Topic Sheet Design Guidelines for Circularity

environment programme

This topic sheet is part of the publication "Turning off the Tap: How the world can end plastic pollution and create a circular economy" (ISBN No: 978-92-807-4024-0). Suggested citation: United Nations Environment Programme (2023). Turning off the Tap: How the world can end plastic pollution and create a circular economy. Topic Sheet: Design Guidelines for Circularity. Nairobi.

Making circularity economics work by design

There is a misconception that consumers are to blame for not recycling enough, but in fact it is the design of plastic products that is a leading issue. Today, many plastic items are designed in ways that make reuse or recycling difficult and uneconomical. It is estimated that only 21 per cent of plastics in short-lived products are economically recyclable and there is little incentive to collect the rest, often leaving them to pollute the environment.

Solving plastic pollution will require that all necessary plastics are designed to stay in the economy and be reused and recycled. Designing plastic for circularity in each local setting can increase its inherent value, while improving the profitability of the reuse and recycling industries, boosting uptake and quality of reuse systems and recycled content, and reducing the need for virgin plastic and its associated greenhouse gas (GHG) emissions. Global 'design for circularity' rules and standards are potentially game-changing to ensure international consistency and avoid loopholes created by a myriad of different standards and rules.

Design guidelines to encourage the 3R's

A 'design for circularity' standard should optimise the economics of keeping products and their materials within the economy. Key goals for such standard(s) include practical elements to follow the waste hierarchy of REDUCE-REUSE-RECYCLE:

- Avoid the use of unnecessary or problematic plastic: In addition, there may be cases where excessive plastic is used for a necessary product (e.g. excessive headspace). However, it is important to consider that producing small formats or 'light weighting' can have a negative effect as it could reduce circularity by removing the material value from the products. This will reduce the value of the products and can lead to lower collection rates, particularly in informal waste sectors.
- Establish standard reuse models and infrastructure: Removing unnecessary differentiation in packaging formats or inconsistencies in standards enables the sharing of infrastructure for collection, washing and preparation for reuse, which in turn enhances the economics of reuse. In specific reuse cases (e.g. where the product is used away from the place of purchase) incentives may help in achieving higher than 90 per cent return rates.
- Simplify the number of polymers and other materials used in products while being mindful of the desired or necessary functionalities that multi-polymer items can offer to protect products. This can significantly improve the economics and scale of plastic recycling by reducing the complexity of sorting to remove nonrecyclable polymers, delivering fewer contaminated waste streams and allowing recycling plants to scale up focused on a known range of plastics. This will also serve to remove potentially problematic additives or chemicals of concern from plastic products (e.g. unnecessary dyes). The smallest possible acceptable number of recyclable plastics should be drawn up with key stakeholders, or determined through a market analysis of the most recyclable plastics based on recycling capacity. Ultimately, mono-materials significantly boost recycling by reducing the technical and economic challenges of dealing with multimaterial plastic products, including their separation, identification, sorting and recycling.

Several multi-stakeholder initiatives have already set up voluntary guidelines or standards that industry may decide to follow to enhance the circularity of their products. Given that these existing initiatives have gone a long way in generating consensus among interested parties, they are a very good starting point to develop international standards to be implemented by the parties to a global treaty.

Existing design guidelines to reduce unnecessary plastic

The Consumer Goods Forum Plastic Waste Coalition launched a set of voluntary **Golden Design Rules**¹ in 2021 consisting of practical recommendations to reduce plastic waste and enhance its recyclability in the design of plastic packaging. Several of these rules are about reducing and eliminating unnecessary or problematic plastic elements: remove problematic elements from all plastic packaging; eliminate excess headspace; reduce plastic overwraps; or reduce virgin plastic in business-to-business packaging. Some of these rules are aligned with existing legislation across many countries, and thus adopting them internationally may not be too problematic.

Existing design guidelines for reuse

Standards set by PR3, the private-public partnership for reusable packaging, deliver a set of core requirements for aligning packaging reuse systems between companies and brands with the key aim of sharing infrastructure for reuse, and thus making reuse more profitable². These standards consider the different parts of the overall reuse system: collection points, containers, digital (data elements to facilitate reuse), return incentives, labelling, reverse logistics and washing. Note that only one of the standards relates to the actual packaging products (containers), while the other six relate to other parts of the reuse system. Examples of considerations for the design of containers include containers being designed to withstand at least 10 reuse cycles and be recyclable at the end of life; the inclusion of both labelling / information for use and reuse, as well as data carriers (such as QR codes or RFID tags); optimisation of crucial life cycle stages such as transport (e.g. avoiding empty spaces between containers) or washing (ensuring the containers do not have hard-to-reach angles); among many others. The World Economic Forum's Consumers Beyond Waste 'Design Guidelines for Reuse'³ also provide useful insights into specific aspects of designing reusable consumer goods packaging. See also ISO 18603:2013 (Packaging and the environment - Reuse).

Other publications provide very useful considerations on aspects to improve reuse schemes, as well as success stories, and suggestions of product families where reuse and refill schemes may be more likely to succeed. These include the Ellen MacArthur Foundation's 'Reuse – Rethinking Packaging' guide⁴, or the Sustainable Packaging Coalition Reusable Packaging guidance⁵.

