure, or the potential opportunities for the informal sector in collection and return systems.

In broad terms, measures to drive reuse in the treaty can deliver three outcomes:

- enable and facilitate the transition from single-use to reuse;
- scale up and expand those systems; and
- ensure a high-level of environmental performance from reuse systems to maximise the environmental benefits and minimise overall plastic material production, consumption and pollution.

Specifically, **the treaty can and should address the following key elements**, across the main text, annexes, and supporting guidance. Elements that may adapt or grow over time will be better placed in annexes and guidance.

- **Robust and harmonised definitions**

establishing clear, consistent definitions is crucial for setting a global standard and ensuring uniform application and interpretation across countries and sectors. Some headline definitions will be needed in the main text, other definitions may be more operationally specific and could be defined in subsequent guidance. New definitions may be needed as new contexts for reuse are added to the treaty over time.

- **Harmonised and binding global reuse target**

Targets in the treaty would be application-specific, and it will be desirable to have scope to increase this ambition over time. International commitments should be a common floor, not a ceiling on national target ambition, while acknowledging national circumstances and capabilities. Differenti-

ated responsibility should relate to the speed of change expected, rather than the ultimate destination. National governments will wish to require reporting on performance from reuse systems to enable them to fulfil reporting obligations with minimum effort. Reporting for reuse should not be more onerous than that for single-use, and the treaty should consider this in terms of overall reporting requirements, as should national governments when implementing treaty obligations domestically. It is worth noting that higher targets may in fact be easier to achieve, as larger scale systems will provide a greater incentive for wider system transitions, and open up greater economies of scale.

■ **Minimum requirements of reuse systems** will deliver a degree of commonality, adding efficiency and knowledge exchange, and ensuring a level playing field domestically and internationally. Crucially they will ensure that systems do not deliver 'reuse in name only' and that environmental benefits are realised. Minimum requirements must encompass both the products and the systems designed to ensure that those products are in fact reused. Minimum standards can address how effective schemes may need to address design features like standardisation and pooling, or consider alignment with systems for Extended Producer Responsibility (EPR) or benefits from the use of deposits to ensure responsible return. However, these requirements should be flexible enough to accommodate technological advancements and varying national contexts and capabilities. Minimum requirements in the main treaty may therefore be limited, with much greater detail provided as guidance. In either case, some principles may be common to multiple products, while others will be product-specific.

Key supporting measures to enable systems to work are likely to include requirements to support product return. The act of product return is essential to all centralised systems, and relies on consumer participation in all business-to-consumer models. Deposits are a well-established mechanism for achieving high return rates for both single-use and reusable products.

Other changes to the wider system for single-use products could significantly encourage reuse. Currently the price of single-use products does not reflect the real cost to society. For instance, EPR schemes may both facilitate the delivery of reuse systems directly (with producers collectively collaborating to deliver and fund the system), and also offer the opportunity for funding reuse investments with fees levied on single-use products via single-use EPR schemes (which should be a separate feature of the overall treaty).

There should be a focus on data requirements and transparency to enable change and accountability. Technology will increasingly enable tracing and tracking of progress towards reuse. This is true of individual reuse systems, and the way that governments can harness reuse data for national policymaking and international reporting.

Providing guidance and support on this will be valuable, but **the treaty should not over-prescribe specific infrastructure requirements** to support this that may not be suitable for all contexts. **Enabling collaboration** domestically (so multiple businesses can work together to deliver solutions) and internationally (so knowledge is shared) will significantly aid implementation. A greater degree of harmonisation and standardisation should be anticipated as systems optimise, and this should improve overall outcomes.

A final supporting pillar is to secure needed financing for the transition. While EPR and

incentive mechanisms already mentioned may aid this, investment capital may be easier to raise in some countries than others. The treaty must include reuse in the provisions for any wider international funding mechanisms. It will be key to both initial market penetration and ongoing operations, though the latter should be less challenging.

The current treaty drafts need to evolve to address reuse more specifically and in greater detail. The options for implementing reuse measures in Part II, paragraph 5.b. of the zero draft treaty are currently clubbed together with a range of other objectives, including "reduction", "recycling", "refill", "repair", "repurposing" and "refurbishment". All of these must have a place in the final text, but dealing with reuse as a replacement for short-life single-use items explicitly and in isolation as a separate paragraph is key to delivering the changes outlined above. Combined measures may make more sense for longer life products.

'Start then strengthen'

We already know many of the actions we need to take. Our knowledge will improve over time, making solutions apparent, as well as more technically feasible, economically viable, and environmentally effective. **A dynamic treaty regime will be able to increase ambition and scope over time**, an approach that has been highly successful in other environmental treaties, such as the Montreal Protocol on Substances that Deplete the Ozone Layer.

'Start then strengthen' is also highly applicable to the wider need for a transition to reuse. Some products are already well-suited to reuse solutions, and these can and should be prioritised. However, the reuse transition is still a work in progress, and the range of products, and effectiveness and efficiency of solutions is only likely to grow over time. Global alignment on standards and ongoing knowledge exchange will be a crucial catalyst for these changes.

The treaty must therefore allow for further progress on reuse: widening the scope of products; raising system requirements and standards; and increasing performance targets. However, it is already possible for negotiators to commit to ambitious action on the five priority products in this report in relation to these three areas, and to use the global treaty as a key lever to drive changes to reduce plastic pollution.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1.0 INTRODUCTION

Global plastic production and consumption has grown substantially in recent decades, creating a complex and growing global problem with severe environmental, social, economic and health dimensions. 99.5% of plastics produced are currently produced using oil and gas,[2] increasing our reliance on fossil fuels, and associated GHG emissions.

However, the material pollution arising from over-use and mismanagement of plastic items has primarily driven the demand for distinct coordinated international action focused on plastics. Taken together, both issues have severe negative consequences, affecting the livelihoods, food systems, health and social wellbeing of millions of people, especially the poor and vulnerable.[3] In the absence of action, this problem will only continue to grow. For example, if current trends continue, projections indicate a fourfold increase in ocean plastic by 2050 relative to 2020 levels.[4]

In 2022, UN Member States agreed to commence negotiations for a new global Treaty aimed at ending plastic pollution, hereinafter referred to as 'the Plastic Pollution Treaty'.[5] To achieve the ambitious objective of ending plastic pollution, the treaty must adhere to the negotiation mandate and address the root cause of the plastic problem - overproduction and unsustainable consumption of plastics. End of life solutions alone cannot address the entirety of our plastic pollution problem. The most comprehensive modelling on scenarios to reduce ocean leakage suggests the need for a lifecycle approach to solutions - ranging from material and product redesign, plastic reduction, product bans, phase-outs, substitution, and reuse to, as a final stage in addressing plastic pollution throughout the lifecycle, recycling and responsible disposal.

Against this backdrop, WWF commissioned independent environmental consultants, Eunomia, to explore the potential for global regulations on reuse to enable plastic pollution reduction in the context of the Plastic Pollution Treaty,

and to identify the top 5 plastic products that would be most suited to control measures in this context. This tight focus for the current report highlights where action via the treaty should start, not a limit on longer term potential or ambition.

This report makes the case for reuse measures leading to demand-side plastic production reduction as an important piece of the puzzle to phase-out plastic products with high pollution risk. It assesses groups of plastic products according to the likely environmental effectiveness of a switch to reuse systems, and the technical and social feasibility of such switches based on current knowledge.

The top 5 plastic applications that are most suited to reuse are identified in this way. Control measures that could be applied to these top 5 are examined, bearing in mind varying country contexts and capabilities and primarily focused on the explicit objectives of the Plastic Pollution Treaty (to reduce plastic pollution and its impacts).

Call-Out Box 1-1

WHY AREN'T SINGLE-USE PLASTIC BANS ENOUGH?

Measures aimed at restricting or eliminating the use of SUPs are gaining traction worldwide. However, simply banning SUPs without a corresponding push for the adoption of strong reuse systems could unintentionally lead to a shift towards non-plastic single-use items, or the proliferation of unregulated products that claim to be "reusable" but are not in practice. Either of these outcomes would result in similar, or in some cases, worse environmental impacts than the status quo. It may not always be appropriate to require accompanying reuse measures to SUP bans, especially when the SUP item in question is non-essential, and alternatives are unnecessary. For example, the use of plastic nets and wraps for some fresh fruit and vegetables could potentially be eliminated entirely, requiring them to be sold loose rather than in packaging of any form.

However, in cases where the application is deemed essential, and especially if a wide range of potential alternatives exist, it is necessary to also regulate for reusable alternatives to avoid the risk of substitution with other single-use materials, or sub-standard reusable ones. This could take different forms, covering both specifications and incentivisation. For example: a mandatory requirement for all products of that nature to be reusable according to a minimum standard (e.g., a ban on single-use cups for takeaway, accompanied by a requirement for all beverages in the takeaway sector to be sold in reusable cups within an industry takeback scheme); the introduction of incentives for reusable alternatives (e.g., requiring sellers to offer reusable alternatives and/or charge more for single-use ones); or a combination of the two.

1.1 WHY IS REUSE AN INSTRUMENTAL PART OF THE PLASTIC POLLUTION TREATY?

Only banning single-use plastics and imposing end of life measures is not enough

The Plastic Pollution Treaty must prioritise reduction and reuse systems over recycling, bio-based, biodegradable or compostable plastics, and non-plastic alternatives. The higher upstream an intervention, the greater the benefits, as the risks of plastic pollution should be mitigated to a greater or lesser extent at each subsequent stage. Additionally, bans on single-use plastics (SUPs) and recycling requirements alone, without additional prioritisation of reduction and reuse systems, risks transferring the plastic pollution problem to other problematic single-use materials (see Call-Out Box 1-1). Simply put, we need to change the systems, not just the products.[6]

Reuse systems directly reduce plastic pollution across the product lifecycle and offer a range of other environmental co-benefits

Well-functioning reuse systems have the potential to displace single-use, linear models of consumption, introducing products that last longer and return logistics systems to reduce the large numbers of single-use

plastic items that are thrown away after a short period of use. This can achieve demand-side reduction in plastic production and overall material use, and simultaneously reduces the per-item probability of plastic waste and pollution as there are fewer items in circulation overall, and a mechanism in place to ensure that they are responsibly returned, rather than irresponsibly disposed of. This in turn yields a range of other environmental co-benefits (see Call-Out Box 1-2 below). A range of socio-economic benefits can also result from the introduction of reuse systems, and have been explored in Appendix 2.0.

The literature on reuse to date tends to focus on single-use packaging and other single-use items because these are prevalent items which have a high 'turnover' and therefore represent the greatest opportunity for increasing material resource efficiencies and waste reductions through reuse. Estimates of the proportion of global plastic production used for packaging applications vary, with the OECD suggesting this is around 31%[7] but others suggesting this was as high as 44% in 2022.[8] Short-lived applications, such as packaging, consumer products and textiles dominate plastic waste streams, and according to OECD estimates, will account for around two-thirds of all plastic waste in 2060.[9] Of these items, single-use packaging is not only a large contributor, but the fact that these items are intended for single-use, makes them particularly suitable for a transition to a reuse system, whereas for other products (such as textiles) greater reuse is likely to be just one of a suite of necessary measures to improve longevity and efficiency of use. This report ultimately therefore concludes that these single-use items are the most promising to tackle first through reuse in a 'start then strengthen' treaty regime. In doing so, the treaty could play a key role in enabling the establishment and scaling up of return and reuse models for these plastic products, and meet its purpose to end plastic pollution by 2040.

There is therefore a direct link between reuse measures and reductions in the plastic material footprint and resulting plastic pollution across the lifecycle of plastic products. This link provides a clear basis for the inclusion of reuse as part of the core binding obligations in the Plastic Pollution Treaty. As reuse performance is maximised through increased scale and system optimisation, so too do these environmental benefits increase – justifying bold and ambitious global reuse requirements to maximise the potential for plastic pollution reduction in keeping with the Plastic Pollution Treaty's objectives. A selection of key pollution reduction performance parameters to maximise is found below.

- **Plastic material use:** Each reusable product typically needs a larger amount of material per item compared to a single-use item as they need to be designed to be more robust and longer-lasting. However, significant overall material reduction is possible over time if reusable products are used multiple times in well-established return systems. While reusable products would need to be reused a sufficient amount of times to make up for the increased material use on a per item basis, it has been found that an optimised reuse system, with a change from single-use to returnable packaging could reduce plastic material use in beverage bottles by 90%, personal care products by 76%, fresh food products by 54% and food cupboard products by 45% when comparing mass of plastic per 1000 uses.[10] Using recycled materials to produce reusable products in place of virgin materials can reduce this footprint even further.

- **Plastic waste generation:** The above reductions in overall plastic material use and longer lifetimes associated with reusable items also result in a decrease in overall plastic waste generated, making reuse a valuable waste prevention tool. For example, one study looking at the potential impacts of a switch from single-use to reusable packaging systems for beverage bottles, personal care products, fresh food products and food cupboard products found that "Switching from rigid single-use to rigid returnable packaging provides a significant reduction in plastic volumes across scenarios — 54% to 76% — and a dramatic decrease in waste generation — around 90%."[11]

- **Plastic leakage:** Given the value associated with reusable products relative to single-use ones, they are much more likely to be returned, rather than becoming littered. This significantly reduces the per-item probability of plastic leakage and the overall volumes of single-use plastic material leaked. If designed well, reuse systems themselves will also be responsible for managing reusable items at the end of their useful life, making them more likely

to enter recycling systems rather than ending up being burned, dumped, or otherwise mismanaged at the end of life. Designing reusable items to also be recyclable will increase this likelihood.

The potential scale of the impacts of reuse on the three performance parameters above should not be underestimated. For example, if we conservatively assume that one reusable bottle is capable of being reused 10 times (i.e., making 10 rotations) and that it works in a reuse system that has an 80% return rate efficiency, each reusable bottle would displace 8 single-use bottles. It is estimated that worldwide, ~500 billion single-use plastic bottles are sold annually,[12] and that as much as 22% of all plastic waste is mismanaged and becomes litter.[13] This means that as many as 110 billion plastic bottles worldwide are currently being mismanaged or end up in our environment. The switch to reusables in this hypothetical scenario could reduce single-use plastic bottles sold, ending up as waste, and subsequently being mismanaged or littered by over 80%. This is actually a pessimistic view. Ongoing reuse trials for beverage bottles have found that realistically, reusable bottles can make a much higher number of rotations than this – 25 on average – and that higher return rates are feasible through system optimisation – nearer to 90% as is the case in existing DRS systems for single-use bottles, or even higher.[14] A switch to optimised reuse systems could therefore reduce the number of single-use plastic bottles consumed, ending up as waste, and polluting our oceans, by over 90%.

Call-Out Box 1-2

ENVIRONMENTAL CO-BENEFITS OF OPTIMISED REUSE SYSTEMS

In addition to their direct impact in plastic pollution reduction, optimised reuse systems can yield a range of environmental co-benefits that the Treaty should encourage. These include:

Emissions: Greenhouse gas (GHG) emissions are a critical consideration throughout the lifecycle of reusable products, associated with extraction of raw materials, manufacturing, transport, cleaning, maintenance, and end-of-life management. It is therefore important to consider these emissions when assessing the environmental impact of reuse systems in comparison to their single-use counterparts. Transitioning to optimised reuse systems from single-use would significantly reduce GHG emissions. For example, research indicates that reuse systems for certain applications can decrease the emissions by 65-80% relative to single-use plastic products.[15] Another more conservative study suggests that while the changes in emissions associated with switching are variable across different scenarios, a high scale switch to optimised return models would result in reductions of between 35% to 69% across multiple applications.[16]

Water use: The production of reusable items, as is the case for single-use items, involves water consumption in raw material extraction and manufacturing, although this impact is reduced as the number of times the product is used increases. Water is also consumed as part of the cleaning process of reusable products, though these processes become highly efficient (minimising water use, and reusing water several times) as reuse systems scale up. Even accounting for this, the amount of water used to produce single-use products far outweigh that used by reusables/ reuse systems, by as much as 2 to 9 times. A system change from single-use to a return system for plastic beverage bottles has been found to reduce water usage by 70%.[17]

Ensuring reuse systems deliver these benefits in practice is one reason why reuse measures in the Treaty will need to specify standards or performance requirements, not simply ask for 'reuse' in the abstract. High reuse performance is a prerequisite for positive reuse outcomes.

Clear regulations and global cooperation are needed to transition to reuse systems

Transitioning from single-use to reuse systems at meaningful scale is a significant challenge in the ablsence of regulatory intervention for several reasons. Supply chain processes based on single-use

Call-Out Box 1-3

WHAT COULD GO WRONG IN THE ABSENCE OF A STRONG TREATY?

Poor design, a lack of harmonisation, or weak implementation of reuse measures in the plastics treaty could have adverse effects on the environment. These risks include:

Reuse in the name only: There is a risk of reuse measures being misinterpreted or insufficiently regulated, resulting in practices that have no real environmental benefit and represent 'reuse in name only'. Most single-use items are technically 'reusable', but if they are not designed with this intention in mind, and if they do not circulate within established systems for return and reuse, their potential will not be realised, and use of the word 'reusable' will be misleading. It is important to note that the suitability of materials for reusable alternatives varies across different application fields and must be assessed individually. In some instances, reusable plastics may emerge as the optimal choice.

Material substitution: The treaty's mandate is limited to controls on plastics and plastic pollution – there is a significant risk that in order to reduce plastic, but at the same time avoid reuse requirements, the relevant plastic products or applications will simply be replaced by single-use products made of other materials that may have similar or worse impacts on the environment across their life cycles (ranging from litter to carbon emissions to land-use competition).[18]

Exemptions and loopholes: There may be the temptation to seek exemptions from reuse measures if a regulated application is recycled at a high rate in a particular country. Without a globally harmonised measure of recyclability (to determine whether the relevant claims are true) and a robust, globally agreed approach to assess whether the single-use, recycled application represents an overall environmental benefit compared to a reusable alternative in an optimised system, this would create a loophole within the reuse requirements and undermine their effectiveness. A high waste collection and recycling rate may help reduce plastic pollution associated with an item, but it will not offer the same wider benefits of reduced material extraction as reuse.

packaging systems have been optimized over years, and lack incentives to change. In contrast, reuse systems disrupting the status quo may face significant start-up costs and will, at first, lack economies of scale.

This means that despite the significant potential for long term economic and environmental benefits, there is little to no "first mover advantage" for individual businesses from adopting reuse systems, except in very specific contexts. In the absence of a clear business case and regulatory framework for reuse at scale, businesses will fail to take ownership of reuse systems. Reuse will remain small, at pilot stage, dependent on government subsidies, and unable to attract sufficient investment to build necessary infrastructure and incentivise product design changes.

Companies must therefore be incentivised to act simultaneously, so that no individual company has to take on all the costs and risks – and so that international, national, and small firms can all benefit. Strong global regulation is essential to address this market failure. Without it, the adoption of reuse systems is likely to be slower, more fragmented, and the service they deliver may not maximise the potential environmental gains, or even increase the environmental impacts if done poorly (see Call-Out Box 1-3).

It is also noted that negotiators for the plastic treaty are committed to considering implications for waste pickers as part of a just transition. There is a risk that without global regulation, reuse initiatives will replace existing informal structures and livelihoods, or be developed in such a way that is exploitative to waste pickers. Return and reuse schemes, if regulated well, may offer significant opportunities to include the informal sector in collection arrangements, and this should be a feature of system design and implementation where appropriate.

1.2 UNDERSTANDING "REUSE" AND "REUSE SYSTEMS"

The concept of reuse involves the repeated use of a product or component for its intended purpose without significant modification.[19] Reuse should be viewed not merely as an objective in itself, but as a strategic approach encompassing various delivery models to achieve wider sustainability goals. In the context of the Plastic Pollution Treaty, this is a key strategy to achieve a reduction in demand side plastic production and reduce overall material footprint; however, more widely, reuse can help to achieve net zero and bend the curve on biodiversity loss. The aim is to maximise the productive use of each item or asset. In most reuse contexts this is achieved by ensuring that the item is reused as many times as possible, and the number of rotations is such that material resource efficiency outweighs that of a single-use item significantly.

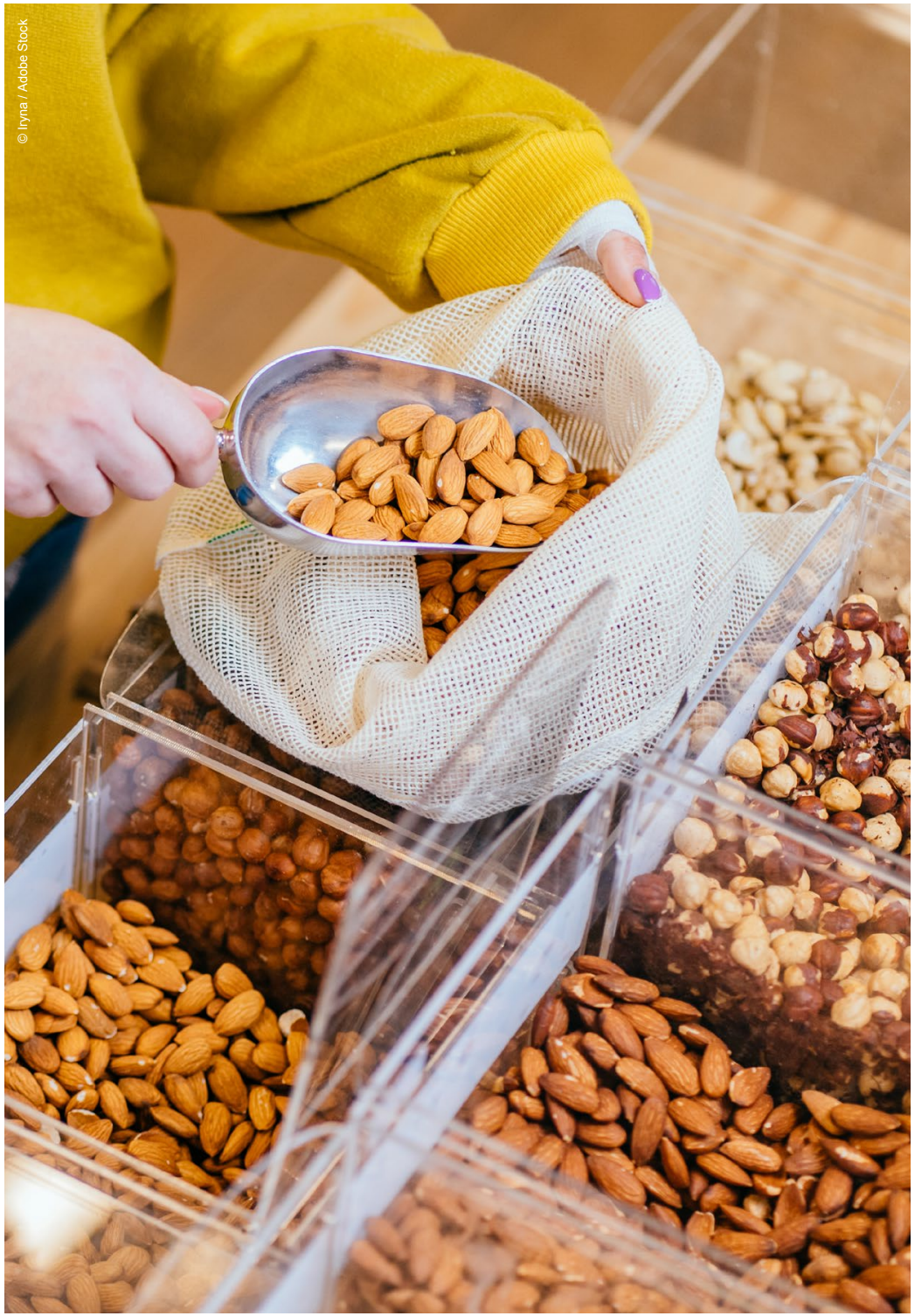
Much of the literature and analysis of reuse systems to date has focused on the packaging sector, wherein the term 'reuse' encompasses various models, commonly classified into two dimensions: "return" and "refill", and "at home" and "on the go" Beyond the packaging sector, these concepts are currently poorly understood, and common language and understanding of concepts are lacking. Given that the treaty's mandate extends beyond packaging, to all plastic products, **in this report, we distinguish between "return and reuse" systems, in which the consumer returns the product to a service provider for cleaning and redistribution between uses and "reuse and retain" systems, in which the final user retains ownership of the product between uses.** The latter is commonly referred to as "refill" in a packaging context, but this does not accurately describe the full range of practice available for non-packaging products.

It is also important to consider that at present, return systems for packaging are not always focused on reuse - the most prevalent return system for packaging currently is probably via single-use Deposit Return Systems for beverage containers. However, much of the learning about what works for consumers is likely to be transferable between the two as consumer experience is identical for both return and recycle and return and reuse systems". The application of the reuse concept in this report to both packaging and non-packaging products is explained in Table 1-1.

In this study, we focus on return and reuse systems, and do not elaborate on measures related to retain and reuse systems. Both models offer significant benefits, but **return and reuse systems particularly will depend on, and be readily influenced by, the actions of national governments**; first, to make the necessary transition to deliver a system level change, and second, to ensure the resulting reuse systems truly deliver environmental gains by regulating system performance. It is noted that return and reuse systems can be implemented at a range of scales, and may include elements of reuse and retain systems. For example, in the context of a restaurant that is required to provide reusable crockery and cutlery for eat-in foodservice, this might seem like a reuse and

Table 1-1 DISTINGUISHING BETWEEN DIFFERENT MODELS OF REUSE IN THIS REPORT

Product/ reuse system	Return (and reuse) User returns items to system between uses	Retain (and Reuse) User keeps items between uses
Packaging	Generally understood as 'return', either from home or on the go, e.g., consumer returning empty reusable takeaway containers to the provider for redistribution via home collection or takeback points.	Generally understood as 'refill' (either from home or on the go), e.g., a consumer refilling their own reusable water bottle using a water fountain.
Non-packaging	Consumers returning used items to a service provider for cleaning/ redistribution (e.g., cloth nappy laundry subscriptions).	Consumers keep used items and undertake cleaning etc. themselves before next use (e.g., reusable q-tips products).



retain system from the perspective of the restaurant that must switch to reusable items, and take on responsibility for their cleaning and distribution. However, this would constitute a return and reuse system from the perspective of the final consumer, who will use the crockery/ cutlery and return it to the restaurant for washing and redistribution. This highlights the fact that in all cases, return and reuse systems do not necessitate large scale, centralised infrastructure. Reuse and retain systems, on the other hand, rely heavily on context specific behaviours, and while they have significant environmental potential in the context of the Treaty, they do not always lend themselves to global target setting and measurement, albeit with some exceptions (see Call-Out Box 1-4 for further detail).

In this regard, **solutions that benefit most from global harmonisation should be the priority for global rules in the Treaty, while states party to it should be required to take additional nationally determined measures for context-dependent solutions.** Further research and innovation in reuse and retain models for some products (especially non-packaging products) will be needed before a robust and harmonised set of control measures (including targets, standards, and a list of suitable items) could be developed in this context. Relative to this, collective understanding of return and reuse models is more mature, and their potential to significantly reduce plastic pollution and increase material preservation is well-documented. The global treaty will be a powerful tool to drive this change. To achieve these benefits, systems need to be delivered to a high standard of performance and at scale (i.e., moving beyond pilot phase, and implementation in individual organisations or in specific geographies, to becoming the status-quo). Both are unlikely to develop in the absence of regulation. Harmonised global requirements can:

- Accelerate the speed of transition to reuse in individual countries by making reuse a more competitive alternative to single-use options.
- Create common approaches between countries, maximising interoperability for all and improving efficiency.
- Ensure reuse systems are high performing, maximising their environmental potential.

Call-Out Box 1-4

REUSE AND RETAIN SYSTEMS IN THE CONTEXT OF THE TREATY

In the context of 'reuse and retain' models, which includes both refill models associated with packaging (e.g., bring your own reusable coffee cup) as well as personal product use for non-packaging items (e.g., reusable q-tip products instead of single-use ones), the ownership and responsibility for items rests with the individual. This negates the need for centralised collection and processing. However, a supportive system or infrastructure might be necessary to facilitate these models (e.g., access to public water fountains for reusable water bottles, acceptance of personal reusable food containers for takeaway services, availability of dry food dispensers in supermarkets, availability of subscription models and product "refills" or concentrates for at home solutions, etc.). Conversely, the need for behavioural practice among citizens to change is potentially higher for some of these items, as it is individuals in their own homes that will undertake any cleaning or repreparation, though there may also be scope for new service sectors to provide these functions.

Retain and reuse models could be applicable to many of the same application fields as return and reuse models, and a combination of the two for the same application but in different consumer contexts is possible (e.g., retain and reuse for beverage cups used for takeaway, return and reuse for beverage cups used on-site). There are also some additional specific fields where packaging refill models (a subset of retain and reuse approaches) are more feasible than return and reuse models at present, such as in dispensing systems for dry food products, some household cleaners and cosmetics, etc.

Given the wide range of possible applications for retain and reuse models, and their reliance on individual consumers, it can be difficult to regulate such models, particularly in terms of setting targets and measuring compliance. However, this is not always the case, and measures to regulate reuse and retain models should be promoted where possible.

In contexts where return and reuse models may be considered too time consuming or costly to implement in the short term, retain and reuse models may be a more attractive option, either as an alternative, or as a transitionary measure to start rolling out reusable alternatives and making consumers familiar with them. Consumers in many of the least developed and developing countries may already be familiar with such models (albeit informally) and prefer consumer-led reuse to automated systems that may be more costly, complex or challenging to access.

The treaty should therefore include provisions requiring member states to explore and develop retain and reuse models issuing guidance on the types of measures that would enable this, and a range of indirect measures to encourage uptake of such models should also be considered. For example:

- Setting mandatory targets for retailers/ HORECA sector to allocate a certain percentage of their space/ products to packaging-free options (i.e. refill/dispensing stations) for both food and non-food products.
- Initiating research to determine the feasibility of regulating retain and reuse models, and the products or product groups that are suited for these, keeping in mind the need for measurability.
- Making it a mandatory right for consumers to use their own containers when purchasing goods, food or beverages, taking into account hygiene and safety considerations.
- Introducing financial incentives, such as zero VAT on reusable products, to motivate individuals towards adopting reuse practices.
- Additionally, these measures could be implemented in conjunction with bans/ targets for the reduction of SUP counterparts, including charging for single-use items.

Call-Out Box 1-5

LONGER LIFE PLASTIC PRODUCTS OF CONCERN

For longer-life plastic products, like household appliances, tyres and textiles the goal should lie in maximizing utilization and extending lifetimes, not just 'reuse'. While these products do contribute to plastic pollution both in use (for example through microplastic shedding) and at end of life, they represent a smaller, lower velocity source of plastic pollution compared to single-use plastics.

These items should therefore be intended for prolonged use, supported by strategies in design, use and disposal strategies focused on longevity. Reuse may still play a role but there is no need to maximise circulation except where this also encourages more efficient utilisation. The latter is more directly impacted by durability, including the right to repair, as well as use choices. In usage, circular consumption models like leasing, renting or borrowing shift focus from ownership to sharing, reducing the need for new products and maximizing the utilization of the existing products.

It is important to acknowledge the existing reuse sector for textiles, with second-hand clothing becoming the largest trade of second-hand goods globally (REF). This can of course have benefits. However, unless the consumption of cheap, low-quality new clothing is curtailed, textile reuse will deliver only relatively marginal benefits. It may also suffer from cases where reuse occurs in name only – placing items into a market for reuse does not guarantee they are reused at the end of the process.

For the environmentally sensitive sector-wide plastic applications (e.g., plastic products used in fishing, aquaculture or agriculture) and contact-sensitive specific plastic items (e.g., cosmetics), the key priorities for reducing plastic pollution are reducing use and preventing these items from being left in the environment.

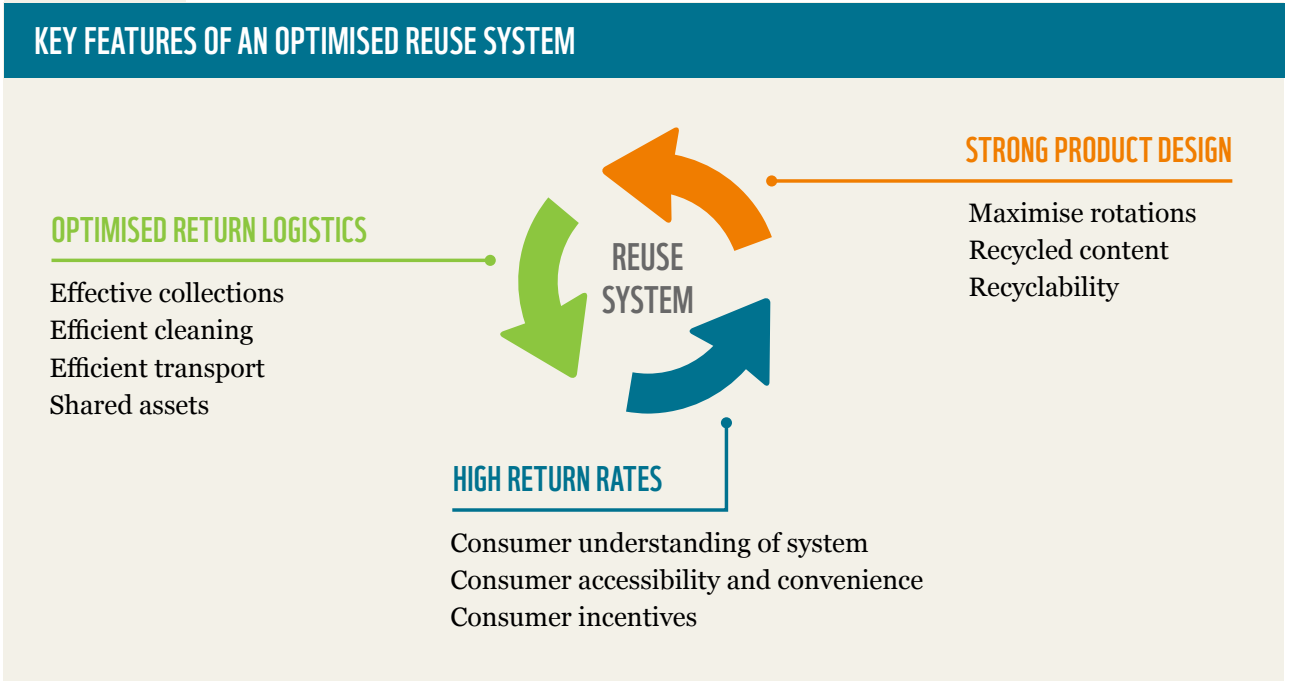
To address these challenges, two complementary measures are recommended:

- Adoption of improved design and technologies through mandatory sector-specific minimum product requirements to extend the lifespan of the products (e.g., allowing only plastics that are resistant to chemical weathering and fragmentation) and promoting reuse of the plastic products 'on-site' by the individuals/business directly.
- Implementation of takeback programmes (e.g., mandatory EPR schemes, voluntary free collection services) with the primary objective of these programmes to ensure the systematic collection of unwanted products and secondary focus on the potential for repair and reuse.

Promotion of different in-situ operational practices might additionally reduce use, improve reuse within a single site's operations (a form of reuse and retain), and encourage use in ways that reduced microplastic shedding and encourage removal from the environment after use.

It is noted that reuse is distinct from repurposing, refurbishment, and repair. These are all valuable strategies for material preservation and waste prevention, but may involve some degree of transformation or alteration of the item (e.g., repairing or replacing a cracked mobile phone screen), or its use for a different purpose than that which was originally intended (using an old mobile phone as a baby monitor). While repurpose, refurbish and repair measures can extend the useful lifespan of products before they become waste, and return and reuse might be part of facilitating this cycle, standalone reuse measures tend to focus on products that are currently single-use or short-lived in nature, and recirculating these for an identical purpose over multiple rotations, within a formal and standardised reuse system. Given that these single-use and short-lived items are also associated with a much

Figure 1-1



higher risk of plastic pollution than longer-lived items, they form the focus of this study, as do specific reuse models to address them. Additional and complementary measures to reduce waste and preserve materials in longer-lived items (such as electronics, etc.), through repair, refurbishment and other strategies, will also need to be specified within the Treaty, but are not the focus of this work, see Call-Out Box 1-5.

1.3 ELEMENTS OF EFFECTIVE REUSE SYSTEMS

The environmental performance of reusable products and the systems in which they operate is an important consideration to ensure that the Treaty's goals are met. Ensuring the effective design and performance of reuse systems will also guard against greenwashing by countries, systems, or individual producers. Simply labelling something as reusable does not make it reusable – it must be both reusable, and actually reused as intended (typically within a system that facilitates reuse for return and reuse models), with this delivered in a safe and sustainable way that maximises environmental benefits.

The overall performance of reusable products and systems in reducing waste and pollution is related to a range of parameters, such as design of the product including a minimum number of potential use cycles (rotations) per container, a high return rate (ensuring those rotations are achieved), and efficient cleaning and transport logistics to make sure the overall system is optimised. The use of recycled materials in production and the ultimate recyclability of containers when they do reach end of life are also a consideration.[20, 21] Consumer engagement and participation is key to ensuring that systems and products are used as intended, and this means barriers to reuse must be lifted and incentives put in place to ensure uptake. Key process stages include product design, consumer return, and reverse logistics, to enable collection, cleaning and transport, as summarised in Figure 1-1.

This provides a theoretical framework by which reuse systems can be optimised, and their benefits in terms of plastic material and pollution reduction maximised. **In practice, these benefits and the underpinning efficiency of reuse systems will vary between countries due to factors such as differences in infrastructure, enforcement of regulations, and consumer behaviour.** Harmonised global regulations would help to smooth this variation between countries - an added value that only the Treaty's binding obligations can bring. As previously mentioned, plastic pollution has negative environmental and public health impacts on disadvantaged communities. Therefore, such harmonised global policy and its implementation for reuse systems is likely to have a greater positive impact on disadvantaged commu-

nities and developing countries, both environmentally and in terms of public health.[22]

It is important to ensure that reuse measures do not result in unintended consequences, particularly in regions with unique cultural or regulatory environments. For example, shifting from single-use water bottles to reusable ones with refill systems requires access to potable water systems and infrastructure for reuse. Lower-income groups, or communities in areas with limited infrastructure access, may face disproportionate health and economic impacts from an abrupt shift. In another case, the use of reusable nappies in place of disposable ones is workable in many contexts, but requires access to clean water and more often than not, due to prevailing gender norms, places the burden of labour associated with this change on women.

Integration of 'just transition' principles and approaches will be essential for implementing reuse system measures in different countries, in order to ensure fairness, inclusivity, job opportunities, and understanding of impacts for all stakeholders, under varying regional contexts. It helps to make the shift to return systems environmentally sustainable and socially equitable. The implementation of reuse systems in different country contexts is a complex issue that necessitates consideration of various factors.

Below we highlight several key points to consider when designing reuse systems with regards to transferability and the fairness of requirements across demographic groups and geographies. It is noted that these same considerations apply also in the set-up of production and distribution units for single-use items, as well as recycling infrastructure, and are therefore not unique to reuse systems alone.

Water availability

Most reusable products need to be cleaned or reconditioned after each use to ensure they are safe for reuse. This requires a reliable supply of clean water. Water scarcity can be a major obstacle for reuse systems in some regions, where water resources are limited or contaminated. Although single-use products can consume more water throughout its lifecycle than returnable products, the water used for cleaning in return systems could still be substantial and potentially compete with other vital water needs. Therefore, the trade-offs between water use and return systems should be carefully evaluated.

Uninterrupted energy supply

Certain reuse systems require a reliable and continuous source of energy to run their processes and equipment. If the power supply is interrupted or unstable, systems can face many challenges that can affect productivity, efficiency, quality, safety and sustainability. Power failures can result in loss of time, resources and data, damage to equipment and materials, and health and safety hazards for workers and users. Note that this is not the case for all reuse systems, and the degree of impact will vary depending on system design.

Well-adapted and established transport infrastructure/logistics

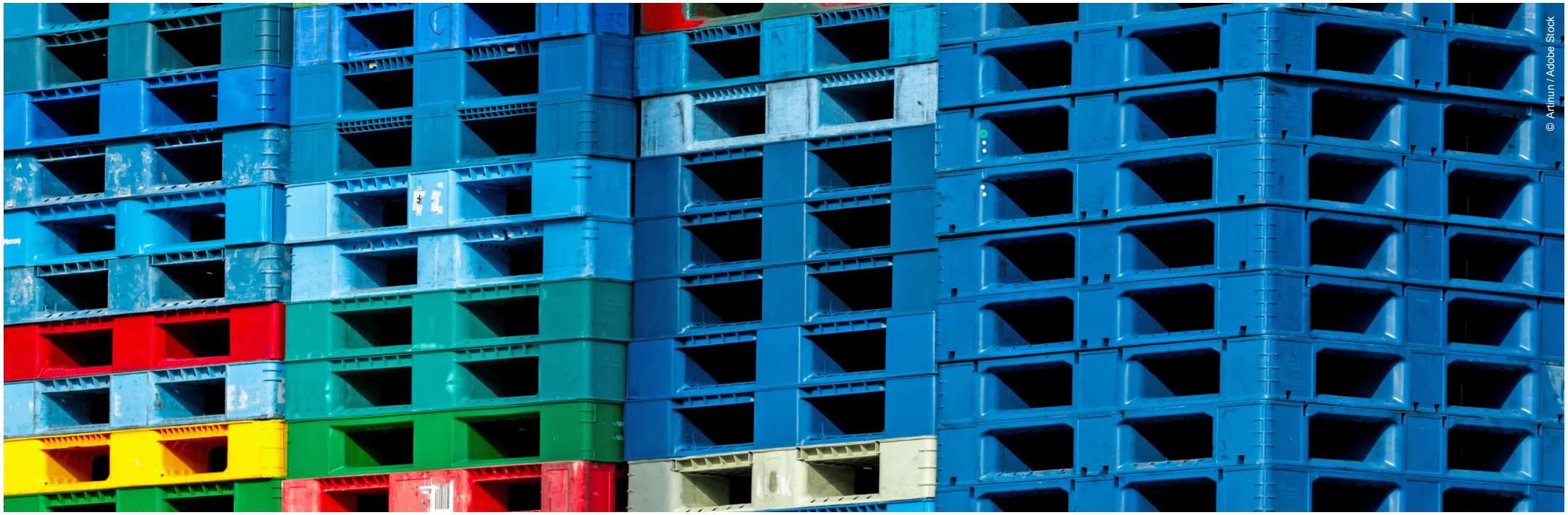
Reuse systems require adequate infrastructure for cleaning and redistributing the products. This involves washing facilities to sanitize the product, as well as collection and distribution logistics to transport the product between users and washers. In countries where such infrastructure is not available or sufficient, reuse systems could face difficulties in implementation. It is important to ensure that existing transport infrastructure and logistics (whether provided in formalised systems or by the informal sector) are adapted to enable reuse, and where new infrastructure needs to be developed, that this is done in way that enables reuse systems to function effectively and integrate existing systems[24].

Regulatory and Policy enablers

Supportive policies and regulations can help implement return systems. For instance, by standardising product formats and systems for collection, processing and redistribution, the costs of investing and operating return systems can be lowered/shared, feasibility can be enhanced, the scale and market share of return systems can be increased, and the rate of returning used products can be improved.[25] Different countries may have different levels and types of support, depending on their specific economic, environmental, and social situations.

Product and supply chain traceability

Traceability of reusable product information across the supply chain is an important element of reuse systems, to ensure performance can be monitored



and products can be improved if needed. This information can encompass many aspects of the product, such as its quality, composition, usage, lifespan and certification to name a few. Technological advancements such as the Internet of Things and blockchain could have a significant impact on the traceability of products. Although, greater emphasis should be placed on ensuring that solutions are effective for those who are most marginalized or impacted in low-income countries.[26]

Cultural and consumer attitudes

Public attitudes towards environmental issues can influence consumer participation in pro-environmental initiatives, which is essential for the successful adoption of a return system. Interregional differences in these cultural attitudes may necessitate nuanced approaches to promoting consumer engagement in different countries, depending on the cultural, societal and political landscape of the region. This tends to be linked to perceived costs and convenience of associated changes, which are most manageable when economies of scale are leveraged (rather than a fragmented landscape in which consumers are confused and performance is driven down by competition).

There is therefore a balance to be struck between the need for harmonised global rules to ensure that reuse measures are implemented effectively to meet the goal of eliminating plastic pollution, and the need for reuse systems to be developed that take into account national and local considerations to maximise efficiency. This suggests a role for the global plastic pollution treaty to identify plastic products for which reuse solutions are likely to be beneficial across all country contexts, and to set targets and minimum standards for the establishment of reuse systems for these products, without being overly prescriptive about the exact design and features of those systems. This would give member states the clarity and direction needed to make bold and ambitious policy decisions in line with their treaty obligations, as well as the flexibility to do so in a way that most suits their local conditions.

2.0 THE MOST PROMISING PLASTIC APPLICATIONS FOR REUSE

The previous chapter makes the case for reuse measures in the context of the Plastic Pollution Treaty, particularly focusing on the critical role of control measures that:

- **support the transition from single-use, linear models of consumption to reuse systems aligned to circular economy principles,** and
- **encourage high environmental performance of products within these systems through reduced plastic pollution along the product lifecycle.**

Previous WWF reports[27] have identified high-risk plastic products that should be prioritised for overall regulation in the Treaty, and the types of control measures (including but not limited to reuse) that would be most suited to tackling them.[28] In this report, those plastic product groups that were originally identified as 'suitable' for reuse measures are assessed in greater detail, with the aim of identifying applications that have the most immediate potential to realise environmental benefits from a switch to reuse at scale, and that should therefore be prioritised in the Treaty. The resulting "top 5" applications identified represent the fastest opportunities whereby a shift to reuse would not only have significant environmental benefits but is also readily achievable based on current knowledge and practice.

This shortlist is not intended to downplay the potential for reuse for other products, either alone or in combination with other measures – but change must start somewhere, and these products have the potential for rapid achievable wins in the shortest timescale, with the Plastic Pollution Treaty as a potentially significant lever to drive this change and contribute to the elimination of plastic

pollution. In a dynamic treaty regime, there must be scope to repeat and extend this assessment to add additional products in future as knowledge improves and additional opportunities become easier to achieve.

2.1 BREAKING DOWN PLASTIC PRODUCT GROUPS FOR ASSESSMENT

Prior research conducted by Eunomia for WWF[29] identified three high-level plastics product groups that are both "high risk" and likely to be suitable for control measures related to reuse:

- **'Packaging'** refers to products, made wholly of plastic materials or of plastic materials in combination with other materials that are used to contain, protect, handle, deliver and present goods at all points of the value chain, i.e., from raw materials to finished goods, and from the producer to the user or consumer. In this assessment we focus on single-use packaging that is frequently found in the environment with a demonstrated potential for harm. Reusable packaging could be a suitable alternative to a range of single-use packaging, from food and drink containers to pharmaceutical and cosmetic product packaging. Reuse systems have already been used successfully for products in this category.

- **'Characteristic-specific products'** in this assessment includes other single-use plastic products (i.e., non-packaging) that do not belong to specific sectors but are brought together based on characteristics that increase pollution risks. These are frequently found in the environment and have a demonstrated potential for harm. There is potential to replace short-lived single-use plastic (SUP) items within this category with reusable alternatives, for example replacing single-use tableware, PPE and hygiene products.

- **'Sector-specific products'** refer to plastic products for which the sector in which they are used is a key determinant of whether a significant proportion will be used or disposed of directly in or close to sensitive ecosystems, causing plastic pollution. In this assessment, this includes fishing gear (such as fishing nets, lines, traps and lures made of plastic) and agricultural plastics (e.g., plastic sheets, tubes and films used in the agriculture sector) which are frequently found in the environment and have a demonstrated potential for harm. The previous study concluded that for some of these product groups reuse is possibly suitable. Fishing equipment is an example of plastic product designed for reuse. Reuse solutions for other cases may be less well developed and be a higher priority to reduce plastic pollution.

It's important to note that other product groups from the previous report were excluded from the current detailed assessment, including longer-life specific plastic items (e.g., tyres, textiles, furniture), and sector-specific plastic products that are less likely to end up in the environment (e.g., plastics used in the electronics and automotive sectors). This is because such products were deemed lower priority overall due to their lower pollution risk (as established in the previous study) or the nature of the pollution risk (e.g. microplastic shedding will not be automatically ameliorated by reuse). They are therefore less likely to be suited for reuse measures within the scope of this research. However, other control measures, such as repair, refurbishment and recycling of such products should be considered. Return systems, including return and reuse systems, may be a part of this wider approach. And reuse of parts or components may also be appropriate as part of wider measures for these products (see Call-Out Box 1-5).

Building on this foundation, the three most relevant product groups were revisited and refined to reflect the plastic products and their applications within each group in greater detail. With the revised sub-groups we consider not only the product itself but also the context in which people are using a given product. Some use-contexts for a product may be very amenable to reuse, while others may be more challenging. In line with the 'start then strengthen' approach, pursuing the easiest cases first will be a feature of a successful transition. An example of the application of this logic framework is provided for the "packaging" product group in the Appendix in Call-Out Box 2-1. A detailed breakdown of the packaging product groups from the previous WWF report into sub-groups for assessment in this study is provided in Appendix 2.

2.2 CRITERIA FOR ASSESSMENT

The previously identified list of product groups was assessed against a set of three broad criteria for suitability of reuse – namely environmental effectiveness, technical feasibility and socio-economic and health aspects. Each of these is explored in more detail in the sub-sections below. For this analysis, the viability of reuse within the first decade of the Treaty's life (i.e., by or before around 2035) has been selected as the benchmark against which products and applications are prioritised for reuse measures.

The assessment is based on available literature and data, supplemented by expert opinion. As large-scale reuse systems are relatively uncommon currently, the analysis considers both the evidence of actual (i.e., existing) reusable products, systems and their performance, as well as the potential for future systems (based on theoretical studies, pilots, and life cycle assessments [LCAs]). The quality, quantity and confidence of available evidence on the feasibility of reuse is variable, with low comparability across plastic applications and groups, and inconsistencies at the local / country level. It is also the case that smaller scale pilot systems are likely to perform worse than future optimised at-scale systems which the public will have become familiar with. Because of this, the research uses a qualitative approach, considering the available evidence and applying supplementary logic tests on the nature of the product and context in which it is used to identify the overall likely feasibility and impacts of reuse in different cases, and the potential for this to be encouraged via measures in a global treaty.

This assessment employed a 'red-amber-green' (RAG) performance rating system, where red, amber, and green signify low, medium and high feasibility and effectiveness, respectively. Product groups and sub-groups receiving the highest aggregate of green ratings across these criteria were deemed most suitable for reuse systems. These leading product categories were then consolidated into the top five application fields for potential reuse measures.

We note that assessing the feasibility of reuse systems relative to single-use, linear models of consumption presents significant challenges. Established single-use systems have been optimised over decades, with existing technologies, one-way logistics and economies of scale all acting in their favour to set a clear benchmark in efficiency, cost, and convenience. Reuse systems, despite their immense potential for long-term environmental and economic benefits, have largely been disregarded in both policy and practice, and have only been adopted at scale in a few cases (e.g., reusable bottle systems in some European countries) – as such they have not had the opportunity to scale up, innovate and optimise, and have yet to reach peak efficiency.

The assessment here prioritises reuse solutions that are most likely to benefit from existing technological and supply chain innovation in the first decade of the Treaty, but this is of course a somewhat uncertain exercise. As well as the risk that some solutions may prove slower than expected to materialise, it is quite possible that some will arise faster, especially in the context of a global treaty that drives change and demonstrates innovation in one field that can be applied in another. In a start-then-strengthen treaty regime, regular review of the emerging reuse landscape and solutions will be needed. Finally, even where reuse is not prioritised as a standalone measure for a product here, it should not be excluded from consideration as one part of a suite of measures to tackle specific problematic products. Even where it may have limited effects in tackling plastic pollution in isolation, reuse could still play a key role as part of a wider product sustainability strategy (e.g. in government procurement).

2.2.1.1 ENVIRONMENTAL EFFECTIVENESS

The assessment of the environmental effectiveness of reuse systems centred on two primary criteria:

- **Resource efficiency was assessed in terms of potential reductions in material consumption.** The evaluation of material consumption reduction was based on the expected or potential number of uses (rotations) of the reusable packaging or item, as indicative of the plastic production and waste generation avoided in comparison to single-use alternatives. The lifetime in use of single-use products was also considered, since reuse is likely to be most impactful in replacing items that are single-use or short lived in nature. Where

the literature provided estimates of environmental co-benefits such energy and water use, and overall GHG emissions, these were also considered.

- **The assessment of litter and pollution reduction considered both the actual and potential collection and return rates, alongside the pollution potential of the single-use item or packaging.** This approach is predicated on the premise that each reusable packaging or item returned for reuse equates to one less item contributing to waste and potentially litter, with resulting environmental pollution (e.g., as litter, or through burning and landfilling of waste). A higher return rate thus signifies a more effective reuse system in curbing environmental contamination. This metric not only gauges the efficiency of the collection system but also reflects consumer participation in the reuse process.

2.2.1.2 TECHNICAL FEASIBILITY

In order to assess the technical feasibility of reuse, we considered likely developments up to the year 2035. We assessed three key factors:

- **Regarding existing and predicted reuse systems,** our analysis encompassed factors such as the global proliferation of reuse systems (which demonstrates the viability of reuse in practice), existing or forthcoming national legislation (which indicates existing policies and institutional capacity to regulate for reuse), and international business commitments to reuse (which indicates industry willingness and recognition of the potential for reuse) for specific applications.

- **The assessment of the existing infrastructure focused on the presence of existing reuse infrastructure** (existence of packaging providers, distributors, refillers, cleaning facilities etc.), and reverse logistics in the form of collection and transport systems, including deposit systems for collecting single-use alternatives (since this suggests feasibility of similar systems for reuse). It assessed the compatibility of new reuse systems with existing reuse networks for other applications or current logistic frameworks. This included transportation and distribution networks, as well as the potential integration of new reuse systems with existing waste management practices.

- **An assessment of the existence of reusable products, ongoing design and technological innovation to enable reuse,** for example considering the extent to which innovative features like modular, adaptable designs, and standardisation are being explored. The development and efficacy of new collection and takeback technologies, such as Reverse Vending Machines (RVMs) or smart bins, and cleaning technologies was evaluated for their role in streamlining the collection and return process. The potential of digital tracking and identification methods, including RFID tags and smart packaging, was assessed for their ability to enhance the management of reusable items.

2.2.1.3 SOCIAL, ECONOMIC AND HEALTH ASPECTS

In the assessment of the social, economic, and health aspects of reuse applications, three main categories were considered:

- **Consumer acceptance and engagement involved evaluating actual participation rates in existing reuse systems, where available and potential participation rates in reuse systems based on current and ongoing research.** For actual participation, we analysed available data on participation levels and return rates of existing systems, providing insights into current consumer usage. Potential participation was assessed through further factors, such as awareness and knowledge, convenience and accessibility, perceived value, and perceived health and safety. These factors were established through consumer surveys, examining consumer awareness of the system, ease of use, perceived benefits such as cost savings or environmental impact, and concerns regarding cleanliness and safety.

- **For the socio-economic feasibility based on the financial requirements for establishing and operating reuse systems, including initial investment and ongoing operational costs.** This analysis also considered potential future regulatory changes impacting system costs, such as carbon taxes and EPR fees. The role of return incentives, like deposit schemes, was examined for their contribution to the economic viability of reuse systems and their potential to generate revenue

from unredeemed deposits. Additionally, the impact of reuse systems on job creation and local businesses was explored, assessing their capacity to stimulate local economies and support community enterprises.

- **Health and safety assessment focused on understanding and complying with legal requirements.** This involved a rapid assessment of existing health and safety regulations to identify any legal constraints or exclusions applicable to the categories of reuse applications under consideration. This is mostly relevant for contact-sensitive products.

These criteria further assess the impact of implementing reuse systems on specific groups or communities, taking into account the varying challenges faced by member states based on income and existing infrastructure, ranging from water access to waste management.[30] In addition, environmental consciousness and willingness levels vary among countries and demographic contexts. The transition from single-use to reusable products may also disproportionately affect elderly individuals, disabled individuals, or those with specific medical conditions, potentially placing a burden on or incurring costs for this demographic.[31] Furthermore, lower-income groups or communities in areas with limited infrastructure access may experience disproportionate health and economic impacts from a sudden shift, particularly if policies around single-use bans and simultaneous reuse are exclusionary without intending to be so. For example, a ban on single-use food containers and switching to reusable food containers relies on consumers being able to afford these alternatives, and access systems for cleaning and reconditioning up to hygienic standards.

2.3 SUMMARY OF ASSESSMENT RESULTS

Table 2-1 summarises the assessment described above, following the „red-amber-green“ (RAG) performance rating system. Overall, 11 product groups were identified as being highly suitable for reuse measures by 2035, and got the highest aggregate green rating across the set of criteria.

Table 2-1 (Part 1)

SUMMARY TABLE OF REUSE FEASIBILITY ASSESSMENT AND SELECTED PRODUCT CATEGORIES

Feasibility: low medium high

Product group	Example	RAG rating	Final selection
1a. Contact sensitive packaging – B2C – Food – Retail (Prefilled/sealed)	Prefilled and sealed food containers sold at retailers include ready-to-eat items such as sandwiches, salads, or pre-cooked meals that can be consumed immediately without further preparation, as well as non-ready-to-eat food that requires some processing before consumption like raw meats and baking ingredients		No
1b. Contact sensitive packaging – B2C – Food – Retail (Filled on site for takeaway)	Food items filled on-site encompass a broad range of ready-to-eat options from salad bars, hot soup bars, freshly made sandwiches, and a variety of both ready-to-eat and non-ready-to-eat items from the deli counter, including assorted cheeses, raw meats, olives, and salads		Yes
1c. Contact sensitive packaging – B2C – Food – HORECA – Prefilled/sealed (On-site consumption)	Prefilled and sealed sandwiches, salads, and other food items are available for ready-to-eat consumption on-site		No
1d. Contact sensitive packaging – B2C – Food – HORECA – Prefilled/sealed (Takeaway)	Same packaging types as above used for on-the-go applications.		No
1e. Contact sensitive packaging – B2C – Food – HORECA – Filled on site (On-site consumption)	Hot or cold food is being served for on-site immediate consumption like warm cooked dishes, salads and chilled desserts		Yes
1f. Contact sensitive packaging – B2C – Food – HORECA – Filled on site (Takeaway)	Same packaging types as above used for on-the-go applications.		Yes
1g. Contact sensitive packaging – B2C – Drinks – Retail (Prefilled/sealed)	Prefilled and sealed beverage containers sold at retailers like bottled water, fruit juices, soft drinks, and energy drinks		Yes
1h. Contact sensitive packaging – B2C – Drinks – HORECA (Prefilled/sealed)	Same packaging types as above sold in HORECA services.		Yes
1i. Contact sensitive packaging – B2C – Drinks – HORECA – Filled on site (On-site consumption)	Hot and cold beverages being filled on-site into cups for on-site immediate consumption like freshly brewed coffee, tea, smoothies, or chilled sodas		Yes
1j. Contact sensitive packaging – B2C – Drinks – HORECA – Filled on site (Takeaway)	Same packaging types as above used for on-the-go applications.		Yes
1k. Contact sensitive packaging – B2C – Non-food and drink (Cosmetics and personal care)	Packaging for various personal care and beauty products like toothpaste tubes, perfume spray bottles, shampoo and soap bottles, pots and tubs of creams, lotions and scrubs, beauty products like lipstick and mascara tubes, etc.		No
1l. Contact sensitive packaging – B2C – Non-food and drink (Other)	Packaging for contact-sensitive products not listed above - pet and animal food (e.g., bags and pouches), hazardous products (e.g., chemical containers and pesticide bottles), pharmaceuticals and medical (e.g., medication bottles, blister packs for pills, protective casings and inserts for medical devices, IV bags, test tubes).		No

Table 2-1 (Part 2)

Feasibility: low medium high

Product group	Example	RAG rating	Final selection
1m. Contact sensitive packaging - B2B - Bulk transportation (Closed-loop operation)	Packaging solutions for B2B sectors involving contact-sensitive products in closed-loop operation e.g., crates, dunnage, drums, bottles, jars, buckets, intermediate bulk containers and big bags		Yes
1n. Contact sensitive packaging - B2B - Bulk transportation (Open-loop operation)	Same packaging solutions listed above for B2B sectors in open-loop operations.		No
1o. Non-contact sensitive packaging – B2C – Sales packaging, grouped	Packaging solutions for B2C sectors involving non-contact-sensitive products both sales and grouped packaging e.g., bags, blister packs, clamshells, pouches, boxes, cases and sleeves		No
1p. Non-contact sensitive packaging – B2C – Delivery/E-commerce	Packaging solutions for B2C involving delivery and e-commerce e.g., corrugated plastic boxes, padded mailers and poly mailers		Yes
1q. Non-contact sensitive packaging – B2B – Sales, grouped and transport packaging (Closed-loop)	Packaging solutions for B2B sectors involving non-contact-sensitive products in closed-loop operation e.g., pallets, crates, dunnage, drums, sheets, films and big bags		Yes
1r. Non-contact sensitive packaging – B2B – Sales, grouped and transport packaging (Open-loop)	Packaging solutions for B2B sectors involving non-contact-sensitive products in open-loop operation e.g., pallets, crates, dunnage, drums, sheets, films and big bags		No
2a. Specific Plastic Items: Single-use short lived – Personal/household plastics	Specific personal and household plastic products including absorbent hygiene products (AHPs) (nappies, sanitary pads, incontinence pads or tampons), household technical (vacuum bags, water filters), lifestyle (cigarette, disposable vapes)		No
2b. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Food service	HORECA, venues, campuses, airports etc. non-packaging food and drink consumption e.g., cutlery, plates, cups, straws, stirrer		Yes
2c. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Other single-use short lived plastic	Complimentary dry amenities in hotels (e.g., slippers, pens, plastic cups), events and entertainment (e.g., signages, wrist bands, ponchos, glow sticks, flags and balloons, tokens)		Yes
2d. Specific Plastic Items: Single-use short-lived - Other	Single-use short lived items not listed above - e.g., pharma disposable syringes, needles, vials, PPE, contact lenses		No
3a. Sector-specific plastic applications: Environmentally sensitive – Marine/aquatic – Fishing/aquaculture	Plastic products are used in aquaculture (e.g., nets, cages, ropes, cords, pipes, tubes, feeders, protective gear, buoyancy devices) and fishing gear (e.g., nets, lines, pots, traps, buoys)		No
3b. Sector-specific plastic applications: Environmentally sensitive – Terrestrial/agriculture	This category describes plastic products which are used directly in the terrestrial environment, specifically with consideration of agricultural applications such as large-scale crop production and livestock (e.g., mulch films, polytunnels, pipes and irrigation systems for crop production, silage films, nets and twines for storing feed for livestock) and horticulture and gardening (e.g., pots, trays, protective covers, plant support structures, labels and markers)		No

2.3.1 THE DESIRABILITY OF APPLYING CONTROL MEASURES BY PRODUCT AND CONTEXT

Given that several of the product sub-groups selected for reuse measures (as shown above) were overlapping in terms of the context in which they are made available to consumers, and ultimately used and disposed of, we judged that reuse measures could be more meaningfully applied to specific contexts, or context and product combinations, rather than an overall product in some cases. For instance, in settings where on-site use and consumption occur in a closed and controlled environment (e.g., airports, sport event, festivals) it becomes feasible to conveniently retain plastic items on-site and facilitate their collection for reuse. This applies to both food-related and non-food-related plastic items used in such settings.

Therefore, the selected 11 product groups (Table 2-1), were subsequently reconfigured into the top five most promising areas for treaty regulation for reuse, see Table 2-2:

1. Prefilled beverages in plastic bottles

2. Takeaway food and beverage plastic containers

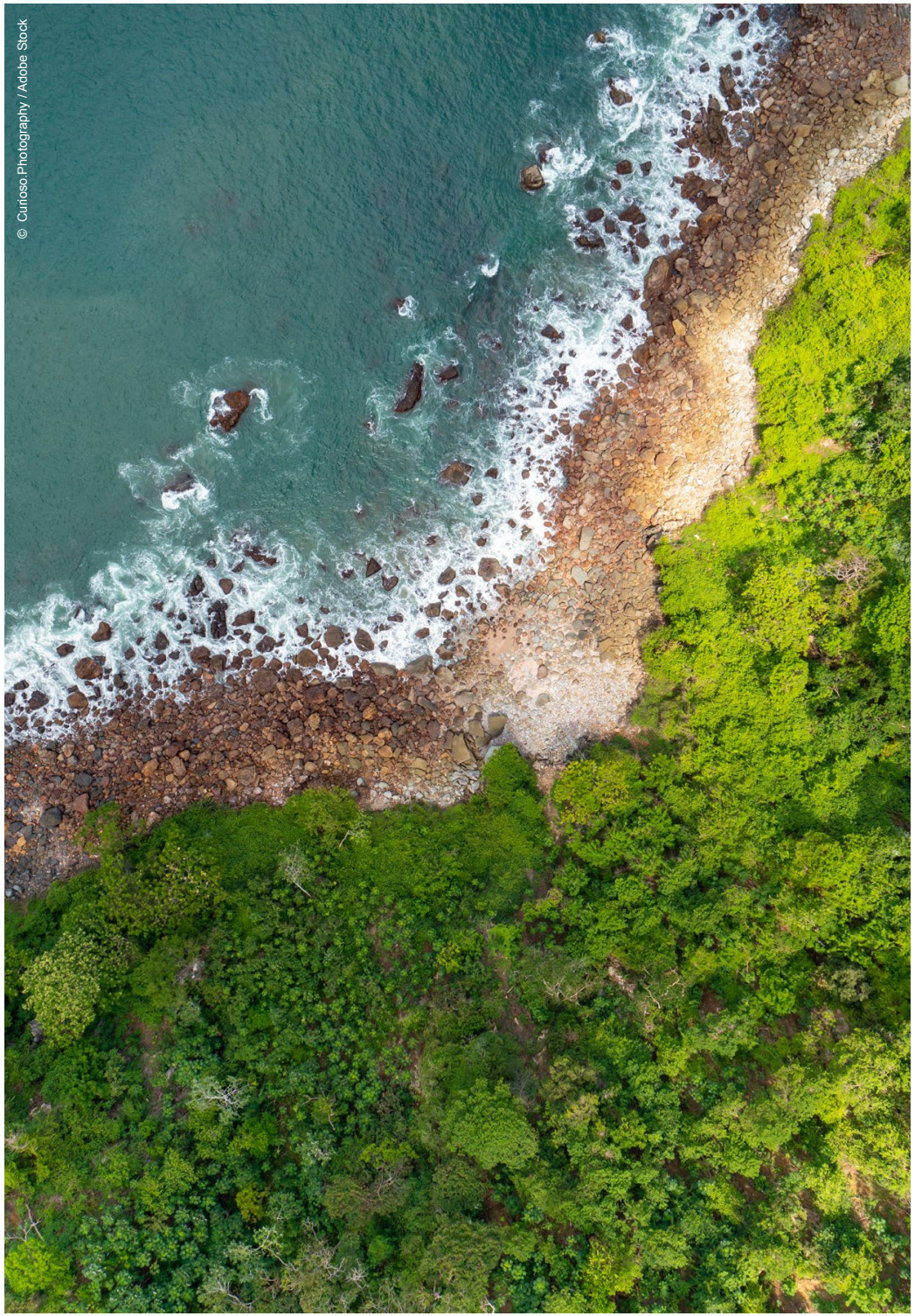
3. On-site single-use plastic products

4. Consumer delivery plastic packaging

5. B2B plastic packaging in closed-loop operations

Table 2-2 TOP FIVE PROMISING APPLICATIONS FOR REUSE

Top five applications	Selected Product Groups	Scope summary
1. Prefilled beverages in plastic bottles	1g. Contact sensitive – B2C – Drinks – Retail (Prefilled/sealed) 1h. Contact sensitive – B2C – Drinks – HORECA (Prefilled/sealed)	All beverage types that are currently sold in single-use plastic bottles, with potential prioritisation for non-dairy-like, non-alcoholic, or lower alcohol content beverages, in retail and HORECA, both for on-site and off-site consumption.
2. Takeaway food and beverage plastic containers	1b. Contact sensitive – B2C – Food – Retail (Filled on site for takeaway) 1f. Contact sensitive – B2C – Food – HORECA – Filled on site (Takeaway) 1j. Contact sensitive – B2C – Drinks – HORECA – Filled on site (Takeaway)	All takeaway food and beverages currently sold in plastic containers for offsite consumption. This includes both return on-the-go and return from home options.
3. On-site single-use plastic products	1e. Contact sensitive – B2C – Food – HORECA – Filled on site (On-site consumption) 1i. Contact sensitive packaging – B2C – Drinks – HORECA – Filled on site (On-site consumption) 2b. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Food service 2c. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Other single-use short lived plastic	Single-use plastic food and drink containers that are filled at the point of sale and consumed on-site, including HORECA, venues, and events, single-use non-packaging plastic items used in food and drink consumption (e.g., straws, cutlery) as well as non-food related single-use plastic items used in events and entertainment (e.g., wristbands, ponchos).
4. Consumer delivery plastic packaging	1p. Non-contact sensitive – B2C – Delivery/E-commerce	Single-use plastic bags/ pouches used to deliver products to end consumers, including in e-commerce. The classification is based on the method by which products are received by consumers (delivery) rather than the method of purchase.
5. B2B plastic packaging in closed-loop operations	1m. Contact sensitive - B2B - Bulk transportation (Closed-loop) 1q. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Closed-loop)	Primary, secondary, and tertiary single-use plastic packaging in closed-loop systems, including pallets, kegs, drums, boxes, crates, wrapping, and straps.



3.0 RECOMMENDED MEASURES FOR THE TREATY

As highlighted in Section 1.0, transforming from single-use to reuse models presents a significant opportunity to reduce plastic pollution and overall plastic consumption globally. Further, when effectively implemented, reusable products can reduce GHG emissions compared to single-use plastic products. To achieve a significant transition from single-use and linear models of consumption to reuse systems and applications, help is needed.

A global treaty can drive change further and faster than countries are likely to be able to alone. To date, national policies have often lacked specific targets and mechanisms to drive reuse across various sectors, with reuse even declining in some areas.[32] Additionally, common requirements in a global treaty would as a minimum establish a foundational framework for harmonised national policies ensuring the implementation of minimum requirements and practices across all countries. However, the approach to common global rules can and should go further. Greater international harmonisation of systems and requirements would facilitate more efficient design and delivery of reuse systems, and balance the playing field for everyone from multinational companies to small scale producers and retailers. Without this final level of harmonisation, countries and firms risk adopting varied and potentially conflicting approaches. The Plastic Pollution Treaty offers a unique opportunity to establish these enabling conditions for scaling reuse globally. The objectives of the control measures for reuse are threefold:

- **Enable and facilitate the transition from single-use to reuse;**
- **Scale up and expand existing reuse systems;**
- **Ensure a high-level of environmental performance from reuse systems to maximise the environmental benefits and minimise overall plastic material production, consumption and pollution.**

The sections below detail the types of priorities and control measures on reuse that could be applied to enable reuse in the context of the treaty, focused on the top 5 applications identified above.

It is noted that the specific design of each of these measures is beyond the scope of this research as this will be determined as an outcome of the treaty negotiations (e.g., determining the most appropriate target levels for each plastic application at global scale). However, key considerations and main design features for treaty negotiators to bear in mind when drafting measures are outlined here. This includes a framework for how the different measures can work together to enable the transition to reuse and the scaling up of reuse systems in different countries. It also includes recommendations for the high-level placement and structure of the measures within the treaty instrument itself.

3.1 PRIORITIES AND CONTROL MEASURES TO ENABLE REUSE

In relation to reuse, the Plastic Pollution Treaty is a powerful instrument to help drive the development of large-scale reuse systems, with a focus on centralised return models (which require takeback, processing and distribution infrastructure, and may need a regulatory framework to enable this). The Treaty can and must also tackle the plastic pollution challenge with a broad spectrum of measures – ranging from bans on single-use product controls to product sustainability requirements that go above and beyond reuse – but these are not the focus of this report.

Suitability for large-scale return and reuse models was a critical factor in selecting the top 5 promising applications, as this delivery model is most understood at present. These reuse models depend on a centralised return, reconditioning and distribution infrastructure, and are both suitable for, and likely to be, significantly dependent on national regulation to deliver change. The Treaty therefore offers a unique opportunity for states to agree to act, how they should act, and what standards should be. Alignment should make change faster, more effective, and more efficient for all.

Three main priorities and control measures are recommended in this report. These recommendations align with the top 5 promising application fields identified in Section 2.0 and based on the previous study carried out by Eunomia for WWF[33, 34]. Additionally, the recommendations take into account the latest version of the Zero Draft[35] and submissions made by member states and other organisations during INC and other position papers relevant to reuse measures in the context of the treaty.[36, 37, 38, 39, 40, 41, 42, 43, 44]

On this basis, key priorities for the Treaty in relation to control measures for reuse specifically are:

- **Robust and harmonised definitions –** establishing clear, consistent definitions is crucial for setting a global standard and ensuring uniform application and interpretation across countries and sectors;

- **Harmonised and binding global reuse targets –** setting ambitious yet achievable binding and harmonised targets for reuse will drive collective international effort, ensuring a minimum level of achievement of desired environmental impacts and allowing progress to be measured effectively;

- **Minimum requirements of reuse systems –** implementing baseline requirements will ensure a foundation level of compliance and level playing field while also guarding against greenwashing and other unintended consequences. This would include best practices encouraged through guidance, such as linking to other relevant policies such as requirements for extended producer responsibility (EPR) and deposit return schemes (DRS).

Several key principles underpin this categorisation of priority areas. These include:

- **Interconnection: Definitions, targets, and minimum requirements are interconnected** and mutually dependent, all playing a crucial role in facilitating a transition to high-quality reuse (i.e., reuse that genuinely delivers on the potential environmental benefits described in Section 1 above). Definitions are essential for minimum requirements and targets to have any meaning, and minimum requirements are essential to ensure

that targets drive genuine change. Finally, without targets there is no serious lever available in the Treaty to drive actual change at national level, or to ensure accountability at international level. All three are also key to ensure that when 'reuse' occurs it is both genuine, and genuinely beneficial for the environment.

- **Start then strengthen:** The Treaty regime can evolve over time. This might see increasing ambition for products in scope for reuse from the outset, the addition of new products, or the specification or raising of standards for reuse systems. This may also influence the location of requirements and commitments in the treaty text, annexes, and guidance. Elements that may need more regular updating should potentially be placed in an annex, while elements that are not known at the outset (such as certain features that might deliver best practice) may be suitable for guidance.

- **Enabling measures:** In addition to the main priorities and control measures, a broader suite of enabling and supporting measures is essential to enhance the overall effectiveness of the framework outlined for the implementation of the Plastic Pollution Treaty. For instance, encouraging consumer behaviour to return reusable plastic products through awareness raising, access to relevant collection systems, and offering financial incentives (e.g., through single-use charges or a deposit return scheme); or unlocking business investment opportunities for reuse systems by introducing targeted tax incentives (or potentially EPR fee modulation) can be effective. These enabling and supporting measures are detailed in Section 4.

It is essential to acknowledge that the most effective strategies to foster reuse are still evolving. Therefore, while a unified and robust policy framework is crucial, it should not become restrictive. Encouraging innovation in the reuse sector is pivotal, and economic operators should have the latitude to explore and define best practices.

3.1.1 DEFINITIONS

The success of the Plastics Pollution Treaty undoubtedly relies on having clear and universally agreed definitions. These definitions are not just a matter of semantics; they are crucial for ensuring clarity and harmonisation across all aspects of the Treaty, including reuse measures. By providing a universal language for reuse, which is currently lacking, these definitions ensure a shared understanding of key terms and concepts across different countries and application fields. Without a shared vocabulary and understanding, setting targets and minimum requirements would lead to inconsistencies and misalignments in implementation and measurement.

Eliminating 'single-use' plastics will not be sufficient to deliver reuse. Eliminating single-use plastics and enabling reuse are distinct yet interconnected objectives. Definitions of single-use may appear to define reuse by default, but in fact they do nothing to ensure that single-use 'alternatives' are in fact reused. The Treaty must incorporate definitions and measures that work in tandem across areas where single-use controls are introduced. Some single-use plastic items can and should be entirely eliminated (with no need to create reusable alternatives), while others should be replaced with reusable alternatives (in which case product standards and any requirements for a reuse system are likely to be required to avoid abuse). If a ban on single-use plastics is implemented without considering this aspect, there is a risk of unintended consequences. Another risk that may be hard to control within the scope of the Treaty is that of material switching when only plastic single-use items are controlled – see Call-Out Box 1-3.

The scope of reuse definitions within the Treaty can be categorised into foundational terms that are essential for understanding across all reuse measures and applications and other terms that are desirable, but not essential (e.g., terminology that is application- or sector-specific).

- **Essential definitions –** crucial to the Treaty and its effective implementation, include terms directly related to reuse, such as 'reuse', 'reuse system', 'reusable products', 'return rate' and 'rotation'. These definitions form the core of the Treaty's language around reuse.

■ **Desirable definitions –** relevant to the operational and practical aspects of reuse systems and reusable products, might encompass terms like 'system operator', 'incentive', and 'reverse logistics'. Additionally, there might also be the need for application-specific examples such as 'takeaway', 'closed-loop operation' and 'on-site consumption'.

Avoiding unclear or inconsistent terminology and objectives is of utmost importance. In refining both essential and desirable definitions, careful attention must be paid to wording to minimise ambiguity. This precision is vital to prevent the creation of 'reuse in name only' scenarios or opportunities for greenwashing. For instance, 'reuse' should always be conceptualised as a system, not merely as a material or product. Phrases like 'items can be used more than once for their original purpose' should be avoided to prevent ambiguity and potential greenwashing and instead 'used multiple times' or 'many times' would be preferable and better aligned with the Treaty's objectives. Specifying a minimum number of rotations for an item can, combined with a return rate target, offer two key parameters that should drive system performance to not only a high level of performance, but one where further optimisation will be in the economic interests of the system operator.

The scope and nature of definitions may need to evolve over time, as reusable and reuse systems in different products and contexts varies significantly. Attention to date has focused overwhelmingly on packaging, with some consideration of other short-life single-use items. Once the Treaty is in place, there will need to be scope to update requirements to encompass a growing range of items. Equally, as best practice evolves there may be scope to add detail to facilitate efficient and effective delivery internationally. These concerns should not delay starting. For example, a definition of reuse system could include the phrase 'improved environmental performance' and minimum requirement could elaborate on what constitutes 'improved environmental performance' in practice.

3.1.2 TARGETS

Reuse targets need to be well-defined, quantitative and time-bound with consequences for failure. They should strike a balance between ambition and achievability. Recognizing differences in readiness, a **two-tiered approach** could be introduced, with developed countries having faster targets and allowing the least developed countries more time to catch up. Provision to enable countries in this second group to commit to going faster might also be a strength. These end-point targets should also incorporate **phased, interim steps** to ensure changes start as soon as possible, and to give everyone confidence in the direction of travel and rate of change required. This will also enable accountability, both between domestic actors, and internationally.

The introduction of mandatory reuse targets is essential for achieving tangible results. It will enable the international community to assess progress, and also enable better management of change nationally. Mandatory reuse targets represent a firm commitment to combat plastic pollution, necessitating concrete actions and enabling progress to be measured. Clear monitoring and reporting requirements, using a common calculation and reporting methodology must accompany these targets – both for countries reporting internationally, but also to be transposed into national requirements on economic operators where appropriate. It is crucial to align these reuse targets with reduction targets and measures for single-use formats to ensure they do not merely add to the existing market.

Reuse targets should be included in the form of application-specific targets. Initially, application-specific targets should focus on at least the top five promising application fields identified in this report. If the end point for targets is further away (e.g. 2040) then a phased approach requiring rapid action should also be included, with five-year incremental targets, and the first five-year period starting in 2025. Target levels will vary by application, and are likely to be easiest to achieve (and therefore set at a higher level) for B2B closed-loop packaging, and single-use items consumed on-site in the foodservice industry. Among the remaining three priority applications, prefilled beverage bottles represent a group of products for which there is significant existing experience in the implementation of successful reuse models, and targets can

therefore be set reasonably high. Targets for take-away packaging and consumer delivery packaging are likely to be the most challenging to meet of the five, and should therefore likely be set lower in the short term to enable the establishment of necessary regulatory frameworks, and for industry to respond with innovative product design and infrastructure changes – however, in the longer term, these targets should be ramped up as well, as systems and new products roll out over time. The list of applications subject to targets can also be expanded later to include other applications, fostering tailored solutions within each industry and product category. Regular reviews and adjustments of application-specific targets are essential to maintain their relevance and effectiveness.

Higher targets may actually be easier to deliver. High targets will require a transition at scale – motivating meaningful national and industry action, and ensuring that reuse systems can achieve the economies of scale in both economic and behavioural terms that will enable them to be effective and efficient.

An aspirational objective obligating states party to the Treaty to expand the scope and level of ambition for reuse targets is also necessary. This sends an overarching, strong signal for market-wide transition, above and beyond the initially prioritised products. This ambition should be pursued both internationally, as part of a dynamic and evolving treaty regime, but also domestically, where national circumstances permit faster progress.

Importantly, the reuse targets established in the treaty should be viewed as minimum thresholds to be achieved, encouraging countries to set more ambitious national targets that go beyond the treaty's baseline requirements. They should provide a common floor, not limit ambition.

Reuse targets are dependent on definitions and measurement, and this will also have implications for national legislation. When setting application-specific targets in reuse systems, it is crucial to consider a range of factors including metrics, units of measurement, data gathering methods, and the roles of obligated actors. These factors vary depending on the specific application and the stakeholders involved.

For example, for prefilled beverages, a critical metric is the total volume of beverages sold in reusable bottles compared to single-use bottles. Actual measurement and reporting on this is likely to require national legislation that in turn requires economic actors to give national governments the data they will need for their own international reporting obligations. Allowing economic actors to discharge their obligations collectively via a reuse system operator (similar to a PRO in the context of EPR schemes), and requiring the scheme to report on performance would likely be a key enabler of data transparency and reporting. It would reduce the administrative burden on individual producers as well as state regulators, while also offering better data quality.

3.1.3 MINIMUM REQUIREMENTS

The third essential measure proposed in this report involves implementation of minimum requirements to ensure a foundational level of compliance and effectiveness in reuse practices globally. These minimum requirements translate the Treaty's definitions and targets into practical criteria and practices, making the transition to reuse a tangible reality with significant environmental impacts, whilst ensuring consumer safety and avoiding the health risks that have arisen with single-use counterparts. Minimum requirements are crucial as they set a universally acceptable lower limit, and ensure that all reuse initiatives meet basic standards of environmental performance, safety and sustainability. As reuse is only worthwhile when it outperforms single-use models against key performance metrics, minimum requirements are essential to avoid 'reuse in name only'.

Further, these minimum requirements should be complemented by guidance on best practices, additionally, built upon lessons learned from existing sector-specific reuse standards, see Call-Out Box 3-2.

In the absence of global rules, diverse reuse systems with varying minimum requirements could emerge. Some might be high performing, and others might not be. Additionally, in a world where all systems are developed uniquely, opportunities for economies of scale will be lost, and reuse will be harder to navigate for all economic actors, big and small. Cross-border supply

Call-Out Box 3-1

WHAT AND HOW TO MEASURE AND REPORT?

The scaling of reuse systems is currently hindered by a significant barrier: the absence of harmonised metrics for measuring and tracking reuse performance. To address this, it is essential to establish robust and comprehensive reuse metrics and measurement methods, ensuring harmonisation across industries, governments, and standard-setting institutions. This will facilitate credible reuse measurement and effective regulation enforcement. An example of this effort is the 'Consumers Beyond Waste' initiative by the World Economic Forum, which is working on building reuse measurement guidelines intended to become the accepted industry standard. Share of volume or product units and reuse effectiveness were recommended as the two primary metrics further expanded with return rate.

- the share of volume or product units, which measures the percentage of product delivered in reusable formats (e.g., litres of beverage),
- and reuse effectiveness, capturing the number of rotations achieved by reusable products,
- return rate was additionally added to the list.

Setting ambitious but achievable standards and targets for both return rate and average number of rotations (with minimum requirements for both) will avoid the risk of 'reuse in name only' (where products claim to be reusable but are not in fact reused at a level that realises the benefits of reuse). Once this is achieved, further optimisation is in the system's economic interest, driving further improvement.

The Treaty should pass regulations to achieve standardised measurement and a reporting framework, one that imposes minimal administrative burden, to transparently measure and track progress towards reusable models and ensure their environmental soundness.

These requirements will also need application at national level. International guidance on best practice may help to achieve this effectively and efficiently.

National legislation will need to specify data collection entities, methodologies, and reporting mechanisms, and the actors expected to provide data. While national data collection is crucial for measuring, regulating, and growing reuse, data obligations for reusable products or systems should avoid being more burdensome than those for management routes lower down the waste hierarchy.

Life Cycle Assessment (LCA) currently serves as the predominant method for evaluating the environmental impacts of products and systems throughout their lifecycle, but caution is needed to ensure that it is applied fairly, and in a way that can account for transformative system change in future. When it comes to comparing reusable packaging formats/systems with their single-use counterparts, the application of LCAs often encounters limitations (as is the case with single-use alternatives as well). If analysis focuses on current systems, single-use systems are well-established and operate at scale with associated efficiencies, whereas reusable systems are still evolving and not yet fully optimized. This can lead to potentially unfair or unhelpful comparisons for future planning. Furthermore, LCAs can also limit their scope on ways that neglecting crucial environmental and social factors where reuse systems may outperform single-use. These factors may include the impacts of unmanaged litter on ecosystems, the dispersion of microplastics, and the broader social consequences associated with material production, use, and disposal – in short, some of the key drivers of concerns about plastic pollution, and the Treaty. There have been recent attempts to use LCA analysis to undermine the case for reuse, but these often lack transparency on both data and assumptions used. LCAs on packaging systems can be an important tool for optimising products and systems and ensuring the benefits of reuse are realised, but care is therefore needed to ensure they are applied rigorously, consistently, and fairly. Therefore, the Treaty will be safer setting high level performance requirements for reuse systems, rather than encouraging conditionality on LCAs at national level for these headline parameters, as any conditionality of obligations linked to LCAs will be challenging to standardise and quality assure, leaving it potentially open to abuse.

chains and differing reuse policies at the country level would be inefficient, especially for producers operating in multiple markets.

Minimum requirements must encompass both the products and the systems designed to ensure those products are in fact reused. Widespread reuse at scale involves more than just the product; it requires a system that ensures the product is returned, placed back into circulation, and used again. Ineffective or absent reuse systems will likely result in minimal reuse for most products. Effective reuse policies must encompass the entire reuse system, not just the reusable products. These may include design and performance criteria like ownership, financing, scope, and elements of design, as detailed in Table 3-1. However, these requirements should be flexible enough to accommodate technological advancements and varying national contexts and capabilities. It is therefore likely that more detailed elements of requirements would be in the form of guidance, or be collectively developed within the treaty regime after signature.

A one-size-fits-all-products solution for reuse does not exist even with a common national context. Reuse systems must be tailored to specific products, after establishing overall minimum requirements in line with the above recommendations, and recognizing distinctions between sectors such as food, beverages, personal products, and B2B or B2C. For example, a closed-loop B2B transport packaging reuse system will differ from one for takeaway food containers. The product

Table 3-1 **RECOMMENDED MINIMUM CRITERIA FOR PRODUCT DESIGN AND SYSTEM PERFORMANCE**

System	Product
■ Reuse systems must be set up to include necessary infrastructure and reverse logistics for collection, sorting, washing, refilling, and redistribution; ■ Reuse systems must be subject to minimum reuse collection/return rate targets by a designated application-specific entity (it has been suggested that this should be 90% to maximise environmental benefits, and this return rate is achievable in consumer-facing packaging systems); ■ Robust data collection and reporting on reuse system performance; ■ Holding economic operators accountable for return rates; allowing collective discharge of reuse obligations (including collection, sorting, washing and redistribution); ■ Capable of adjusting system design for unmet return rates, utilizing incentives like deposits[46], fees[47] or rewards[48] to enhance returns; ■ Implement strategies to increase public demand and engagement with reuse systems and models; ■ Prioritize decarbonization in reverse logistics and transport, transitioning to carbon-neutral options; and ■ Ensure reuse system implementation and operation are unrestricted by national boundaries.	■ Optimize reusable product design for durability, safety (avoiding chemicals and polymers of concern), collection, transport, reconditioning (nestability, collapsibility), and interoperability between different reuse systems; ■ Design reusable products for a minimum number of rotations within a given system before end-of-life, with some suggesting at least 10 rotations (while the exact requirement may vary by product/context, and higher may be desirable, ten provides a performance 'floor' that should be achievable); ■ Where possible, use recycled materials for reusable products and ensure recyclability at end-of-life back into the same product; ■ Harmonize packaging design for universal acceptance across different reuse systems, ensuring material agnosticism and avoidance of chemicals of concern; and ■ Provide clear labelling for consumers on how and why to return.

groups approach is relevant here – for example there are significant commonalities between packaging product groups, whilst short-life single-use items pose different challenges (e.g. the lack of scope for centralised return leading to a likely reliance on a reuse and retain model and necessitating behavioural or operational changes by users in practice). This has informed prioritisation for this study, and also the decision to regulate some products by context, not simply product characteristics. However, this landscape will get more complex as the Treaty expands scope over time.

This being said, the key enablers to establish effective reuse systems remain the same for all applications. **As highlighted throughout this report, the act of product return is essential to the effective performance of all centralised reuse systems, and as this relies on consumer participation in all business-to-consumer models, it is highly likely that consumer participation will need to be incentivised.** This necessitates the development of efficient and accessible return systems, which can be facilitated on the producer side through EPR-style schemes where producers are (potentially collectively) responsible for the end-of-life management of their products, and on the consumer side through incentives such as deposits. In the area of packaging, DRS for both single-use and reusable containers has been shown to bring high return rates. It is likely to be a critical feature in packaging reuse models in future.

Three elements of key interest would include:

- **Using EPR-style schemes for reuse to ease reporting and compliance within national legislation.** Economic operators should be able to discharge their reuse obligations through an existing EPR scheme or to a specific reuse organisation. To maximize economies of scale and simplify the consumer experience, allowing economic operators to collectively discharge reuse obligations is crucial. This approach should include shared return infrastructure, such as drop-off locations that prioritise consumer convenience and participation.

- **In addition, it is desirable for single-use EPR to subsidise reuse systems.** Across both single-use and reuse EPR provision, producers should be obliged to cover the costs of reuse provision, including ensuring system access, infrastructure, and consumer communication.

- **Deposits are a well-established mechanism for achieving high return rates for both single-use and reusable products.** A refundable deposit at the point of purchase incentivizes consumers to return items, and is likely to be key to future reuse systems achieving high performance. Single-use recycling collection systems which use deposits do so as part of a wider Deposit Return System, which centralises payments, and refunds, and in the case of reuse would be managed as part of the wider reuse system. There is a strong case for minimum standards or best practice guidance about governance arrangements relating to such a DRS mechanism to facilitate fair, efficient, and effective functioning.

In combination, requirements covering these elements should ensure high return rates and good governance in national systems.

3.2 WHAT THIS MEANS FOR THE TREATY

3.2.1 OPTIONS FOR IMPLEMENTATION

The options for implementing reuse measures in Part II, paragraph 5.b. of the zero draft treaty are currently clubbed together with a range of other objectives, including "reduction", "recycling", "refill", "repair", "repurposing" and "refurbishment".[53] The above analysis of potential applications for reuse and associated measures shows that this is not appropriate, as reuse measures relate not only to the products they address, but the operational systems by which these products reach consumers (e-commerce, retail, etc.), and the mode of consumption (on-site, take-away, etc.). The applications that are suited to reuse will not necessarily be suited to other types of circularity approaches, and vice versa. This means that reuse measures need to be specified separately from measures related to other treaty objectives.

As described above, concrete and harmonised priorities and measures such as definitions, targets, and minimum requirements must also go hand in hand to ensure that action to promote reuse is implementable in a harmonised and structured way, and that they are measurable and effective in terms of environmental performance. While keeping in mind the different levels of readiness for reuse measures across countries.

Overall, however, a treaty that relies heavily on the use of nationally determined measures and targets on reuse is likely to face delays in implementation, administrative and financial challenges for both governments and industry stakeholders, and ultimately, a greater chance of failure (meaning that we remain in a single-use, linear economic system with increasing environmental pollution). The global stock-take of the effectiveness of national determined contributions (NDCs) in meeting the goals of the Paris Agreement at COP 28 provides a clear indicator of the weaknesses of such an approach.[54] While this argument holds true for all control measures in the Treaty, the need for more stringent implementation is particularly pronounced for reuse due to the risk of unintended consequences (see Call-Out Box 1-3).

Giving states party to the Treaty the flexibility to determine reuse measures, without a consistent and clear underlying framework of definitions, targets and minimum requirements to ensure a minimum level of performance, significantly increases the risk of such unintended consequences. Conversely, if the treaty were specific, structured and harmonised in its approach to reuse, the measures could potentially serve not only as a control on single-use plastics, but also as a deterrent for single-use items made of other materials, as the benefits of reusa-

ble alternatives and the systems for their uptake become more widespread.

In this regard, it must be noted that despite their immense potential to reduce material consumption alongside per item pollution associated with single-use items, reuse systems are relatively nascent. This means that the Treaty must not only be ambitious, but also agile in relation to reuse measures, setting targets and standards that bring about a system level change without being prescriptive in ways that limit innovation. A start-then-strengthen approach is desirable, so that as new evidence emerges, ambition can be scaled up over time across different dimensions (level of targets, product coverage, quality of reuse systems). While this report identifies the top 5 applications that are suited to reuse measures, therefore, this is intended to serve only as a starting point, and the reuse measures must be designed to be dynamic over time. This dynamism might include extensions in the scope of products covered, the amount of reuse targeted for included products, and/or increasing requirements on the quality of reuse systems to maximise environmental and social benefits.

3.2.2 STRUCTURE AND KEY PROVISIONS

With the principles above in mind, and given the rationale for the key reuse measures provided above, the most appropriate structure and provisions for reuse measures in the global Plastic Pollution Treaty can be determined.

Priorities and control measures on reuse are recommended to be included both in the main body of the Treaty text, as well as in the Annexes. In addition, there is likely to be a role for guidance to support states in effective implementation. In some cases, the Annexes and associated guidance may need to be developed and evolve over time as part of the Treaty process, where best solutions are still being determined. However, waiting for this level of detail need not delay binding commitments in the main Treaty document.

Reuse provisions in the main body of the text (including any core obligations related to both return and reuse models, as is the focus here, and reuse and retain models as well) should be in the form of a separate paragraph, and not clubbed together with other objectives around recycling, repair and refurbishment. Each of these would benefit from having their own separate sub paragraphs and provisions. An exception might be where the Treaty tackles a specific product, product group, or sector – in such a case, product specific provisions might include examples of multiple types of control, in a tailored combination for the specific product or product group in question. Those on reuse should still be specific in that case. If all provisions are kept in one paragraph, a clear separation between them is needed in the Annex and Guidance, for example on the targets.

Additional provisions should also be included in the appropriate paragraphs to provide harmonised definitions for reuse, as well as requirements in relation to monitoring, transparency, labelling and reporting. Provisions that are likely to be subject to further revision in the future, such as the products and sectors that are subject to reuse requirements, timebound targets for reuse, and minimum requirements for reuse systems and applications, have been suggested for inclusion in the Annexes, to enable future revisions without needing to alter the main text of the Treaty itself (which is likely to be more challenging, and reduce the prospects for continual improvement).

We have also identified a need for accompanying guidance to be issued by the governing body to support implementation of the control measures on reuse – for example, outlining the key elements of different types of measures, best practice for the implementation of these measures, and considerations associated with implementation in different country contexts, including how the relative costs and benefits of alternative approaches should be assessed and how to tackle unintended consequences such as the potential for material switching (see Call-Out Box 1-3).

These recommendations also reflect our considerations of different national contexts and capabilities to meet the relevant obligations, by introducing a longer timeframe for achievement of the targets in countries that are less capable of implementing return and reuse systems immediately – these should be included in the form of exemptions, with accompanying guidance on transitional measures to encourage reuse during the period of exemption

(see Call-Out Box 1-4 for examples). The conditions under which such exemptions should be granted should be considered carefully – for example, the existence of recycling infrastructure is not a prerequisite to establishing reuse systems and prioritising recycling over reuse should not be permitted; reuse systems can be implemented alongside – and potentially before – waste management infrastructure, and if done well can limit the associated capacity and investment needed for waste infrastructure needed in the first place.

The recommended provisions on reuse and their suggested placement in either the main body of the text, annexes or guidance is provided in Table 3-2.

In the table below, some additional provisions are recommended to ensure that progress against reuse requirements listed above can be measured and monitored, and that future revisions of the Treaty can strengthen requirements in line with increasing ambition for reuse.

Table 3–2 **RECOMMENDED STRUCTURE AND PROVISIONS FOR REUSE MEASURES IN THE TREATY**

1 = Main body; **2** = Annex; **3** = Guidance

Provisions	Placement			Notes
Definitions	**1**	**2**	**3**	
Essential terminology that will apply across all reuse measures irrespective of application/ sector	✓			■ Should only include definitions that are essential for harmonised understanding of the reuse measures. These should not need to change much over time, and include definitions of terms like “reuse”, “rotation”, and “return rate”.
Terminology that is specific to a particular plastic application/ sector that is being regulated		✓		■ Should include definitions that are desirable to enable common interpretation of the reuse requirements for specific applications, and should be in an Annex to ensure they can be more easily updated over time if needed. For the top 5 applications identified in this report, this could include terms like “B2B”, “on-site”, “takeaway”, “closed-loop”, and “consumer delivery”, among others, since these terms may have different interpretations in different country contexts or as the range of products covered in the Treaty expands.
Targets	**1**	**2**	**3**	
Obligation to meet minimum, time-bound targets for the implementation of reuse systems and reusable products to replace plastic applications specified in the Annex. Option for countries to expand the scope/ level of ambition of these targets voluntarily where feasible / environmentally beneficial as part of national measures.	✓			■ Should be applied to products produced in the territory of a country, but also those placed on the market in that country so that imports are also regulated. This could additionally extend to products produced for export to non-Treaty countries as well. ■ This is a harmonised obligation – meaning that all states must meet the minimum targets for reuse in the plastic applications specified in the Annex (which may be updated over time). However, states that can go further (i.e., achieve higher targets, or transition to reuse for other plastic products) should be encouraged to do so.

Table 3–2 (Part 2)

1 = Main body; **2** = Annex; **3** = Guidedance

Provisions	Placement			Notes
Targets	**1**	**2**	**3**	
Mechanism for revision of scope/ levels of targets specified in Annexes over time	✓			■ Allowing the targets for the top 5 applications to be increased, and for targets for additional sectors and applications to be introduced over time, in line with the "start-then-strengthen" approach.
Minimum reuse targets, points of application and deadlines for the top 5 plastic applications identified in Section 2.0 above		✓		■ Should be specified for the top 5 specific applications in an Annex so that they can be more readily revised/ product coverage can be expanded in the future. ■ The level of the targets will vary by the specific application – higher targets will be most appropriate for applications that tend to circulate in closed loops, i.e., in specific settings or among a small group of actors, such as the case for on-site single-use plastic items used in a restaurant, or B2B plastic packaging in closed loops. Comparatively, targets for items that tend to be used in a wide range of settings, by a large number of actors (such as takeaway packaging) will be more challenging to meet, and should therefore be lower initially. ■ The targets should specify clear deadlines for achievement, and be set to increase over time to ensure that the direction of travel is clear even if higher levels of attainment are not immediately feasible. For example, initially, reuse targets for prefilled beverage plastic bottles could be set low (e.g., 5%-25% to be achieved by 2030), reflecting the initial time needed to set up necessary regulatory frameworks, and for industry to respond with product design and infrastructure changes. However, such a low target in isolation would not send a clear or strong message regarding the need for industry transition to reuse, and sub-optimal or short-term investment and operational strategies would result. Specifying that targets will increase over time (e.g., for prefilled bottles, increasing to 25-60% by 2035, and from there to 60%-90% by 2040) would send a much clearer signal and ensure that investments and infrastructure are established with long term goals in mind, whilst also providing the flexibility needed in early years. ■ The point at which the targets are applied for the different plastic applications should also be considered carefully – for non-packaging single-use items, targets based on numbers of items sold is workable (e.g., 100% of all plates, cutlery, trays, straws, etc. used for on-site consumption of food and beverages must be reusable), however, for packaging items, given the nature of the supply chain, targets based on the weight, volume or numbers of items sold in reusable packaging might be more suitable.
List of potential measures that could be implemented to support meeting the reuse targets		✓		A list of potential measures that could be adopted by countries to help achieve the reuse targets should also be included in the Annex. These should not be mandatory, so that countries can select the ones that work best in their specific context, and the list should be open to additions over time as innovation in reuse systems advances : ■ implementation of reuse systems and infrastructure; ■ design criteria to enable reuse in the above systems for the products in the Annex; ■ economic instruments including fees, tax incentives, subsidies and subsidy reform to incentivise changes in supply chain as well as consumer behaviour; ■ mandatory requirements for products to be reusable, and/ or for single-use alternatives to be banned or subject to additional charges ■ mandatory requirements for foodservice/ retail providers to accept reusable items and enable their use by consumers (i.e., to encourage reuse and retain models) ■ green public procurement in favour of reusable items; ■ raising consumer awareness on sustainable consumption; etc.

Table 3–2 (Part 3)

1 = Main body; **2** = Annex; **3** = Guidance

Provisions	Placement			Notes
Targets	1	2	3	
Current knowledge and best practice in the implementation and effectiveness of different measures to implement reuse systems (for the top 5 applications specified in the Annex)			✓	■ To support the implementation of the measures above, and ultimately the attainment of the targets, the governing body should be empowered to adopt guidelines for reuse related to a range of topics, based on ongoing innovations and specific country experiences. This will help to support countries in interpreting and implementing reuse measures, providing a useful knowledge-sharing tool, and enabling flexibility in implementation while innovation is ongoing and best practices emerge. ■ Guidance should include content related to designing reusable products, set up of associated reuse systems, and financing of systems with different country contexts in mind, and could also provide working definitions as the regime evolves, prior to new definitions making it into the Treaty/ annexes.
Current knowledge and best practice related to the implementation of reuse measures for plastic applications not specified in the Annex			✓	■ The governing body should be empowered to also adopt guidelines for reuse related to other applications that they may want to consider for reuse in their specific national context, providing a useful way to support higher ambition countries and to monitor developments in other applications that may become more suited to reuse over time.
Option for time bound exemptions from the targets for countries that can show a need for additional time to implement reuse systems.	✓			■ Eligibility for such exemptions should be restricted to countries that are most likely to struggle with implementation, or where the business case for reuse is more challenging to establish due to geographical limitations, risks of negative distribution impacts, etc. (e.g., only the least developed economies/ low-income economies, microstates and SIDs can apply). A lack of recycling infrastructure should not be considered as a basis for such exemptions, since the establishment of reuse infrastructure can make systems more efficient and reduce the need for waste management infrastructure/ capacity in the first place. ■ For parties registered for the exemption above, there shall be an assessment of the need as well as mobilization of financial resources, capacity building and technology transfer for each country in order to support the transition to reuse systems. There should also be an assessment of whether the adoption of reuse and retain models can be adopted to support the transition to return and reuse models that may initially be too costly/ require too much additional infrastructure to establish. ■ Economic measures related to the incentivisation of supply chain changes and consumer behaviour in favour of reuse must be implemented at the national scale once systems are established/ in the process of scaling up – this should be based on the polluter pays principle, and the role of EPR, taxes and charges should be emphasised (see Section 4.0 for further detail). ■ Further support will be needed to enable the initial transition to such systems (in the form of multilateral funding and transfers from developed to developing country governments/ businesses).

Table 3–2 (Part 4)

1 = Main body; **2** = Annex; **3** = Guidance

Provisions	Placement			Notes
Targets	**1**	**2**	**3**	
Mandatory requirement for reporting of attainment against targets (and associated metrics).	✓			■ Should require states party to the Treaty to establish monitoring systems and transparently track and report progress towards the reuse targets and the effectiveness of reuse measures in line with the minimum requirements for both reuse systems and specific applications. ■ Monitoring and reporting must be sufficiently detailed and granular to enable delivery of Treaty objectives at national level, i.e., focussed not only on the amount of reusable packaging available, but on the amount of reuse that is happening in practice within established systems in order to maximise environmental performance. ■ A provision for states party to the Treaty to require economic operators to disclose the relevant information and report in a harmonised way is likely to accompany this. ■ Further provisions needed for how/ when/ to whom reporting takes place and how this is made publicly available to ensure transparency/ accountability will also be needed.
Current knowledge and best practice in data gathering, calculation, reporting and verification methodologies related to reuse			✓	■ The governing body should be empowered and enabled to adopt guidelines for the measurement, verification and reporting of reuse based on existing best practice, and representing different country contexts and needs. This will help to support monitoring of reuse efforts under the Treaty, and to enable further harmonisation of measurement approaches down the line.
Minimum requirements	**1**	**2**	**3**	
Obligation to implement reuse systems as a part of the measures to achieve reuse targets (as listed above under 'Targets' and further detailed in Section 4.0), and to do so in line with the minimum requirements for systems and products specified in an Annex.	✓			■ Should accompany the above targets and be a core obligation in the main text to ensure that all reusable products and systems are established that meet some minimum performance requirements and achieve positive environmental outcomes, avoiding the risk of unintended consequences such as greenwashing. The minimum requirements themselves will vary by application and may be subject to changes over time, and so should be in an Annex.

Table 3–2 (Part 5)

1 = Main body; **2** = Annex; **3** = Guidance

Provisions	Placement			Notes
Minimum requirements	**1**	**2**	**3**	
Minimum requirements for reuse systems		✓		■ See Table 3-1above for recommendations regarding scope of such minimum requirements. ■ In terms of minimum requirements for responsibilities, enabling obligated economic operators to establish and join collective reuse systems to discharge their reuse obligations will be important, as this is likely to be a key feature of efficient systems for some plastic applications, such as B2B closed-loop packaging (though not all). Requiring reuse systems to be responsible for ensuring a minimum return rate for products, and to be responsible for monitoring and reporting this to national governments will also be crucial. ■ In terms of system design, minimum requirements for environmentally and economically efficient collections, transport, washing and redistribution will be necessary, and while the system operator may not be required to perform all these functions itself, it must ensure that any third-party providers do so. Additional requirements to ensure that informal sector workers are integrated into such systems, and that consumers have fair and convenient access to products and collection systems will also be needed.
Minimum requirements for reuse applications / products		✓		■ See Table 3-1above for recommendations regarding the scope of such minimum requirements. ■ Requiring reusable products to be designed to be reused within an established system (see above), and for a minimum number of rotations within such a system will be crucial – some literature suggests ten rotations should be the minimum specified across all reusable products, but for some applications this minimum could be much higher (e.g., for reusable beverage bottles made of glass and PET, existing systems report a minimum of 25 rotations is feasible). ■ Products should also be designed with consumer convenience, health, safety and hygiene in mind. To maximise environmental benefits, they should be designed to incorporate recycled materials where possible, and to be recyclable at the end of life.
Provision encouraging states party to the Treaty to work with international organisations to develop necessary standards / update existing ones at multilateral level to align with minimum requirements in this instrument and guidance of the governing body	✓			■ This is a key requirement that will enable a shift from minimum requirements in the short term, to best practice standards in the longer term. As an alternative, the governing body could be required to establish such standards, but this is likely to be less efficient than relying on existing standards/ standardisation organisations and also challenging to do in the short term without stifling innovation. ■ In the short term, revision and alignment of existing standards like ISO standard 18603:2013 could be considered. In the longer term, the governing body may want to take on this role as greater potential for global harmonisation emerges.

3.2.3 DATA COLLECTION AND TRANSPARENCY

The table above includes a recommendation for provisions related to monitoring, reporting and transparency. This is crucial, particularly as reuse is a novel area, and both consumer confidence, as well as knowledge sharing will be key to collective improvements over time.

While harmonised requirements for states party to the Treaty are important to ensure a sufficient level of ambition and effectiveness, equally important are requirements to report on progress in a transparent way, so that states party to the Treaty can be held accountable by the international community. Harmonised metrics for reporting, a minimum frequency of reporting and penalties for not meeting reuse obligations must therefore also be included in the Treaty.

The resulting data will be useful for states party to the Treaty to track the performance of economic operators in relation to individual measures, and also to enable labelling and consumer awareness measures around reusable products. At the same time, transparent reporting to a responsible authority (be this the Secretariat, governing body, or other) is desirable, so that country performance can be compared, and overall global progress monitored – this also allows for data to be collated and made publicly available in a clear and consistent way.

An additional benefit here is understanding and disseminating what works, in the form of knowledge sharing to encourage efficient replication, enable solutions to transfer to new applications, and facilitate the process of international standardisation of systems. Cooperation between states party the Treaty will be necessary here, in terms of capacity building and technology transfer to support set up and operation of electronic registries/ databases as part of monitoring activities, and also to ensure that obligations to gather and disclose information are also passed down to economic operators in as harmonised a way as possible.

Further detail on how this overlaps with national implementation activities and wider data expectations for the Treaty as a whole is provided in Section 4.

3.2.4 MECHANISM FOR REVISIONS

Monitoring progress in this way will also enable reuse requirements to be revised over time and as new evidence emerges. As we've mentioned previously, the Treaty must be a dynamic, agile one, able to respond to changes in the plastic supply and value chains, including shifting demand, to remain relevant and effective. A mechanism whereby existing measures can be reviewed against the progress reported, and whereby states party to the Treaty can share new information and lessons learned to inform new Annex measures will therefore need to be established.

Given the breadth of topics covered by the Treaty, and the risk of unintended consequences associated with reuse measures in their infancy, as well as the ambition for plastics to become more circular over time, it is likely that the governing body or Secretariat will have to be supported by specific technical committees established to assess the extent to which additional plastic applications become suitable for reuse measures, or existing requirements can be strengthened over time. For example, the Montreal Protocol has made extensive use of subsidiary working groups under its Technical and Economic Assessment Panel and provides a template for creating provision for this approach. This approach can both provide evidence to states for future conferences of the parties, but may also play an important role in socialising knowledge and understanding of what is possible as technologies and costs change over time. In the context of a plastic pollution Treaty, such committees could include independent technical experts, and represent a range of geographic contexts and relevant technical expertise. The technical committee could also support the development and revision of guidance (and potentially in the future, standards) for reuse.

National governments and associated agencies, standardisation bodies etc. should be encouraged to engage with the committees of this nature to submit applications and evidence in support of their positions on new measures/ applications based on lessons learned. Any committees should similarly be assisted by civil society actors, NGOs and so on to enable them to fulfil their mandate effectively.

4.0 MEANS OF IMPLEMENTATION

The greatest challenge around reuse is unlikely to be actually running a large-scale system effectively and efficiently, but the challenge involved in transitioning away from predominantly single-use and linear systems. This is a key area where national governments can act to support progress, and if they act together, under the Treaty mandate, then the transition is likely to be faster, more effective, more efficient, and can maximise benefits in terms of reduced plastic pollution.

As part of implementing the proposed global rules set out above, there is a need for the Treaty and accompanying guidance to support the development at scale, maximising the benefits of smart technologies and information systems, and realigning incentives to unlock investment and encourage consumers to do the right thing. At the same time, the Treaty must enable, not constrain continual improvement.

Three themes are critical to the Treaty as an enabler for change.

- **Technology** will increasingly enable tracing and tracking of progress towards reuse. This is true of individual reuse systems, and the way that governments can harness reuse data for national policymaking and international reporting.
- **Collaboration** and sharing of practice is also likely to be a key area where improvements are seen over time. A greater degree of harmonisation and standardisation should be anticipated as systems optimise, and this should improve overall outcomes.
- **Financing** the transition is a critical enabler. It will be key to both initial market penetration and ongoing operations, though the latter should be less challenging.

4.1 TECHNOLOGY AND INFRASTRUCTURE

To enable data gathering, monitoring and transparency (see Section 3.2.3 above), the Treaty should stress the need for robust tracking and information systems to be implemented as part of reuse systems. This will be essential to the operation of the systems, the delivery of optimal national policy responses, and to international reporting and accountability. Guidance on this should include:

- **Templates for data gathering and reporting,** including the potential for establishing electronic databases and integrating these with other existing reporting systems where relevant.
- **The potential for smart technologies** (such as RFID tags, QR codes, etc.) for tracking reusable products and measuring return rates and rotations, as well as potential options for mandating the use of such technologies if appropriate in a particular country context.
- **The potential of technology,** e.g., use of consumer apps to facilitate access to reuse systems and return rates, use of RVMs to facilitate collections.

Guidance could also clarify that national reporting by the government is dependent on in-country reporting by reuse systems. As they will need to track much of this information to run efficient systems this should not pose a significant burden. Reuse reporting should not be more burdensome than requirements for reporting on less sustainable items.

The technologies must sit within the context of the wider infrastructure that underpins a reuse system, so further guidance on the design of effective reuse infrastructure should be made available (aligning with the minimum requirements for reuse systems). Again, implementation will vary by country, so guidance on a range of options/ models should be offered, together with an assessment of pros/ cons in different contexts.

Lastly, guidance should be mindful of the need for a socially equitable and just transition, it must be recognised that models of reuse already exist in many country contexts, often involving informal workers. In India, for example, in most cities, scrap collectors go door to door to collect valuable scrap materials – a system that could easily be integrated to enable collection and redistribution of reusable items. Similarly, the system of "dabbawalas" in Mumbai is a well-known one that could potentially be leveraged to enable reuse of takeaway/ food packaging.

Furthermore, collaborative systems and shared infrastructure will be critical to scale up reuse systems. Accordingly, states party to the Treaty must allow and enable collaborative models of reuse to be established across multiple economic operators.

Shared infrastructure in the form of collection systems (or return locations) is likely to be necessary to optimise the consumer experience and maximise engagement with reuse. By also sharing infrastructure for reverse logistics, cleaning and redistribution, individual companies are likely to be able to make services more efficient, and cut transport distances relative to a situation in which each company had to develop its own system.

While the Treaty should therefore require parties to enable collaborative models of reuse, guidance will be needed to highlight the options for such models for different applications, as well as their relative merits and key considerations. In some cases, individual systems may be more desirable, and where existing company systems are performing well, they should not be discouraged. However, particularly in countries with limited geographical land area, or smaller individual markets, **collective reuse systems and international standardisation are likely to be highly desirable to ensure that the economies of scale necessary to make such systems viable are met.** This degree of alignment may not be appropriate to mandate in the Treaty itself, but the Treaty regime could seek to encourage the development and alignment of standards over time.

4.2 FINANCIAL AND TECHNICAL MEANS

The implementation of reuse implies a system change – moving from a linear take-make-dispose model to a circular approach through which our overall plastic material

and pollution footprints can be significantly reduced. This change will provide long term benefits to society, but this transition will need to be funded, as will ongoing reuse operations in the future.

Here we discuss some options for funding the reuse transition.

EPR, enshrining the principle that the producer pays for the cost of managing their product across the lifecycle, is a powerful mechanism in the context of the plastic pollution Treaty, in contrast to the mechanisms for financial and technical knowledge exchange more normally considered in international environmental treaties. This can fund a reusable system once it is established, and level the playing field in terms of cost distribution by using fees raised from single-use EPR schemes (which can include fee modulation for less sustainable packaging, and sometimes already divert some fees towards innovation and new investments).

Potential mechanisms to discourage single-use alternatives from the production perspective might include differentiated taxation for virgin, biobased, and recycled materials, coupled with energy/emissions taxation to ensure the implementation of environmental performance criteria. These will push for less material use overall, and also reward the most environmentally efficient solution. Additional incentives, such as zero VAT for reused items and consumer-facing charges on single-use items, should be tailored to specific application fields.

Requiring economic operators to provide innovative finance mechanisms (e.g., pay in instalments, spreading costs through shared infrastructure etc.) would also help reuse systems to become economically competitive, viable and cheaper in the long term. In addition to private finance (which will be harder to attract in some markets and at earlier stages in transition), funding for this could come from in-country taxes and charges on single-use alternatives, from income generated by wider EPR Schemes (for example transferring revenue from single-use to reuse), or from government grants. In the latter two cases, financial transfers, as grants or loans, might be required nationally or internationally for less wealthy countries or regions. In the former case, mechanisms to enable the private sector to access investment capital internationally could perhaps be considered.

From the consumer perspective, the use of incentives, such as charges on single-use plastics, taxes on virgin plastics, deposits, and so on will be crucial for both producers and consumers, and can have a double dividend if any resulting revenues from such measures are ringfenced for example, to subsidise reusable alternatives (as discussed previously in section 3.1.4). Many countries already have such charges and taxes in place, and reallocating associated revenues in this way would be a quick way of unlocking additional finance. However, implementing countries will need to ensure that taxes and charges of this nature do not create unfairness in terms of access to necessary products and services. The best solution to this may lie outside of specific material policies (and thus the Treaty remit), as it could well involve balancing costs here against other elements of revenue and living and business costs. However, some solutions to the problem of cost distribution are not independent of Plastic Pollution Treaty objectives. Any subsidies for industries like waste incineration for example, which perpetuate linear models of consumption, should be removed, and refocussed in favour of more circular solutions like reuse. For example, in Germany, the use of fossil fuels in products like plastics is excluded from taxation (indirect subsidy).[56]

Once the transition is made, provided the Treaty is ambitious in relation to EPR (both in relation to reuse and more generally) producers should increasingly be paying the costs of managing their products right around the use cycle. Reuse would be no exception to this, and reuse systems would be expected to charge producers for the cost of managing their products. Cross-funding from single-use products could well remain longer term. It is worth noting that investments in reuse do not necessarily have to be made independently of investments in other forms of plastic pollution reduction under the Treaty, especially in relation to returns and collections. For example, DRS infrastructure for beverages could be configured to enable both single-use and reusable containers to be collected.

The transition to reuse, and associated infrastructure changes 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. This therefore additionally implies financial mechanisms that can move funding and technical knowledge between different settings, as well as within a given market.

For example, in countries in which existing supply chain models and logistics do not function well due to a lack of adequate transport networks, or unreliable water or electrical supply, it will be more challenging to set up reverse logistics and a return network that is accessible and efficient. Similarly, in countries where single-use EPR schemes are not established crossover funding will not be an option at first. Likewise, financing large scale investments from the private sector may be harder in markets perceived as a higher investment risk or where capital is scarce.

Multilateral funding will have a role to play here, particularly in supporting longer term infrastructure projects. However other financial mechanisms may also be worth considering. There is potential scope for the introduction of certain fees or taxes, by each party, to direct financial resources to the transition to reuse systems.

Capacity building will also be key. There is a need to unlock innovation and investment into reuse, not just to develop infrastructure and technology (discussed above) but to encourage capacity building and training that will ultimately allow job growth and new employment opportunities. Further, mechanisms to ensure consumer engagement (for example explaining the how and why of new solutions) will not be cost free – funding for an effective reuse system is not simply in products and technology. From business' point of view, ensuring at national level access to research grants, options for public private partnerships, green procurement, and setting standards for venture capital and other forms of investment finance to support projects with longer periods of return would help provide the initial funding needed to support the setup of reuse systems.

Again, the ability of countries to deliver these objectives will vary, and international support mechanisms will need to be a feature of the overall Treaty, and be available and accessible in the context of the reuse transition.

ENDNOTES

1) See WWF, 2023. Regulating high-risk plastic products report

2) European Bioplastics, 'Bioplastics Market Development Update 2023', European Bioplastics e.V., 2023, https://www.european-bioplastics.org/market/

3) Pierre-Olivier Maquart, Yves Froehlich, and Sebastien Boyer, 'Plastic Pollution and Infectious Diseases', The Lancet Planetary Health 6, no. 10 (2022): e842–45, https://doi.org/10.1016/S2542-5196(22)00198-X

4) Mine B. Tekman et al., 'Impacts of Plastic Pollution in the Oceans on Marine Species, Biodiversity and Ecosystems' (Zenodo, 2022), https://doi.org/10.5281/ZENODO.5898684

5) UNEP, 'Intergovernmental Negotiating Committee on Plastic Pollution', UNEP - UN Environment Programme, accessed 6 September 2023, http://www.unep.org/inc-plastic-pollution

6) PEW Charitable Trusts and SystemIQ, 'Breaking the Plastic Wave - A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution', 2020, https://www.pewtrusts.org/-/media/assets/2020/10/breakingtheplasticwave_mainreport.p

7) OECD, Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options (Paris: Organisation for Economic Co-operation and Development, 2022), https://www.oecd-ilibrary.org/environment/global-plastics-outlook_de747aef-en

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APPENDIX

A.1.0 GLOSSARY 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]

Table 1-1 GLOSSARY

Terminology = ■ Definition = ■

Terminology	Definition
Plastic pollution	For the purposes of this report, plastic pollution is defined firstly by the direct or indirect introduction of plastics into environmental mediums (i.e., water, air, soil, etc.) and secondly by the resultant deleterious effects, which could include harm to humans (including human health), other living species and the environment.
Plastic	Plastic is a solid material (including micro- and nano-particles) 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.[2]
Plastic product	A type of item made from or containing plastic that is manufactured for sale or distribution, including plastic packaging and single-use items, as well as items designed to have longer use-phases.
High-risk plastic products	Those product groups most likely to be directly or indirectly introduced into the environment, and to cause resultant negative effects.[3]
Extended producer responsibility (EPR)	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. An EPR policy is characterised by: 1. the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities; and 2. the provision of incentives to producers to take into account environmental considerations when designing their products. This is aligned with the OECD.[4]
Business-to-business (B2B)	The exchange of products, services or information between businesses rather than between a business and a consumer. A transaction is typically completed between two companies, such as manufacturers, wholesalers or retailers.
Business-to-consumer (B2C)	The exchange of products, services or information from businesses directly to consumers who are the end users of the relevant product or service. Note that transactions earlier on in the supply chain (e.g., from the manufacturer to the distributor, and distributor to retailer) would be classed as B2B, while the final sale of the relevant product from the retailer to the consumer is B2C.

Table 1-1 (Part 2)

Reverse logistics

Supply chains dedicated to the reverse flow of products and materials for the purpose of maintenance, repair, reuse, refurbishment, remanufacture, recycling, or regenerating natural systems. This is aligned with EMF.[5] This may include tools like take back schemes and deposit return schemes. For the purpose of this report we focus on reverse logistics to enable reuse.

Deposit Return Scheme (DRS)

A system in which a refundable surcharge is applied to a product to encourage consumers to return it after use. In practice, DRSs can be applied to several different situations:

- Single-use beverage packaging (where it encourages return for subsequent recycling)
- Reusable beverage (or non-beverage) packaging (where it encourages return for reuse)
- Return of non-packaging products (though these may not always involve a centralised system that enables universal return and refund regardless of point of sale). Deposits could be applied to fulfil reuse or recycling objectives in these cases.

E-commerce/delivery packaging

Packaging used for the transport and delivery of products that are purchased electronically, using online services or over the internet, and shipped directly to the customer, generally in B2C transactions. This contrasts with retail packaging, which is used for products sold in physical retail stores.

Transport/tertiary packaging

Packaging conceived to facilitate handling and transport of a number of sales units or grouped packaging, usually between trading partners and generally in the B2B sector, in order to prevent physical handling and transport damage.[6]

Grouped/secondary packaging

Packaging conceived to constitute at the point of purchase, a grouping of a certain number of sales units; whether the latter is sold as such to the final user or consumer (in the B2C sector) or whether it serves only as a means to replenish the shelves at the point of sale (in the B2B sector); it can be removed from the product without affecting its characteristics.[7]

Sales/primary packaging

Packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase.[8]

Off-site

Consumption away from the premises - retailers such as supermarkets, hypermarkets, and convenience stores, including on-the-go or takeaway consumption.

On-site

Consumption on-premises - establishments such as bars, restaurants, coffee shops, clubs, and hotels.

Packaging

All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer.[9] In this report, we focus on plastic packaging.

Reusable product

Products (including packaging) that are conceived, designed, and placed on the market to be used multiple times for the same purpose for which they were conceived in a system for reuse.

Reuse

Re-use means use of a product (or component) multiple times in its original form for the same purpose for which it was conceived.[10] In this report we explore reusable alternatives for plastic products, where the reusable alternative may be made of any material (including but not limited to plastic). Reuse encompasses a range of delivery models – in this report, we group these under “return and reuse” and “retain and reuse”, focussing on the former.

Table 1-1 (Part 3)

Reuse system	Systems for reuse means organisational, technical/or financial arrangements, which enable the re-use either in a closed or open loop system. In this report, we focus on reuse systems wherein consumers return the used product to the system operator, either from home or via collection points. A business or service-provider then takes care of cleaning and redistribution.
Rotations	The number of uses or trips performed by a reusable product from the moment it is placed on the market to the moment it is sent back for reuse in a system with a view to its repeated placing on the market (derived from European Commission implementing decision 2019/665). This can relate to potential rotations, referring to the number of uses that a product is designed to be technically capable of achieving, or the actual rotations that a product achieves in practice within a given operational context.
Return rate	The percentage of reusable products returned to the starting point in the reuse system at the end of a rotation. The higher the return rate, the more economically viable the reuse system, however, return rate should not be considered equivalent to a reuse rate, since items that are returned may not end up being reused thereafter.
Return and Reuse Models	In a return and reuse model, while the return mechanism and location may vary, the user returns a product to the reuse system between uses. Return and reuse models will typically have centralised logistics and infrastructure to manage returned products and place them back in circulation, though return and reuse on site is also possible for some contexts (e.g. hospitality and catering).
Retain and Reuse Models	In a retain and reuse model, the user keeps the product between uses, and will undertake any cleaning or repreparation themselves. 'Refill' or 'bring your own' are established terms for this model in the context of packaging, but retain and reuse can apply to a wider array of products. Especially for packaging, there may still be changes in supply chain logistics and infra-structure to ensure the food or drink product is provided efficiently and effectively at refill locations. Service industries (e.g. for cleaning) may also arise as an option for users, but these would not need to be part of a wider system. This model is not the focus of this report.
Single-use/ short-lived plastic product	Plastic products that are designed and produced to be used once before being thrown away or recycled.[11] In this report this term additionally refers to items that have a very short life in use, with an average lifespan of no more than 0.5-3 years.

A.2.0 METHODOLOGY FOR ASSESSMENT OF THE MOST PROMISING APPLICATIONS FOR REUSE

The section outlines the methodology employed in the assessment of the most promising applications for reuse, as part of the project 'Unpackaging Reuse in the UN Plastic Pollution Treaty', commissioned by WWF Germany[13, 14] and executed by Eunomia Research and Consulting. Building upon previous WWF reports that identified high-risk plastic products for regulatory focus within the Treaty, this assessment delved deeper into the product categories previously earmarked as suitable for reuse measures and assessed them in greater detail. The objective was to identify applications that have the greatest immediate potential to realise environmental benefits from a switch to return and reuse systems, and that should therefore be prioritised in the Treaty.

A.2.1 OVERVIEW OF METHODOLOGY

The methodology adopted for the assessment of the most promising applications for reuse in the context of the UN Global Plastic Pollution Treaty can be broken down into two main stages:

1. Breakdown of plastic product groups for assessment. This built upon Eunomia's previous work, which identified high-risk plastic product categories and sub-categories and assessed their suitability for reuse (among other measures) at a high level. The breakdown of these initial sub-categories was revisited and reassessed. The aim was to refine the previous categorisation to specifically address the feasibility and suitability of reuse. Consequently, some product categories were redefined to align with the objectives of this targeted assessment and others were excluded. Detailed explanations of this redefining process and the final breakdown of the plastic product groups with examples are in Section A.2.2.

2. RAG (Red-Amber-Green) assessment against reuse feasibility criteria. At this stage, a set of three broad criteria were introduced to assess the suitability of the redefined sub-categories for reuse - environmental effectiveness, technical feasibility and socio-economic and health aspects. A rapid yet sufficiently robust assessment was conducted, employing a simple red-amber-green rating system against these criteria and additionally providing a concise summary of the rationales behind each scoring. Detailed descriptions of the three main criteria and the RAG framework for assessment are in Section A.2.3.

It is important to acknowledge that while this rapid qualitative assessment aims to prioritise certain applications for their immediate potential for reuse within the first decade of the Treaty (i.e., by or before around 2035), it does not diminish the emerging reuse potential of other product groups. Given the evolving nature of reuse opportunities and as the reuse knowledge improves, and additional opportunities become easier to achieve, this assessment could be reevaluated.

A.2.2 BREAKDOWN OF PLASTIC PRODUCT GROUPS FOR ASSESSMENT

Building on the foundation established in WWF's previous reports[15, 16], the three high plastic pollution risk product groups that are most likely to be suited to reuse measures (packaging, characteristic specific products and sector-specific products) were revisited and refined to reflect the plastic products and their applications within each group in greater detail. This required a different approach to breaking down sub-groups compared to the previous research.

For instance, the sub-categorisations of 'necessary' and "other" plastic items used in the previous study were developed to help identify items that would be suitable for elimination instead of reduction or other measures. However, the risks of plastic pollution associated with both necessary and unnecessary plastic products can be addressed through reuse measures, making this distinction redundant in this context. Instead, a greater level of detail around product use contexts is needed to determine more product specific potential for reuse in some cases. The resulting changes to the categorisation of plastic products for this assessment relative to the previous WWF reports include:

- For the packaging product group there are a wide range of additional splits and distinctions made, for example dividing B2C and B2B packaging, distinguishing between on-site consumption and take-away, and closed loop and open loop distribution systems. See Table A2-1 for details.

- For single-use short-lived products in the characteristic-specific product group, the sub-groups differentiate products used for personal/household purposes, those specific to commercial/service sectors, and other applications. This is different from the previous method based on the composition, such as 'fibres/nonwovens' and 'other'; hence, this sub-group was renamed, see Table A2-2.

The current assessment also deliberately excludes certain product groups identified in the previous report, including longer-life specific plastic items (e.g., tyres, textiles, furniture), and sector-specific plastic products that are less likely to end up in the environment (e.g., plastics used in the electronics and automotive sectors). These categories were deprioritised based on their comparatively lower pollution risk or because reuse would not significantly mitigate the risk of microplastic shedding. Consequently, these products were considered less suitable for reuse strategies within the ambit of this study, though other control measures, including repair, refurbishment and recycling of such products should be considered, and reuse of parts or components may be appropriate as part of wider measures for these products.

PACKAGING

Plastic packaging items were split into two broad groups based on application:

- Contact sensitive; and
- Non-contact sensitive.

Contact sensitive packaging describes items whose design, production, storage, or use may result in the migration of substances to the packaged product, such that the properties of the product may be altered negatively and pose risks to consumer health. Such packaging is therefore usually subject to stricter quality controls and standards. Contact sensitivity is defined in many national regulations, typically in relation to human health and safety rather than regulations on packaging sustainability. Non-contact sensitive packaging describes packaging which is not considered to be contact sensitive at the time of assessment and therefore does not pose the risks described above.

These groups were further sub-divided to reflect a range of packaging use contexts and consumption patterns (B2B vs. B2C, prefilled vs. filled on site, etc.) and product applications (food, drinks, cosmetics, etc.).

Call-Out Box 2-1

PLASTIC PACKAGING

The term 'plastic packaging', as utilised in this context, encompasses a diverse range of plastic products specifically designed for the containment, protection, handling, delivery, and presentation of goods across the entire value chain. Such products may be composed solely of plastic or a combination of plastic and other materials. There are also many ways to categorise this packaging in relation to its suitability for reuse. These include:

- The nature of products - Packaging products have been differentiated between contact-sensitive and non-contact-sensitive packaging. Contact-sensitive packaging, which is in direct contact with the product, often necessitates specific material properties for safety and preservation. The type of product being packaged, such as food, beverages, dry goods, or cosmetics, significantly influences packaging choices and the feasibility of reuse systems.

- End-user – Packaging products have been differentiated based on the end-user. This includes B2C applications, where packaging is intended for the end consumer, and B2B applications, used in transactions between businesses. For B2B applications, further distinctions are made based on whether the operating loop is closed (packaging used on-site/ between sites of the same entity) or open (packaging used between different entities).

- Location of filling - Further distinctions have been made for food and beverage products based on whether they are prefilled and sealed or filled on-site at the point of sale. Prefilled products, e.g., bottled beverages, involve a more complex system with multiple upstream players (fillers, wholesale, retailer, reconditioner) before reaching the consumer. In contrast, reuse systems for filled on-site, e.g., takeaway food, mainly involve the point of sale, point of return and reconditioner which can all be at the same location and potentially delivered by the same economic actor.

- Location of consumption - For food and beverage products, further distinctions include whether the product is intended for on-site consumption or takeaway. On-site systems facilitate easier collection and takeback, while return is more complicated for offsite consumption, which can occur on the go or at home. Incentives may be required to ensure consumers return the packaging.

- Packaging type - Packaging has been categorised into primary/sales, secondary/grouped, and tertiary/transport packaging. This categorisation closely aligns with the end-user, as secondary and tertiary packaging are predominantly used in B2B contexts and often in closed-loop operations.

In total, 18 sub-categories of packaging types have been created, as packaging is central to our assessment of product categories with the most developed reuse potential. The focus on packaging can also be justified on impact grounds alone - packaging represents the largest plastic application and source of plastic product pollution, accounting for around 40% of total plastic production. Packaging is predominantly single-use and short-lived, typically less than a year.[12]

Table A2-1

Sub-groups						Examples
1	2	3	4	5	6	
Contact-sensitive packaging	B2C	Food	Retail	1a. Prefilled/ sealed		Prefilled and sealed food containers sold by retailers include packaging for items that can be consumed immediately without further preparation (e.g., ready-to-eat items such as sandwiches, salads, or pre-cooked meals), as well as packaging for fresh food that requires some processing before consumption (e.g., raw meats, baking ingredients)
				1b. Filled on site for takeaway		Food items filled on-site encompass a broad range of ready-to-eat options from salad bars, hot soup bars, freshly made sandwiches, and a variety of both ready-to-eat and non-ready-to-eat items from the deli counter, including assorted cheeses, raw meats, olives, and salads
			HORECA	Prefilled/ sealed	1c. On-site consumption	Prefilled and sealed sandwiches, salads, and other food items are available for ready-to-eat consumption on-site
					1d. Takeaway	Same as above but used for on-the-go applications.
				Filled on site	1e. On-site consumption	Hot or cold food served for on-site immediate consumption like warm cooked dishes, salads and chilled desserts
					1.f Takeaway	Same as above but used for on-the-go applications.
		Drinks	Retail	1g. Pre-filled/sealed		Prefilled and sealed beverage containers sold at retailers like bottled water, fruit juices, soft drinks, and energy drinks
			HORECA	1h. Pre-filled/sealed		Same packaging types as above sold in HORECA services.
				Filled on site	1i. On-site consumption	Hot and cold beverages sold in beverage containers that are filled on-site for immediate consumption (e.g., cups for freshly brewed coffee, tea, smoothies, or chilled sodas)
					1j. Takeaway	Same as above but used for on-the-go applications.

Table A2-1 (Part 2)

Sub-groups						Examples
1	2	3	4	5	6	
Contact-sensitive packaging	B2C	Non food and drink	1k. Cosmetics and per-sonal care			Packaging for various personal care and beauty products like toothpaste tubes, perfume spray bottles, shampoo and soap bottles, pots and tubs of creams, lotions and scrubs, beauty products like lipstick and mascara tubes, etc.
			1l. Other			Packaging for contact-sensitive products not listed above - pet and animal food (e.g., pouches), hazardous products (e.g., chemical containers), medical and pharmaceuticals (e.g., medication bottles, blister packs for pills, protective casings for medical devices, IV bags, test tubes).
	B2B	Bulk transpor-tation (for contact-s ensitive products)	1m. Closed-loop operation			Packaging solutions for B2B sector involving contact-sensitive products in closed-loop operation e.g., crates, drums, jars, intermediate bulk containers and big bags
			1n. Open-loop operation			Same packaging solutions listed above for B2B sectors in open-loop operations.
Non-contact sensitive packaging	B2C	1o. Sales, grouped packaging				Packaging solutions for B2C sector involving non-contact-sensitive products, e.g., both sales and grouped packaging like blister packs, clamshells, pouches, boxes, cases and sleeves
		1p. Deliv-ery/E-com-merce				Packaging solutions for B2C involving delivery and e-commerce e.g., corrugated plastic boxes and poly mailers
	B2B	Sales, grouped, transport packaging	1q. Closed-loop operation			Packaging solutions for B2B sectors involving non-contact-sensitive products in closed-loop operation e.g., pallets, crates, dunnage, drums, sheets, films and big bags
			1r. Open-loop operation			Packaging solutions for B2B sectors involving non-contact-sensitive products in open-loop operation e.g., pallets, crates, dunnage, drums, sheets, films and big bags

SPECIFIC SINGLE-USE/ SHORT-LIVED PLASTIC PRODUCTS

Specific short-lived plastic items are those items that are designed and produced to be used once, or for a short period of time, before being thrown away. This sub-group includes both products that are made wholly of plastic materials, as well as the plastic components of certain products that may be manufactured using other materials. These items were broken down further:

- Personal/household plastics;
- Commercial/service sector – food service;
- Commercial/service sector – non-food related service; and
- Others.

Table A2-2

CHARACTERISTIC SPECIFIC, SINGLE-USE/ SHORT-LIVED PRODUCT SUB-CATEGORIES

Sub-groups			Examples
1	2	3	
Characteristic-specific products - Single-use short lived items	2a. Personal/ household plastic products		Specific personal and household plastic products including absorbent hygiene products (AHPs) (nappies, sanitary pads, incontinence pads or tampons), household technical (vacuum bags, water filters), lifestyle (cigarette, disposable vapes)
	Commercial/ service sector specific plastic products	2b. Foodservice	HORECA, venues, campuses, airports etc., non-packaging food and drink consumption e.g., cutlery, plates, cups, straws, stirrers
		2c. Other single-use short lived plastic used on-site at events	Complimentary dry amenities in hotels (e.g., slippers, pens, plastic cups), events and entertainment (e.g., signages, wrist bands, ponchos, glow sticks, flags and balloons, tokens)
	2d. Other		Single-use short lived items not listed above - e.g., pharma, disposable syringes, needles, vials, PPE, contact lenses

SECTOR-SPECIFIC ENVIRONMENTALLY SENSITIVE PLASTIC PRODUCTS

Sector-specific environmentally sensitive plastic products are used or disposed of directly in or near marine, freshwater and terrestrial ecosystems. This means these categories pose a particularly high risk of plastic pollution to the environment and should be assessed independently from plastic products used in other sectors which do not, by design, come into direct contact with sensitive ecosystems. Two sectors have initially been identified as the highest concern in this area:

- Marine and aquatic, i.e., plastics used in fishing and aquaculture, and
- Terrestrial i.e., plastics used in agriculture.

Table A2-3 SECTOR-SPECIFIC ENVIRONMENTALLY SENSITIVE PLASTIC PRODUCT SUB-CATEGORIES

Sub-groups			Examples
1	2	3	
Sector-specific plastic products - Environmentally sensitive	3a. Marine/aquatic - Fishing/ aquaculture		Plastic products are used in aquaculture (e.g., nets, cages, ropes, cords, pipes, tubes, feeders, protective gear, buoyancy devices) and fishing gear (e.g., nets, lines, pots, traps, buoys)
	3b. Terrestrial - agriculture		This category describes plastic products which are used directly in the terrestrial environment, specifically with consideration of agricultural applications such as large-scale crop production and livestock (e.g., mulch films, polytunnels, pipes and irrigation systems for crop production, silage films, nets and twines for storing feed for livestock) and horticulture and gardening (e.g., pots, trays, protective covers, plant support structures, labels and markers)

A.2.3 FRAMEWORK FOR RAG ASSESSMENT

A qualitative assessment was undertaken across the various product sub-categories to determine their suitability for return and reuse systems. This assessment leveraged available evidence and expert knowledge, applying a supplementary logic test. A RAG 'red-amber-green' performance rating system was developed against a list of predefined criteria shown below. Within this framework, red, amber, and green signify low, medium and high feasibility and effectiveness, respectively, see Table A2-4. This reflects the fact that reuse is a relatively novel area of policy and practice, with patchy data and information which makes a robust assessment and reliable quantitative analysis challenging. See Table A2-1 for details.

The assessment was applied against a set of three criteria with further indicators on the suitability of reuse:

- Environmental effectiveness, see Section 2.2.1.1
  - Resource efficiency,
  - Litter and pollution reduction,
- Technical feasibility, see Section 2.2.1.2
  - Existing and predicted reuse systems,
  - Integration into existing systems,
  - Design and innovation,
- Socio-economic and health aspects, see Section 2.2.1.3
  - Consumer acceptance and engagement,
  - Socio-economic feasibility,
  - Health and safety.

For this assessment, the viability of reuse within the first decade of the Treaty's life (i.e., by or before around 2035) was selected as the benchmark against which plastic applications are prioritised for reuse measures. As return and reuse systems are relatively uncommon currently, the analysis considered both evidence of actual (i.e., existing) reusable products, systems and their performance, as well as the potential for future systems (based on theoretical studies and pilots).

A.2.4 RESULTS OF RAG ASSESSMENT

The tables below summarise the results of the RAG assessment against each of the three criteria (and associated indicators) on the suitability of reuse for each of the plastic product sub-categories identified.

GUIDANCE FOR COLOUR CODING OF RAG ASSESSMENT

Table A2-4

Colour coding	Feasibility/effectiveness
Red (R)	Limited/low/none
Amber (A)	Moderate/medium
Green (G)	Significant/high
Gray (N/A)	Not relevant

A.2.4.1 ASSESSMENT OF ENVIRONMENTAL EFFECTIVENESS

Table A2-5 **ENVIRONMENTAL EFFECTIVENESS – PACKAGING**

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Environmental effectiveness		
		Resource efficiency	Reduction in litter and pollution	Rationale
1a. Contact sensitive – B2C – Food – Retail (Prefilled/sealed)	A sealed package of cheese from a supermarket			Evidence demonstrates overall reductions in GHG emissions, water use and waste generation when hard plastic packaging for fresh food products (e.g., yoghurt tubs) shifts a fragmented segment of the market to reuse packaging solutions. For dry goods packaged in flexible plastic shifting to reuse systems shows a definite positive environmental outcome just after a more substantial shift in the market share. As currently a large portion of this product category is packaged in flexible plastic packaging, the overall environmental effectiveness is moderate.
1b. Contact sensitive – B2C – Food – Retail (Filled on site for takeaway)	A container of freshly cut fruit from a fruit market			Evidence demonstrates switching from single-use plastic to reusable containers in an efficient system has good potential to reduce GHG emissions. High likelihood of reduction in pollution potential as products are consumed on the go.
1c. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (On-site consumption)	A sealed package of ready-to-eat sandwiches for on-site consumption			As a large portion of this product category is packaged in flexible plastic packaging the overall environmental effectiveness is moderate. High potential for effective takeback systems. Lower likelihood of reduction in post-consumption pollution potential as products are consumed on-site; however, in countries with less developed waste management systems pollution potential can be still significant.
1d. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (Takeaway)	A sealed package of ready-to-eat sandwiches consumed for takeaway			As a large portion of this product category is packaged in flexible plastic packaging the overall environmental effectiveness is moderate. Higher likelihood of reduction in pollution potential as products are consumed on the go.
1e. Contact sensitive – B2C – Food – HORECA – Filled on site (On-site consumption)	A bowl of hot noodle soup served in a food court for on-site consumption			Evidence demonstrates switching from single-use plastic to reusable containers in an efficient system has good potential to reduce GHG emissions. High potential for effective takeback systems. Lower likelihood of reduction in post-consumption pollution potential as products are consumed on-site; however, in countries with less developed waste management systems pollution potential can be still significant.
1f. Contact sensitive – B2C – Food – HORECA – Filled on site (Takeaway)	A container of fresh fruit at a food stand for takeaway			Evidence demonstrates switching from single-use plastic to reusable containers in an efficient system has good potential to reduce GHG emissions. High likelihood of reduction in pollution potential as products are consumed on the go.

Table A2-5 (Part 2)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Environmental effectiveness		
		Resource efficiency	Reduction in litter and pollution	Rationale
1g. Contact sensitive – B2C – Drinks – Retail (Prefilled/sealed)	Bottled water sold in a supermarket			Evidence including data from existing systems in Europe demonstrates switching from single-use plastic to reusable bottles has good potential to reduce GHG emissions and achieve a high number of rotations. Medium likelihood of reduction in pollution potential, higher for products consumed on the go.
1h. Contact sensitive – B2C – Drinks – HORECA (Prefilled/sealed)	Bottled water sold in a food court for on-site consumption			Evidence including data from existing systems globally demonstrates switching from single-use plastic to reusable bottles has good potential to reduce GHG emissions and achieve high number of rotations. Significant resource efficiency can be achieved for optimised large-scale reuse systems with return models. High potential for effective takeback systems. Lower likelihood of reduction in post-consumption pollution potential as products are consumed on-site; however, in countries with less developed waste management systems pollution potential can be still significant.
1i. Contact sensitive – B2C – Drinks – HORECA – Filled on site (On-site consumption)	A cup of iced tea from a food court for on-site consumption			Evidence demonstrates that switching to reusable cups for both warm and cold drinks there is a significant reduction of GHG emissions. High potential for effective takeback systems. Lower likelihood of reduction in post-consumption pollution potential as products are consumed on-site; however, in countries with less developed waste management systems pollution potential can be still significant
1j. Contact sensitive – B2C – Drinks – HORECA – Filled on site (Takeaway)	A cup of iced tea from a street vendor for takeaway			Evidence demonstrates that when switching to reusable cups for both warm and cold drinks there is a significant reduction of GHG emissions. High likelihood of reduction in pollution potential as products are consumed on the go.
1k. Contact sensitive – B2C – Non-food and drink (Cosmetics and personal care)	A bottle of shampoo			Evidence demonstrates overall reductions in GHG emissions, water use and waste generation when hard plastic packaging for personal care products (e.g., shampoo) shifts a fragmented segment of the market to reuse packaging solutions. Lower likelihood of reduction in post-consumption pollution potential as products are consumed at home, however, in countries with less developed waste management systems pollution potential can be still significant.
1l. Contact sensitive – B2C – Non-food and drink (Other)	A blister pack of over-the-counter pain relief tablets.			No data is available on potential resource efficiency for optimised large-scale reuse systems with return models. Lower likelihood of reduction in post-consumption pollution potential as products are consumed at home or on-site; however, in countries with less developed waste management systems pollution potential can be still significant.
1m. Contact sensitive – B2B – Bulk transportation (Closed-loop operation)	Crates for transporting fresh produce in closed-loop operation			Evidence demonstrates that reusable transport packaging offers environmental benefits – reduction in GHG emissions, energy usage and product damage. High return rate can be easily achieved in closed-loop operation. Lower likelihood of reduction in pollution potential as products are used on-site.

Table A2-5 (Part 3)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Environmental effectiveness		
		Resource efficiency	Reduction in litter and pollution	Rationale
1n. Contact sensitive – B2B – Bulk transportation (Open-loop operation)	Crates for transporting fresh produce in open-loop operation			Evidence demonstrates that reusable transport packaging offers environmental benefits – reduction in GHG emissions, energy usage and product damage. A high return rate can be more challenging to achieve in open-loop operation. Lower likelihood of reduction in pollution potential as products are used on-site.
1o. Non-contact sensitive – B2C – Sales packaging, grouped	Blister packs for small electronics or batteries			No data for other B2C sales packaging is available on potential resource efficiency for optimised large-scale reuse systems with return models. Reusable alternatives for grouped packaging can reduce product damage significantly, for example reusable beer crates. Lower likelihood of reduction in pollution potential as products are consumed mostly at home.
1p. Non-contact sensitive – B2C – Delivery/E-commerce	Padded mailers for shipping small items			Evidence demonstrates that significant reduction in GHG can be achieved. Reusable alternatives can reduce product damage significantly. Lower likelihood of reduction in pollution potential as products are consumed mostly at home.
1q. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Closed-loop)	Pallets used in closed-loop operation			Evidence demonstrates that reusable transport packaging offers environmental benefits – reduction in GHG emissions, energy usage and product damage. High return rate can be easily achieved in closed-loop operation. Lower likelihood of reduction in pollution potential as products are used on-site.
1r. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Open-loop)	Pallets used in open-loop operation			Evidence demonstrates that reusable transport packaging offers environmental benefits – reduction in GHG emissions, energy usage and product damage. A high return rate can be more challenging to achieve in open-loop operation. Lower likelihood of reduction in pollution potential as products are used on-site.

Table A2-6

ENVIRONMENTAL EFFECTIVENESS – SPECIFIC SINGLE-USE/ SHORT-LIVED ITEMS

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Environmental effectiveness		
		Resource efficiency	Reduction in litter and pollution	Rationale
2a. Specific Plastic Items: Single-use short lived – Personal/ household plastics	Vacuum bags			Evidence demonstrates that significant resource efficiency can be achieved when shifting away from single-use products. Depending on the product, it may be possible to eliminate the requirement, eliminate the use of plastic, and/or introduce reusable alternatives. However, a centralised system for takeback, reconditioning and redistribution of reusable products in this space is not currently recommended due to the nature of these products. Solutions are likely to be retained and reuse models. Some products (ABHs, cigarette butts) are particularly prone to incorrect disposal (littering, flushing). Wet wipes and cigarette butts are amongst most commonly found single-use plastic items in marine and terrestrial environments.
2b. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Food service	Cutlery			Evidence demonstrates that significant resource efficiency can be achieved when shifting away from single-use products. Depending on the product, it may be possible to eliminate the requirement, eliminate the use of plastic, and/or introduce reusable alternatives. High potential for effective takeback systems, which might not require centralised logistics and infrastructure as they could be managed on-site. Lower chance of reduction in post-consumption pollution potential as products are consumed on-site; however, these items do arise as plastic pollution in studies.
2c. Specific Plastic Items: Single-use short-lived – Commercial/service sector – Other single-use short lived plastic	Wristband used at festivals			Evidence demonstrates that significant resource efficiency can be achieved when shifting away from single-use products. Depending on the product, it may be possible to eliminate the requirement, eliminate the use of plastic, and/or introduce reusable alternatives. High potential for effective takeback systems. Possibly a lower chance of reduction in post-consumption pollution potential as products are intended for use on-site.
2d. Specific Plastic Items: Single-use short-lived – Other	Face mask			Depending on the product, it may be possible to eliminate the requirement, eliminate the use of plastic, and/or introduce reusable alternatives. Products in this category are varied but can be very small or lightweight/flimsy and are thus mobile and hard to clean up. The likelihood of ending up in the environment varies and may be lower than other single-use items. It is hard to generalise about potential reuse solutions.

Table A2-7

ENVIRONMENTAL EFFECTIVENESS – SECTOR-SPECIFIC APPLICATIONS

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Environmental effectiveness		
		Resource efficiency	Reduction in litter and pollution	Rationale
3a. Sector-specific plastic applications: Environmentally sensitive – Marine/aquatic -Fishing/aquaculture	Fishing net			Designed to be used in direct contact with land/water. Not designed for durability/repair, high propensity to get snagged/lost due to currents or other factors. Commonly found in marine plastic litter globally. Significant resource efficiency can be achieved if products are reused on-site/within operations to maximise the lifetime of the products. Where used, incentivising the retrieval and return of these items from the environment and into responsible management is the highest priority in reducing plastic pollution – effective retrieval is also a pre-requisite for effective reuse.
3b. Sector-specific plastic applications: Environmentally sensitive – Terrestrial/ agriculture	Silage film			Designed to be used in direct contact with land. High propensity to get lost in flooding events. Surface run-off and erosion can transport microplastics from fields to waterways. Commonly found in land litter globally. Significant resource efficiency can be achieved if products are reused on-site/ within operations to maximise the lifetime of the products. Where used, incentivising the retrieval and return of these items from the environment and into responsible management is the highest priority in reducing plastic pollution – effective retrieval is also a pre-requisite for effective reuse.

A.2.4.2 ASSESSMENT OF TECHNICAL FEASIBILITY

Table A2-8 **TECHNICAL FEASIBILITY - PACKAGING**

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation	Rationale
1a. Contact sensitive – B2C – Food – Retail (Prefilled/sealed)	A sealed package of cheese from a supermarket				Existing small-scale reuse systems with return models, primarily trials, are moderately prevalent in countries like the US, France, and Japan, demonstrating technical feasibility for scaling up. No forthcoming national legislation. Some reusable packaging designs are compatible and partially integrated into existing reuse systems, for example reusable yoghurt jars can be returned through RVMs in Germany.
1b. Contact sensitive – B2C – Food – Retail (Filled on site for takeaway)	A container of freshly cut fruit from a fruit market				Existing small-scale reuse systems with return models, primarily trials, are moderately prevalent in countries like Germany and the US, showing strong potential for further scaling. Existing national legislation mandates reuse alternatives for takeaway packaging, for example in Germany. Notably, almost all reusable packaging designs are compatible with and can be integrated into existing reuse systems for takeaway containers in the HORECA sector. Design and innovation exist and being trialled for RVM for takeaway containers.
1c. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (On-site consumption)	A sealed package of ready-to-eat sandwiches for on-site consumption				Only few small-scale reuse systems with return models, primarily trials, demonstrating technical feasibility for scaling up. Existing national legislation banning single-use packaging for food and beverage consumed on site is possible. These systems are advantageous as they do not depend on consumer takeback as they are closed systems and require minimal infrastructure (e.g., space for collection points, access to running water, washing up liquid), making them more feasible and practical for implementation.
1d. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (Takeaway)	A sealed package of ready-to-eat sandwiches consumed for takeaway				Only a few small-scale reuse systems with return models, primarily trials, demonstrating technical feasibility for scaling up. Existing national legislation banning single-use packaging for food and beverage consumed on site. More challenging collection and takeback but innovation exists (e.g. for smart bins).

Table A2-8 (Part 2)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation	Rationale
1e. Contact sensitive – B2C – Food – HORECA – Filled on site (On-site consumption)	A bowl of hot noodle soup served in a food court for on-site consumption				Traditionally, reusables have been used for on-site dining in restaurants, and cafes. For fast food restaurants or other eateries that have been using single-use recent large-scale reuse systems with return models are moderately prevalent in countries like Germany and France, showing strong potential for further scaling. Existing and upcoming national legislation exists banning single-use packaging for on-site consumption for example, France and Germany. Notably, almost all reusable packaging designs are compatible with and can be integrated into existing reuse systems for takeaway containers in the HORECA sector. These systems are advantageous as they do not depend on consumer takeback as they are closed systems and require minimal infrastructure (e.g., space for collection points, access to running water, washing up liquid), making them more feasible and practical for implementation.
1f. Contact sensitive – B2C – Food – HORECA – Filled on site (Takeaway)	A container of fresh fruit at a food stand for takeaway				Existing large-scale reuse systems with return model, are moderately prevalent in countries like Germany, US and India, showing strong potential for further scaling. Existing and upcoming national legislation banning single-use packaging for on-site consumption exists (e.g. France and Germany). Notably, almost all reusable packaging designs are compatible with and can be integrated into existing reuse systems for takeaway containers in the HORECA sector. Design and innovation exists and is being trialled for RVM for takeaway containers.
1g. Contact sensitive – B2C – Drinks – Retail (Prefilled/sealed)	Bottled water sold in a supermarket				Existing well-established large-scale reuse systems with return models are significantly prevalent (e.g. Germany, Belgium, Tanzania, Mexico, Brazil), showing strong potential for further scaling. Existing national reuse targets for beverages sold in reusable containers (e.g. Austria, Germany, Chile). Notably, almost all reusable packaging designs, with existing national standardisations, are compatible with and can be integrated into existing single-use DRS where this exists.
1h. Contact sensitive – B2C – Drinks – HORECA (Prefilled/sealed)	Bottled water sold in a food court for on-site consumption				Existing well-established large-scale reuse systems with return models are significantly prevalent (e.g. Spain, France, Tanzania, Mexico, and Brazil), showing strong potential for further scaling. Existing and upcoming national reuse targets for beverages sold in the HORECA sector (e.g. Spain, Germany, Chile). Notably, almost all reusable packaging designs, with existing national standardisations, are compatible with and can be integrated into existing single-use DRS. For onsite consumption, easy collection and takeback from consumer.

Table A2-8 (Part 3)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation	Rationale
1i. Contact sensitive – B2C – Drinks – HORECA – Filled on site (On-site consumption)	A cup of iced tea from a food court for on-site consumption				Traditionally reusables have been used for on-site dining in restaurants, and cafes. For fast food restaurants or other eateries that have been using single-use, there are recent large-scale reuse systems with return models, which are moderately prevalent in countries like Germany and France, showing strong potential for further scaling. Existing and upcoming national legislation banning single-use packaging for on-site consumption exists (e.g. France, Germany). Notably, almost all reusable packaging designs are compatible with and can be integrated into existing reuse systems for takeaway containers in the HORECA sector. These systems are advantageous as they do not depend on consumer takeback as they are closed systems and require minimal infrastructure (e.g., space for collection points, access to running water, washing up liquid), making them more feasible and practical for implementation.
1j. Contact sensitive – B2C – Drinks – HORECA – Filled on site (Takeaway)	A cup of iced tea from a street vendor for takeaway				Existing large-scale reuse systems with return models are moderately prevalent in countries like Germany and France, showing strong potential for further scaling. Existing and upcoming national legislation banning single-use packaging for on-site consumption exists (e.g. France, Germany). Notably, almost all reusable packaging designs are compatible with and can be integrated into existing reuse systems for takeaway containers in the HORECA sector. Design and innovation exist and is being trialled for RVM for takeaway containers.
1k. Contact sensitive – B2C – Non-food and drink (Cosmetics and personal care)	A bottle of hand sanitiser				Existing medium-scale reuse systems with return models are moderately prevalent in countries like UK and Slovakia, showing potential for further scaling in some countries. Some governments (e.g. Chile, Colombia, Indonesia, and Philippines) do prohibit some personal care products from being sold in reusable packaging. More common to have dispensers in stores where consumers can refill their containers.
1l. Contact sensitive – B2C – Non-food and drink (Other)	A blister pack of over-the-counter pain relief tablets.				Only a few existing reuse systems with return models for products not listed separately. No existing or upcoming legislation specific for this product group. Future potential for exploring reuse in this product group.
1m. Contact sensitive - B2B - Bulk transportation (Closed-loop operation)	Crates for transporting fresh produce in closed-loop operation				Existing well-established large-scale reuse systems with return models, are significantly prevalent in countries in Europe and moderately globally, showing strong potential for further scaling. Local collection centres play a pivotal role in streamlining the return process for end-users, while standardized containers, such as IBS, are in use. Closed-loop operation facilitates easy takeback and collection.

Table A2-8 (Part 4)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation	Rationale
1n. Contact sensitive - B2B - Bulk trans-portation (Open-loop operation)	Crates for transport-ing fresh produce in open-loop operation				Only few small-scale reuse systems with return models are moderately prevalent in countries in Europe and with few other examples globally, showing potential for further scaling. Local collection centres play a pivotal role in streamlining the return process for end-users, while standardized containers, such as IBS, are in use. Open-loop poses a considerably greater challenge in terms of takeback and collection.
1o. Non-contact sensitive – B2C – Sales packaging, grouped	Blister packs for small electronics or batteries				A moderate number of existing return systems globally. No existing or upcoming legislation specific for this product group. Existing solutions for some grouped packaging like reusable crates for beverage.
1p. Non-contact sensitive – B2C – Delivery/E-commerce	Padded mailers for shipping small items				Existing large-scale reuse systems with return models, primarily trials but also well-established, are moderately prevalent in countries like Sweden, US and Germany, demonstrating technical feasibility for scaling up. There is upcoming EU legislation on mandatory reuse targets. It is feasible to integrate into existing infra-structure like home delivery services for reverse logistics. There is existing design and innovation for delivery packaging suitable for reverse logistics. The reuse systems for this product group can capitalise on existing networks (such as home delivery services or postal services) to streamline the collection of empty contain-ers. Additionally there is little requirement for differentiation of outer protective delivery packaging, demonstrating significant potential for standardisation.
1q. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Closed-loop)	Pallets used in closed-loop operation				Existing well-established large-scale reuse systems with return models, are signifi-cantly prevalent globally, due to the international presence of global operations and supply chains operating with internal crates and pallets for moving goods between sites, showing strong potential for further scaling. Standardisations exist for reusa-ble pallets and crates. Closed-loop operation facilitates easy takeback and collection.
1r. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Open-loop)	Pallets used in open-loop operation				Existing well-established medium-scale reuse systems with return models, are moderately prevalent in countries in Europe and with few other examples globally, showing potential for further scaling. Standardisations exist for reusable pallets and crates. Open-loop poses considerably more of a challenge in terms of takeback and collection.

Table A2-9

TECHNICAL FEASIBILITY – SPECIFIC SINGLE-USE/ SHORT-LIVED ITEMS

Feasibility: low | medium | high | not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation and future scalability	Rationale
2a. Specific Plastic Items: Single-use short lived – Personal/ household plastics	Vacuum bags				Only a few existing return systems, for example nappies in France. However, for this product group retain and reuse models by individuals for personal use are more applicable.
2b. Specific Plastic Items: Single-use short-lived – Commer-cial/ service sector – Food service	Cutlery				Existing well-established on-site reuse systems with return models, are moderately prevalent in countries like Germany, Estonia and Australia, showing potential for further scaling. There is existing legislation on banning single-use plastic products at venues. These systems are advantageous as they do not depend on consumer takeback as they are closed systems and require minimal infrastructure (e.g., space for collection points, access to running water, washing up liquid), making them more feasible and practical for implementation.
2c. Specific Plastic Items: Single-use short-lived – Commer-cial/ service sector – Other single-use short lived plastic	Wristband used at festivals				Existing well-established on-site reuse systems with return models, are moderately prevalent in countries like US and Australia, showing potential for further scaling. These systems are advantageous as they do not depend on consumer takeback as they are closed systems and require minimal infrastructure (e.g., space for collection points, access to running water, washing up liquid), making them more feasible and practical for implementation.
2d. Specific Plastic Items: Single-use short-lived - Other	Face mask				Highly dependent on product and context as this is a diverse product group. The controlled environment of hospitals facilitates the collection of items for reuse, as sterilisation and washing infrastructure are already established, though health and safety will always be paramount.

Table A2-10

TECHNICAL FEASIBILITY – SECTOR-SPECIFIC APPLICATIONS

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Technical feasibility			
		Existing or predicted reuse system	Existing infra-structure	Design & Innovation and future scalability	Rationale
3a. Sector-specific plastic applications: Environmentally sensitive – Marine/ aquatic -Fishing/ aquaculture	Fishing net				On-site/in-operation decisions on reuse will vary. National legislation on obligating takeback programmes and further volunteer programmes exists in European countries; however, these are for the end-of-life treatment and not for reuse. For fishing gear, mainly composed of durable products, one aim would be to improve useful life/number of uses through a combination of design and management (e.g. repair, refurbish) choices, of which reuse might only be one.
3b. Sector-specific plastic applications: Environmentally sensitive – Terrestrial/ agriculture	Silage film				On-site/in-operation decisions on reuse will vary. No existing return systems for reuse. National legislation on obligating takeback programmes and further volunteer programmes exists in many countries like Germany, Canada and Spain; however, these are for the end-of-life treatment and not for reuse.

A.2.4.3 ASSESSMENT OF SOCIAL, ECONOMIC AND HEALTH IMPACTS

Table A2-11 **FEASIBILITY OF SOCIO-ECONOMIC AND HEALTH FACTORS - PACKAGING**

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
1a. Contact sensitive – B2C – Food – Retail (Prefilled/sealed)	A sealed package of cheese from a supermarket				Some evidence demonstrates that large scale returnable packaging systems cannot reach cost parity and additional enabling conditions are required. Health and safety concerns are minimal for contact-sensitive packaging with centralised, robust cleaning process. Likely to cause an additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1b. Contact sensitive – B2C – Food – Retail (Filled on site for takeaway)	A container of freshly cut fruit from a fruit market				Evidence demonstrates that reusable packaging formats can be more profitable for users and return on investment can be reached by system providers within 4 years. Health and safety concerns are moderate for contact-sensitive packaging with a decentralised individual on site cleaning process. Likely to cause undue burden in countries where infrastructure is not available everywhere for reconditioning.
1c. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (On-site consumption)	A sealed package of ready-to-eat sandwiches for on-site consumption				Evidence demonstrates that large scale returnable packaging systems cannot reach cost parity and additional enabling conditions are required. Health and safety concerns are minimal for contact-sensitive packaging with a centralised, robust cleaning process. Likely to cause an additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1d. Contact sensitive – B2C – Food – HORECA – Prefilled/sealed (Takeaway)	A sealed package of ready-to-eat sandwiches consumed for takeaway				Evidence demonstrates that large scale returnable packaging systems cannot reach cost parity and additional enabling conditions are required. Health and safety concerns are minimal for contact-sensitive packaging with a centralised, robust cleaning process. Likely to cause an additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1e. Contact sensitive – B2C – Food – HORECA – Filled on site (On-site consumption)	A bowl of hot noodle soup served in a food court for on-site consumption				Evidence demonstrates that reusable packaging formats can be more profitable for users and return on investment can be reached by system providers within 4 years. Health and safety concerns are moderate for contact-sensitive packaging with a decentralised individual on site cleaning process. Likely to cause undue burden in countries where infrastructure is not available everywhere for reconditioning. Likely to cause an additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.

Table A2-11 (Part 2)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
1f. Contact sensitive – B2C – Food – HORECA – Filled on site (Takeaway)	A container of fresh fruit at a food stand for takeaway				Evidence demonstrates reusable packaging formats can be more profitable for users and return on investment can be reached by system providers within 4 years. Health and safety concerns are moderate for contact-sensitive packaging with a decentralised individual on site cleaning process. Likely to cause undue burden in countries where infrastructure is not available everywhere for reconditioning. Likely to cause an additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1g. Contact sensitive – B2C – Drinks – Retail (Prefilled/sealed)	Bottled water sold in a supermarket				Evidence demonstrates large scale returnable packaging systems can reach cost parity. Return on investment for system providers can be reached within 6 years. Health and safety concerns are minimal for contact-sensitive packaging with centralised, robust cleaning process. Likely to cause additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1h. Contact sensitive – B2C – Drinks – HORECA (Prefilled/sealed)	Bottled water sold in a food court for on-site consumption				Evidence demonstrates large scale returnable packaging systems can reach cost parity. Return on investment for system providers can be reached within 6 years. Health and safety concerns are minimal for contact-sensitive packaging with centralised, robust cleaning process. Likely to cause additional burden in low-income countries and communities where single-use plastic is used for health and safety reasons.
1i. Contact sensitive – B2C – Drinks – HORECA – Filled on site (On-site consumption)	A cup of iced tea from a food court for on-site consumption				No extra cost for collection and transport when collected and cleaned on site. Potential extra cost for cleaning and storage. Health and safety concerns are moderate for contact-sensitive packaging with decentralised individual on site cleaning process. Likely to cause undue burden in countries where infrastructure is not available everywhere for reconditioning.
1j. Contact sensitive – B2C – Drinks – HORECA – Filled on site (Takeaway)	A cup of iced tea from a street vendor for takeaway				No extra cost for collection and transport when collected and cleaned on site. Potential extra cost for cleaning and storage. Health and safety concerns are moderate for contact-sensitive packaging with decentralised individual on site cleaning process. Likely to cause undue burden in countries where infrastructure is not available everywhere for reconditioning.

Table A2-11 (Part 3)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
1k. Contact sensitive – B2C – Non-food and drink (Cosmetics and personal care)	A bottle of hand sanitiser				Evidence demonstrates that reusable packaging formats can be more profitable for users and return on investment can be reached by system providers within 4 years. Health and safety concerns are moderate for contact-sensitive packaging with decentralised individual on site cleaning process. Likely to cause additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1l. Contact sensitive – B2C – Non-food and drink (Other)	A blister pack of over-the-counter pain relief tablets.				Historically, dry medicines, especially repeat prescriptions, were served in reusable containers and this practice could be promoted. Refillable packaging formats for the pharmaceutical industry can represent cost savings. Health and safety concerns are moderate for contact-sensitive packaging with decentralised individual on site cleaning process. Pharmaceuticals have been exempted from proposed legislation on reuse in some jurisdictions. Likely to cause additional burden in low-income countries and communities where single-use plastic is used for financial and health and safety reasons.
1m. Contact sensitive - B2B - Bulk transportation (Closed-loop operation)	Crates for transporting fresh produce in closed-loop operation				Solely business to business, no relevancy of consumer acceptance. Reusable packaging in B2B can result in significant long-term cost savings, standardisation allows for automatization and cost reduction. Health and safety concerns are minimal for contact-sensitive packaging with centralised, robust cleaning process.
1n. Contact sensitive - B2B - Bulk transportation (Open-loop operation)	Crates for transporting fresh produce in open-loop operation				Solely business to business, no relevancy of consumer acceptance. Reusable packaging B2B can result in significant long-term cost savings, standardisation allows for automatization and cost reduction. Health and safety concerns are moderate for contact-sensitive packaging with decentralised individual on site cleaning process.
1o. Non-contact sensitive – B2C – Sales packaging, grouped	Blister packs for small electronics or batteries				For grouped packaging, as beer crates, reuse alternatives are well-accepted in some countries (e.g., Germany, Belgium). Reusable packaging B2B can result in significant long-term cost savings, standardisation allows for automatization and cost reduction. Health and safety concerns are minimal as this is non-contact sensitive packaging.
1p. Non-contact sensitive – B2C – Delivery/E-commerce	Padded mailers for shipping small items				Evidence demonstrates one-third of e-consumers are willing to pay for more sustainable packaging. Reusable packaging's costs for the user are similar and return on investment can be reached by system providers within 3 years. Health and safety concerns are minimal as this is non-contact sensitive packaging.

Table A2-11 (Part 4)

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
1q. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Closed-loop)	Pallets used in warehouses for goods storage				Solely business to business, no relevancy of consumer acceptance. Reusable packaging in B2B can result in significant long-term cost savings, standardisation allows for automatization and cost reduction. Health and safety concerns are minimal as this is non-contact sensitive packaging.
1r. Non-contact sensitive – B2B – Sales, grouped and transport packaging (Open-loop)	Pallets used in warehouses for goods storage				Solely business to business, no relevancy of consumer acceptance. Reusable packaging B2B can result in significant long-term cost savings, standardisation allows for automatization and cost reduction. Health and safety concerns are minimal as this is non-contact sensitive packaging.

Table A2-12 **FEASIBILITY OF SOCIO-ECONOMIC AND HEALTH FACTORS – SPECIFIC SINGLE-USE/ SHORT-LIVED ITEMS**

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
2a. Specific Plastic Items: Single-use short lived – Personal/ household plastics	Vacuum bags				Evidence demonstrates a low level of acceptance among some consumers for reusable absorbent hygiene productss due to health and safety concerns, perceived time implications, and potential social stigma. Significant cost savings can be achieved when switching to reusable alternatives; however, upfront cost of reusables is likely to be more and this may affect low-income groups disproportionately. Health and safety concern is significant for some of these products, given their hygiene functions; user-dependent cleaning also requires access to clean water and suitable locations.
2b. Specific Plastic Items: Single-use short-lived – Commercial/ service sector – Food service	Cutlery				Evidence demonstrates high return rate of certain reusable products in festival/ event settings. There is minimal extra cost for collection and transport when collected and cleaned on site, though there may be a potential extra cost for cleaning and storage. Health and safety concerns are moderate for contact-sensitive products with decentralised individual on site cleaning process.
2c. Specific Plastic Items: Single-use short-lived – Commercial/ service sector – Other single-use short lived plastic	Wristband used at festivals				Evidence demonstrates a high level of participation and acceptance among consumers for reusable products used on-site globally where systems are in place. Reusable formats on non-contact sensitive items should result in significant cost savings for the economic operator and no additional cost for the consumer. Health and safety concerns are minimal for non-contact sensitive products.
2d. Specific Plastic Items: Single-use short-lived - Other	Face mask				This is a diverse product category. However, evidence demonstrates a low level of participation and acceptance among consumers for reusable medical products, especially products being used for health or safety reasons. Some reuse is nonetheless possible. The controlled environment of hospitals facilitates the collection of items for reuse, as sterilisation and washing infrastructure are already established, which would result in reduction in cost. Health and safety concerns are significant due to the hygiene and health critical functions of some of the products.

Table A2-13

FEASIBILITY OF SOCIO-ECONOMIC AND HEALTH FACTORS – SECTOR-SPECIFIC APPLICATIONS

Feasibility: low medium high not relevant

Packaging groups	Illustrative example	Feasibility of socio-economic and health factors			
		Consumer acceptance	Socio-economic	Health & Safety	Rationale
3a. Sector-specific plastic applications: Environmentally sensitive – Marine/aquatic -Fishing/ aquaculture	Fishing net				Primarily business-to-business market, no relevance of consumer acceptance. Production from virgin plastic is currently so cheap that extra costs and effort would be implied for collection, sorting, and cleaning to reuse or recycle products. Health and safety concerns are minimal, except in cases (like fishing in bad weather) where retrieval might involve risks.
3b. Sector-specific plastic applications: Environmentally sensitive – Terrestrial/ agriculture	Silage film				Primarily a business-to-business market, no relevance of consumer acceptance. Production from virgin plastic is currently so cheap that extra costs and effort would be implied for collection, sorting, and cleaning to reuse or recycle products. Health and safety concerns are minimal.

ENDNOTES

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OUR MISSION IS TO STOP DEGRADATION OF THE PLANET'S NATURAL ENVIRONMENT AND TO BUILD A FUTURE IN WHICH HUMANS LIVE IN HARMONY WITH NATURE.

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