Finally, the Reuse Portal (reuseportal.org) is an open collaborative platform providing users – whether innovators, businesses, policymakers, activists, consumers or citizens – convenient access to practical guidance, tools and networks to act and drive momentum for reuse solutions. It is championed by the United Nations Environment Programme, the World Wildlife Fund and the World Economic Forum and will be launched in 2023.

Existing design guidelines for recycling

The Consumer Goods Forum's Golden Design Rules also contain several rules that focus on enhancing plastic packaging recyclability through design. These essentially focus on increasing the value in recycling of specific plastic packaging types (e.g. PET bottles, rigid HDPE and PP, PET trays, flexible packaging) as well as the use of on-pack recycling instructions. Common technical standards such as the International Organization for Standardization (ISO) standard for design for recyclability (including labelling) could be utilised to harmonise design. These guidelines usually suggest the reduction of material diversity (e.g. ensuring >90 per cent of the product is made of one single polymer); reduction / avoidance of pigments; ensuring products are compatible with sorting mechanisms (e.g. following specific density thresholds) etc. Also relevant in this sense is ISO's Technical Report on substances and materials that may impede recycling (SO/ TR 17098:2013).

The How2Recycle scheme⁶ was created to provide consistent and transparent on-package recycling information to consumers in North America through clear, consistent and concise labelling. In the United Kingdom of Great Britain & Northern Ireland, the On-Pack Recycling Label scheme⁷ aims to deliver a simple, consistent and UK-wide recycling message on retailer and brand packaging, to help consumers reuse and recycle more material correctly. Similarly, the Australasian Recycling Labelling Program⁸ is an on-pack labelling scheme to help consumers to recycle correctly and to support brand owners and packaging manufacturers to design packaging that is recyclable in Australia and New Zealand. UNEP's One Planet Network's 'Can I Recycle This?'9 provides a global mapping and assessment of standards, labels and claims on plastic packaging.

¹ Consumer Goods Forum Plastic Waste Coalition (2021) Golden Design Rules.

² https://www.resolve.ngo/site-pr3standards.htm#.

³ https://weforum.ent.box.com/s/iajeqni5jr8cuocoyouxmlmwi82hegov.

⁴ https://ellenmacarthurfoundation.org/reuse-rethinking-packaging

⁵ https://sustainablepackaging.org/wp-content/uploads/2022/04/Guidance-for-Reusable-Packaging.pdf.

⁶ https://how2recycle.info/.

⁷ https://www.oprl.org.uk/.

⁸ https://apco.org.au/the-australasian-recycling-label.

⁹ https://www.oneplanetnetwork.org/news-and-events/news/report-can-i-recycle.

International harmonisation could make design guidelines more effective

Harmonised international action is crucial to realise the full economic potential of the market transformation from a linear wasteful economy to an efficient circular plastics economy. This is particularly true from the design perspective, where aligned approaches may unlock efficiencies and economies of scale. Following the global alignment of specific guidelines and standards for specific listed products or categories of products, governments could implement them into their national legislation. The guidelines and standards may be developed based on existing ones where available (e.g. those outlined in this topic sheet), and in a consistent manner to maximise their synergies and could be adapted over time to adopt new technological options. An important aspect in the national adoption of design guidelines and standards would be to ensure design schools include them into their curricula. Additionally, design guidelines may be developed into standards for which accreditation exists, and promoted in Extended Producer Responsibility (EPR) schemes and trade mechanisms, e.g. by using the compliance with the guidelines as the mechanism to trigger eco-modulated fees in EPR or differentiated import/export tariffs.

In 2018 the European Commission adopted its Strategy for Plastics in a Circular Economy as part of the wider circular economy action plan adopted in 2015. The Strategy aims to transform the way plastics are designed, produced, used and recycled in the European Union (EU) to ensure that by 2030 all plastic packaging placed on the EU market can be reused or recycled in a cost-effective manner¹⁰.

Actions include new rules on packaging to improve the recyclability of plastics and increase the demand for recycled plastic content, improving separate collection of plastic waste, a directive on single-use products and fishing gear, measures to restrict the use of microplastics in products and address and reduce the unintentional release of microplastics into the environment, measures on bio-based, biodegradable and compostable plastics and scaling support for innovation. The main directives are:

- Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment (SUPP-Directive) provides a progressive phase out of certain Single Use Plastic Products, such as cutlery, plates and balloon sticks, to be replaced by reusable products and systems. It also includes Feemodulated Extended Producer Responsibility (EPR) schemes including the costs of clean-up and specific design and labelling requirements¹¹.
- **Directive 1994/62/EC on Packaging and Packaging Waste (PPWD)** defines the essential requirements for packaging design and composition and sets out packaging collection and recycling targets. It aims to improve the environmental performance of packaging, reduce packaging waste and protect the free circulation of packaging in the EU Single Market. A proposal to amend and reinforce the PPWD¹² requires that 55 per cent of plastic packaging waste is reused and recycled in Member States by 2030. Member states are encouraged to do so through deposit return schemes (see chapter 2.2), economic incentives, recycling targets and minimum percentages of reusable packaging placed on the market.

¹² Proposal for a Directive amending Directive 94/62/EC on packaging and packaging waste COM/2015/0596 final - 2015/0276 (COD).

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¹⁰ https://www.europarc.org/wp-content/uploads/2018/01/Eu-plastics-strategy-brochure.pdf.

¹¹ DIRECTIVE (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment.