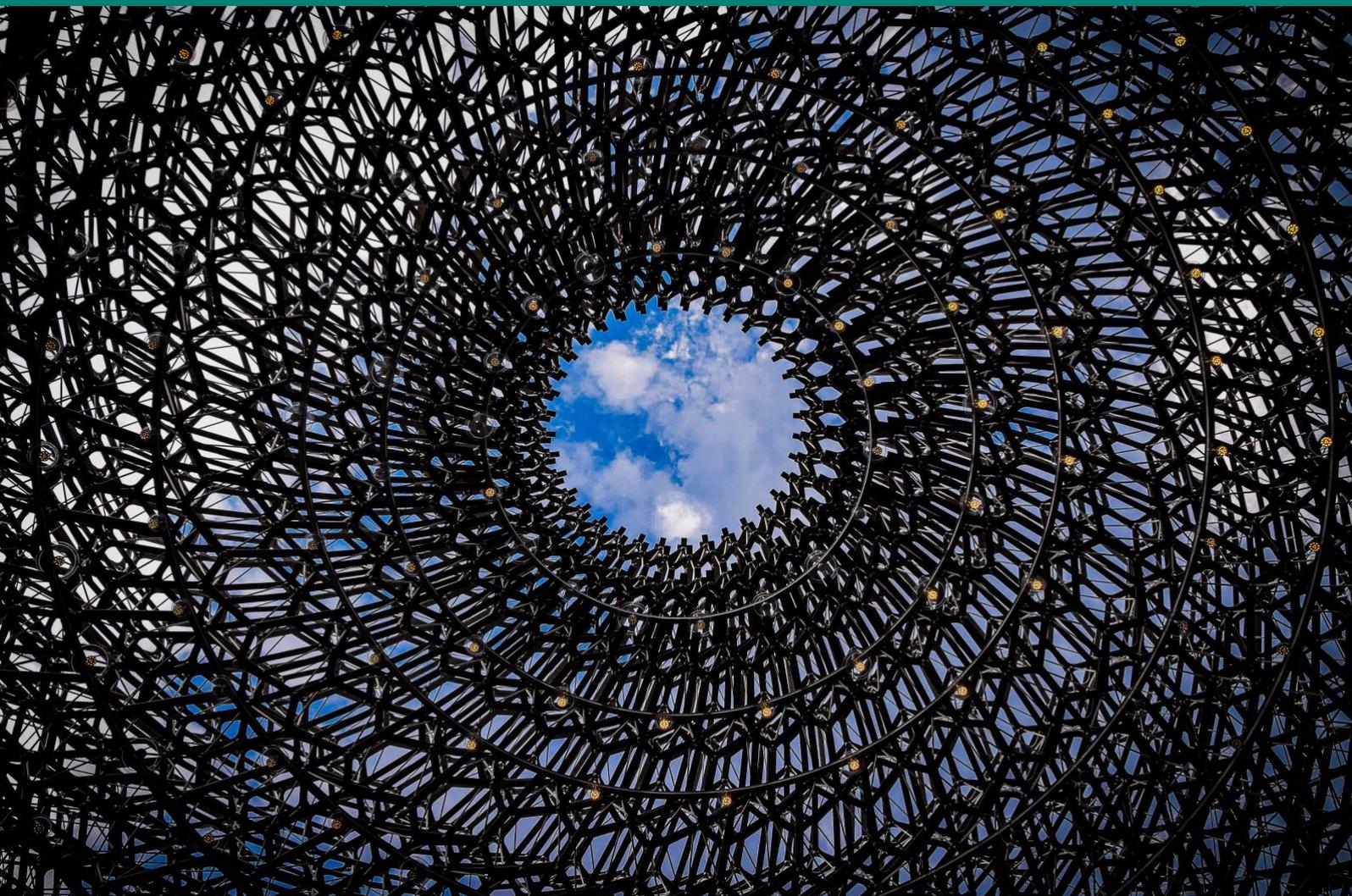


Communication approaches towards consumers in a circular economy



European Environment Agency
European Topic Centre on Waste and
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List of Abbreviations

CE:	Circular Economy
CEAP:	Circular Economy Action Plan
CPR:	Construction Production Regulation
DoP:	Declaration of Performance
ELV:	End of Life Vehicles
EPR:	Extended Producer Responsibility
IoT:	Internet of Things
LCA:	Life Cycle Assessment
MS:	Member States
PaaS:	Product as a Service
PPWD:	Packaging and Packaging Waste Directive
PRO:	Producer Responsibility Organization
PSS:	Product Service Systems
RFID:	Radio Frequency Identification
WEEE:	Waste Electrical and Electronics Equipment

1 Introduction

The concept of circularity has deep historical and philosophical origins. While not yet named circular, methods of sustainable sourcing that relate to the concept of circularity have been in use for decades, mainly in the forestry and agricultural sectors. Today this has drastically changed, as **production and consumption are now deeply characterised by the linear economy**. Products are being manufactured in a take-make-waste-repeat fashion, with no regard for the environment or planetary boundaries. The transition to a circular economy (CE) has tremendous potential to transform economic systems and substantially contribute to sustainable development. While debating how to tap into this potential, it was often assumed that the sheer provision of circular solutions would be sufficient for an effective uptake of the circular concept, described by Kirchherr et al. (2017) as,

“an economic system that replaces the end-of-life concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates [...] with the aim to accomplish sustainable development. It is enabled by novel business models and responsible consumers.”

Most of the attention in the past has focused on the supply side of circularity. While indeed circular business models, processes and products are a prerequisite, a lack of attention on the demand side is currently hampering the uptake of those solutions (Welch et al., 2017; Hobson and Lynch, 2016; Mylan et al., 2016; Rizos et al., 2016) and therefore challenging the circular economy as such.

The European Commission recently confirmed that “studies and surveys show that European **consumers often lack the basis they need to make informed choices**”. As a result, even if they wish to, they are not capable of rewarding those companies that embed sustainably in their business models or company policy (BEUC 2020). So far, CE communication has been mainly conducted through labels such as the Cradle to Cradle design principle or the EU Ecolabel. Nonetheless, it is now widely acknowledged that transparent and intelligible communication implemented **through innovative approaches** is necessary to lead consumers towards purchasing choices that are in line with circular economy principles. This need has been addressed in the EU’s Circular Economy Action Plan (CEAP) that foresees the need to **empower consumers in the field of adequate consumer information** in order to enable them to participate in the circular economy (European Commission 2020b). Consequently, the CEAP entails an “initiative to improve consumer information and strengthen consumer protection against commercial practices that run counter to Green Deal and CEAP objectives, e.g. ‘greenwashing’ and early obsolescence” (Ref. Ares (2020)3256804 - 23/06/2020). Additionally, the plan also outlines the creation of a “sustainable product policy legislative initiative” to ensure that products are created for durability, recyclability and reparability, amongst other attributes that comply with circular principles.

This study provides an overview of how a product’s circular economy attributes are communicated over its lifecycle. First, an overview of the role of consumers in shaping the economy is provided. The SHIFT framework (White et al., 2019) will be described and used as a guiding concept to demonstrate how psychological factors can be used in product communication to persuade consumers to buy circular products. In the main part of the study focuses on the three lifecycle phases in which circular aspects of products are mainly communicated, taking closer looks at short, medium and long lifespan products as communication strategies vary depending on the product category.



Figure 1: Circular economy model and the role of an informed and engaged consumer. Source: EEA and ETC/WMGE, Illustration by CSCP.

2 The role of consumers in a transition towards a circular economy

Although the importance of the “demand side” for a transition to a CE is clear, what this practically means **in terms of consumers’ role** is still under discussion (Camacho-Otero et al. 2019). The European Commission acknowledges that a successful uptake of a circular economy requires **new modes of consumer behaviour** (COM (2014) 398 final, Towards a circular economy). This study argues that an **informed** and **engaged** consumer plays an important role in accelerating the transition to a circular economy. While a **rational consumer** could be considered as an enabler of circular concepts, a vast amount of literature agrees that so far, such a consumer does not exist (Camacho-Otero et al. 2019).

Users unfamiliar with CE principles such as longevity (i.e. encouraging long use, or resisting obsolescence), leasing (i.e. product service systems or servitisation), reuse (i.e. extended use, or postponing obsolescence through extending product life) and recycling (i.e. recovery, or reversing obsolescence through extending material life) (Chamberlin and Boks 2018) might misconceive the performance and individual benefits of a circular product. To give some examples, a circular business model that shifts from selling to leasing a functionality might raise concerns with regard to total cost of ownership of the product. Typical CE-related features, such as reuse and recycling might raise concerns about product safety and performance. **Unclear or incomplete information** about a circular product or service for the consumer represent a **fundamental barrier for rational decision making**. Consumers might struggle with assessing the benefits and costs of a circular solution for themselves, as their internal decision-making compasses, trained by conventional linear production and consumption processes, might have problems in correctly assessing the implications of a product’s usability. Several consumer-related barriers that can be considered specific to circular business models have been identified (e.g. Becker-Leifhold and Iran (2019); Chamberlin and Boks, 2018; Camacho-Otero, 2019; Kaufman et al. 2020). **Error! Reference source not found.** shows an overview including examples.

Table 2.1: Overview of consumer concerns about circular products and practices

Consumer concerns	Example
Contamination /disgust/newness	Concerns about using remanufactured or access-based products that have previously been touched by others
Convenience/availability	Concerns about gaining initial access to the product or service
Ownership	Unfamiliarity, for example with rental services that shift focus from ownership to access
Cost/financial incentive/tangible value	New, restricted modes of ownership might raise concerns about total costs of ownership/the tangible value of a product
Environmental impact	Concerns about environmental benefits due to unfamiliarity with circular principles
Quality/performance	Concerns about product quality and performance due to unfamiliarity with circular principles
Customer service/supportive relationships	Increased need for interaction between manufacturers and consumers raises concerns about access to/convenience of the interaction

Source: based on Chamberlin and Boks (2018), adapted

As the adaption of more circular behaviour patterns is probably at least equally important as the consumer’s ability to understand and assess the circularity of a product, communication will need to equally address this aspect, or even more actively strive to adjust it (Strube and Nicolau, 2019). Consumers are required to change their values, attitudes and beliefs to positively alter their behaviour (Camacho-Otero et al., 2019). Nonetheless, this process embeds a series of challenges and the most common one is the so-called **values-action gap** referring to **unchanged behaviour despite of available information** (Young et al., 2010; Auger and Devinney 2007; Gatersleben et al., 2002; Kollmuss and Agyeman 2002).

The above-mentioned **consumer concerns** derived from circular principles, **need to be addressed by innovative communication approaches of circular models, products and services** to close the value action gap. Relevant consumer power can be supported in two ways. On one hand, the consumer needs to gain a solid understanding of circular solutions and their principles, as they might quite significantly differ from linear alternatives which serve as the conventional reference. On the other, circular solutions often require different forms of application by the consumer, such as repairing and recycling, which obviously need to be understood and, most importantly, taken up if their impact is to be maximised. Both elements can be considered equally fundamental to a successful uptake of the circular economy.

A more conceptual approach to address and overcome the consumer’s attitude-behaviour gap in the circular economy can be found in the SHIFT-framework proposed by White et al. (2019). The SHIFT framework proposes that consumers are more inclined to engage in pro-environmental behaviours when the message or context leverages the following psychological factors: **social influence, habit formation, individual self, feelings and cognition, and tangibility**. Table 2.2 gives an overview of the factors and introduces their underlying strategies.

Table 2.2: SHIFT factors and corresponding strategies.

Factor	Strategies
Social influence	Social influence can be strengthened by creating social identities (Tajfel and Turner 1986). This makes it more likely that individuals will engage in sustainable actions if other members are also doing so (Goldstein, Cialdini, and Griskevicius 2008; Han and Stoel 2017; Welsch and Kühling 2009). Individuals viewing themselves as a member of a pro-environmental ingroup is a key determinant of pro-environmental choices and actions (Fielding et al. 2008; Gupta and Ogden 2009; Van der Werff, Steg, and Keizer 2013). Social desirability is another aspect of social influence through which pro environmental actions and communications can be steered, since consumers tend to select sustainable options to make a positive impression on others (Green and Peloza, 2014) and they endorse high-involvement sustainable options to convey social status to others (Griskevicius et al., 2010). An example of how social influence is being addressed is the increasing presence of influencers on social media.
Habit formation	There are two main ways of enabling a (re)-formation of habits. The first one is breaking undesired habits through interventions such as penalties in the form of fines, taxes or tariffs (Govindan, Kannan; Hasanagic, Mia 2018). The second is the concept of discontinuity , which is the disruption of a stable context, for example, a new living or work environment, and marriage, that can provide a window of opportunity for the adoption of new habits. Additionally, action that encourages repetition can strengthen positive habits (Kurz et al. 2014). ‘Making the action easier’ can enable habit formation (Van Houten, Nau, and Merrigan 1981) while creating a default could also help in facilitating an action (Pichert and Katsikopoulos 2008). Desired repetitions could also be encouraged through providing prompts before the actions (Osbaldiston and Schott 2012) as well as feedback after the action occurs (Chiang et al. 2014; Fischer 2008; Karjalainen 2011). Rewards, discounts and gifts are seen as another approach to increase desired behaviours via addressing extrinsic motivations (Diamond and Loewy 1991; Slavin, Wodarski, and Blackburn 1981; Wilhite and Ling 1995).
Individual self	The concept of the individual self-addresses psychological and cultural factors, with the first dimension being the self-concept . It is the desire to maintain positive self-views, reaffirmed through consumption (Dunning 2007). When confronted with negative environmental impacts consumption, individuals tend to become defensive (Dickinson 2009; Feygina, Jost, and Goldsmith 2010). To avoid this, positively associating sustainable behaviour through self-affirmation or the endorsement of important self-values, mitigates self-protective responses and leads to greater endorsement of sustainable actions (Brough et al. 2016; Prooijen and Sparks 2014; Sparks et al. 2010). Self-consistency , the tendency of individuals to want to perceive themselves as consistent in their positive action can be an opportunity

	<p>for behaviour change, as engaging in sustainable behaviour at one time often leads to consistent sustainable behaviour in the future (Van der Werff, Steg, and Keizer 2014). Additionally, aligning the communication of a sustainability practice with the self-interest of a consumer can leverage sustainable behaviour (Griskevicius, Cant’u, and Vugt 2012; Paavola 2001). Highlighting self -benefits in communication strategies can also counteract the barriers to sustainable actions (Gleim et al. 2013; Lanzini and Thøgersen 2014). Self-efficacy, another layer to be addressed to foster the uptake of sustainable practices can be described as the belief that an individual can engage in a required action and that carrying out the action will have the intended impact (Bandura 1977).</p>
Feelings	<p>Habitual change can be induced by addressing negative or positive emotions. Negative emotions, such as fear and guilt, can be used effectively in communications to promote sustainable behaviour when moderately applied (Meng and Trudel 2017; Peloza, White, and Shang 2013), while inducing too intense negative emotions can lead to the rejection of proposed sustainable practices (Kollmuss and Agyeman 2002). Fear, when linked with self-efficacy, can be used to induce behaviour change (Li 2014; Osbaldiston and Sheldon 2002), as well as guilt making consumers assume individual responsibility for the unsustainable outcomes of their behaviour (Lerner and Keltner 2000) and taking moral responsibility for his or her environment (Kaiser and Shimoda 1999).</p> <p>The creation of positive emotions through taking sustainable action, such as joy, pride and optimism, can spill over and lead to more favourable evaluations of the overall service experience (Giebelhausen et al. 2016).</p>
Cognition	<p>The main cognitive drivers that induce sustainable behaviour are salient information, learning and knowledge. As lack of information is a barrier to behaviour change, salient information is crucial in communicating circular benefits. Sufficient knowledge might be seen as a cross-cutting necessity throughout all SHIFT-factors (White et al 2019). Eco-labels can be considered an effective means of providing relevant information, as they have the ability to do this in a structured, standardised and (ideally) comparable way leading to consumers making eco-friendlier decisions (Borin, Cerf, and Krishnan 2011; Taufique, Vocino, and Polonsky 2017; Thøgersen 2000). Framing is also considered a powerful tool to drive sustainable behaviour on a cognitive level. Concentrating on communicating negative consequences (losses) rather than positive ones (savings) has stronger effects on consumer behaviour (Hardisty and Weber 2009).</p>
Tangibility	<p>Communication that makes sustainability- related actions as well as their outcomes tangible to consumers is central (Reczek, Trudel, and White 2018). It is important to reallocate the consumer’s focus more to the future, for example by asking him or her to think about future generations, as sustainable behaviour is more future oriented and consumers tend to be rather present oriented (Wade-Benzoni, Tenbrunsel, and Bazerman 1997). Concentrating on communicating local and proximal impacts, drawing on people’s attachments to a specific place (Devine-Wright and Howes 2010; Gifford 2014), emphasising personal experience of climate change impacts (Weber 2010) and using current issues such as extreme weather events can lead to greater belief in sustainability and the taking of appropriate action (Li, Johnson, and Zaval 2011). Concrete communication through showcasing the immediate impacts of environmental problems such as climate change (Paswan, Guzman, and Lewin 2017) and outlining clear steps that can be taken to make a difference (White, MacDonnell, and Dahl 2011) can make the consequences of inaction (or action) clear. Encouraging the desire for intangibles, such as experiences (Van Boven 2005) digital products (Atasoy and Morewedge 2018; Belk 2013) and services (Lovelock 1983). Communication cannot only positively influence the uptake of sustainable behaviour in general, it can improve it by promoting dematerialisation, and – more related to the context of this report – promote the uptake of circular practices.</p>

Source: adapted from White et al 2019.

Each of the SHIFT factors represents a potential leverage for promoting more circular practices. Communication that is aimed at increasing demand for circular practices should therefore not focus on singular factors, but rather address a combination of those, as **each factor ‘triggers’ the consumer on a different level**. To name one example, the concepts of ‘feelings’ on the one hand and ‘cognition’ on the other hand account for the fact that consumer behavior is both influenced by rational and emotional considerations. Similarly, strategies exist to address the consumer as an individual just as strategies exist to address him as a member of a social group. The communication strategies introduced in the framework will serve as the main inventory when identifying and assessing CE-related communication in chapter 4. The analysis will also strive to identify which strategies (derived from which factors) find the most application in a given product category and/or stage of the life cycle.

The SHIFT-factors already show that **the consumer can be addressed on different ‘levels’** in the communication, which each stipulate different ‘roles’ of the individual (e.g. the individual self vs. the social self). This distinction of different roles becomes even more important when looking at consumers as a group. Literature shows that **different consumer types exist** and those differences have to be taken in to account in communication strategies according to the characteristics of the consumer classification (Queensland Government 2020). Everett Rogers (1983) first distinguished five consumer types when it comes to the adoption of new products. **Innovators** are the very first to acquire a product, breaking out of their social context and subjugating themselves to substantial risks if the product fails. Next come the **early adopters** who act as leaders in their communities and through their purchasing decisions influence other members of their social networks. **Early majority** adopters follow the lead of the early adopters and are important as they are the bridge between those consumers who purchase a product early and those who do so in a later stage of the product’s presence on the market. **Late majority** consumers are those who purchase a new product later than most of the society and then only if a certain amount of pressure is exerted on them. **Laggards** the final group of consumer adoption types who usually adopt the new product after it has been present for a substantial amount of time as they usually prefer to stick to seasoned products.

Being aware of these different consumer types and ensuring that each is addressed by communications could support the adoption of circular products. Influencers on social media, for example, could act as catalysts and innovators when it comes to the early adoption more circular products. Through their social media presence, such individuals could help reach the early adopters and then the early majority, ensuring that the product becomes mainstream. This is not the focus of this study but it should be researched further to ensure that circular products are marketed successfully.

3 The Analytical Framework: Life cycle stage, sector and life span as determinants of circular economy communication

Based on the considerations discussed in the preceding sections, this chapter provides the analytical framework that allows the identification and assessment of circular economy related communication.

The life cycle approach

Interventions for promoting the circular economy are manifold. Generally, circular economy strategies follow the R-list: reduce, reuse and recycle are the most common, while a fourth, recover, is often added (Brusseau, 2019). Other hierarchical lists of R-words exist, with the number of R’s varying between three and ten, depending on the source (Henry et al., 2020). The R’s provide orientation for the formulation of appropriate interventions such as material sourcing, eco design, production and distribution, consumption and stock, and finally waste management. The R-lists not only highlight different types of circularity intervention, but also indicate that not all interventions are applicable to all products and services across their lifecycles. While maintenance and repair, for example, can be applied during a product’s use phase by the consumer, reuse, refurbishment and remanufacture are mainly determined by decisions made by

the manufacturer during the production, design and the distribution stages. Those differences in windows of opportunity and relevant actors influence how circular economy opportunities need to be advertised and their best use communicated to ensure their adoption.

To take the contextual character of circular interventions into account, the visual model of the circular economy, which highlights the different stages of a product's lifecycle and the flow of materials and energy **throughout it** can serve as a useful as reference.

Using the lifecycle approach, the strategies and tools will be **elaborated along their relevant lifecycle stage**, as this allows for better comparability of interventions across different sectors and additional factors such as lifespan. Having said that, this report strives to analyse success factors of circular economy **communication**, not the interventions themselves. While circular interventions are applicable throughout all stages of a lifecycle – from raw materials' sourcing to end of life – this is not true of the communication related to each intervention. Communication can only happen in three phases of a lifecycle:

- the **production and distribution stage** – through claims of usage of reused or recycled content;
- the **use phase** - through user manuals and supplementary information; and
- the **end-of-life phase** – information of appropriate disposal methods.

The following analysis is structured along these three phases. Interventions stemming from the two preceding phases, such as the internal decision to source recycled materials, will also be taken into account, but not according to the time of their implementation.

Instead, the identified tools, instruments and strategies will be **elaborated according to the lifecycle stage in which they are communicated**, for example at the point of sale by means of an ecolabel. This approach allows the systemic identification of existing practices and their comparison among differing sectors, and ultimately the highlighting of success factors in the communication of several circular economy related interventions. Obviously, circular economy communication cannot always be related to a specific lifecycle stage. The communication of the recyclability of a product, for example, might be most relevant for the majority of consumers at the end-of-life stage, when it can promote the necessary intervention, appropriate disposal, most effectively. On the other hand, this information/communication could be relevant during the distribution stage as, knowing a product can be disposed of in a circular way might influence consumers' buying decisions. Such cases of communication serving several different circular purposes is taken into account by reflections on both purposes in the analysis.

The sectoral lens

To limit the scope of this report, a selection of circular interventions and their respective communications had to be made to allow for a structured argumentation and ultimately better comparability. As a result, a **sectoral lens** was added to allow a focus on sectors that have significant potential for promoting a circular economy. The Circular Economy Action Plan was taken as a reference for the selection of the sectors as it already points to 'sectors [that] face specific challenges in the context of the circular economy' (EC 2020), listing the following 'key product value chains':

- electronics and information and communications technologies (ICTs);
- batteries and vehicles;
- packaging;
- plastics;
- textiles;
- construction and buildings;
- food, water and nutrients.

The only key value chain mentioned in the Circular Economy Action Plan excluded from this analysis is the food, water and nutrients sector, as, due to its organic nature, circular economy related interventions, as well as their communication, differ drastically from those in the other named sectors, severely hampering comparability. Similarly, the plastic value chain is analysed explicitly since, compared to the other value chains, it is not a product (group) in itself but a resource category. It is therefore considered as part of the other value chains – plastic packaging, ICT made of plastic, plastic textiles, etc. The value chains effectively define the scope that is applied in the analysis rather than being used to structure it, as it is the case with the lifecycle stages.

The product's lifespan lens

The **total lifespan of a product** is likely to have a significant influence on circular economy related interventions that can be applied in a meaningful way. While for product groups with short lifespans such as packaging, interventions focussing on closing the loop and consequently retaining material flows are paramount to improving their circular economy performance. Interventions such as extending the loop, which increase longer lasting products' lifespans, such as textiles, are also important. The analysis will therefore cluster products according to their expected lifespans to facilitate the identification of common success factors. Where circular economy related interventions cannot be determined by the lifespan of a product but are universal in their application, **general elements** within each lifecycle stage will be identified in each section.

Based on these considerations, the following clustering has been applied for products with:

- **short lifespans**, such as packaging;
- **medium lifespans** such as electronics, ICT, batteries and textiles;
- **long lifespans** such as construction materials.

Measuring effectiveness

While research on circularity is relatively well established on the intervention level, this report is one of the first attempts to analyse how communication can support the uptake of those interventions and therefore the uptake of the circular economy itself. It was already pointed out that the lack of attention on the 'demand side' of circular interventions and more specifically the value-action gap are currently significant barriers in this regard, **communication is therefore playing a crucial role as the enabler**. During the analysis, common similarities and differences could be identified due to the differentiation between life cycle stage and also product lifespan, yielding **first insights on success factors for CE-communication**. However, in the context of this report it is **not possible to actually measure success** of the different communication approaches, as quantitative data on how much communication supported (or even hampered) the uptake of circularity could not be analysed within this report. Performing this exercise will be extremely helpful in further solidifying knowledge on communication success factors.

4 Overview of communication approaches using a product life cycle perspective

4.1 Distribution Stage

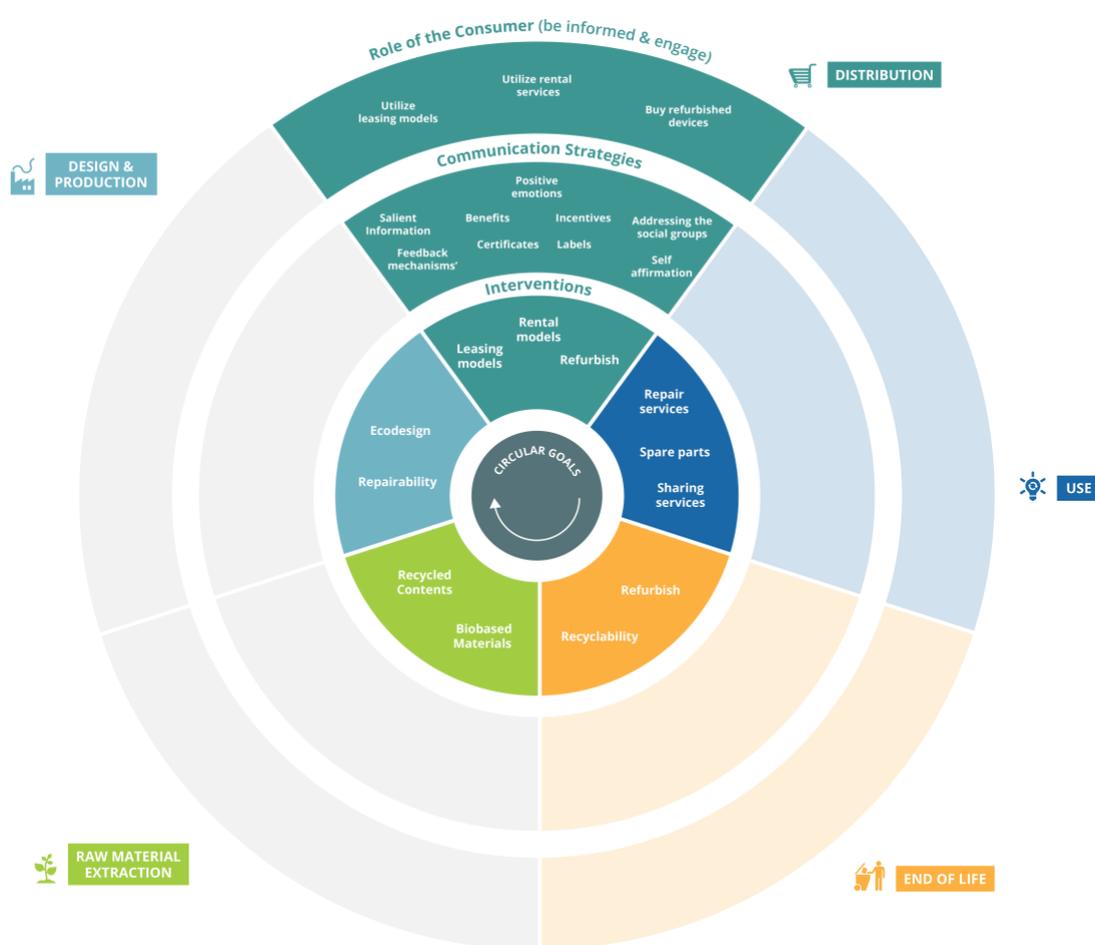


Figure 2: The role of an informed and engaged consumer in the distribution stage. Source: EEA and ETC/WMGE, Illustration by CSCP.

4.1.1 Short lifespan products

Communication approaches identified

- For short lifespan products, the focus of circular economy related communication lies in closing the loop rather than extending it;
- labelling was found to be an important instrument in communication, which also facilitates benchmarking;
- packaging as most extreme example of products with a short lifespan:
 - o communication of (bio-based) input material on packaging;
 - o communication of recyclability of materials;
 - o communication of quality of alternative materials.

In the realm of products with a short lifespan, the majority of circular economy related interventions are focussing on circularising the input materials. Potential approaches are manifold, ranging from the use of **recycled** or **bio-based** feedstocks to the most extreme variation of not only **recycling** but even **upcycling** – signalling that value can not only be retained, but even enhanced.

General

The proof of the use of such circular input streams is unsurprisingly the most common element in communication during the distribution stage of products with short lifespans. The introduction of **the Blue Angel environmental label** by the German government in 1978 was probably the first such systematic intervention, which was first applied to just six product groups and services, including recycled paper, deposit schemes for bottles and glass bottle banks. The scheme, which exemplified the paramount importance of the communication of circular input streams for short-lived products, was established in response to growing environmental consciousness and aimed to reward environmental action taken by producers. It can therefore be seen as very first attempt to **use circular economy related interventions for consumer communication**. Over time, this environmental label has been significantly scaled-up and the Blue Angel now covers almost 250 different products and services including products with very long lifespans including construction materials. It also demonstrates that even relatively small-scale circular economy related interventions can **slowly permeate into a universal expectation** and significantly strengthen the consumers' ecologic consciousness. In many cases, the requirements of the label have evolved into law, meaning that it became a driver of broad environmental improvements in whole industrial sectors. As a result, many companies work to fulfil the requirements and communicate a leading sustainability position by achieving Blue Angel certification for their products.

The Blue Angel concept has been picked up and further developed by other countries and regions; for example, by the Nordic Swan ecolabel which was established as a Scandinavian analogue in 1989. In the participating countries, both have become the main sustainability related signalling instrument for consumers, achieving awareness of 76 % for the Blue Angel in Germany and 94 % for the Nordic Swan in Scandinavia. It is worth noting that neither system sees itself as explicitly circular economy related but rather as a general sustainability label; accordingly, their communication does not specifically focus on circular economy criteria.

The communication of circular and sustainable attributes of products through national labels and certificates has **culminated in the EU EcoLabel** which was established in 1992 (European Commission 2020b). It certifies products that meet sustainability and circularity criteria throughout their entire lifecycles, making sure that products and their manufacture produce as little carbon dioxide as possible, are durable, easy to repair and can be readily recycled. The transition towards a circular economy will be facilitated by the EU EcoLabel which certifies not only short lifespan products, but also those with medium and long lifespans (Sustain Europe 2020). The label acts as a communication instrument for the Circular Economy Action Plan, helping consumers to make purchasing decisions that support the creation of circular economy (European Commission, 2020a).

Another example is Cradle to Cradle certification which specifically focuses on products that are **designed for use in a circular economy** – recyclable, sustainable and/or dismantlable. Certification entails the examination of the entire lifecycle of a product to ensure that each aspect is compatible with the principles of a circular economy (Cradle2Cradle 2020).

Labels and certifications, such as the Blue Angel, Nordic Swan and Cradle to Cradle, that are clearly visible on a product, provide **salient information** and could enable consumers to **benchmark products** when confronted with multiple product options. This could lead to consumers picking the product with a label or certification over one without.

Packaging

Packaging can be seen as the most extreme example of a short-life product, given that its main role, apart from product communication is the safe transport of the actual product to the place of use. Consequently, many different examples can be found of communicating the circularity of input streams. While recycled materials are widely used in packaging and Blue Angel and Nordic Swan both have criteria for recycled shopping bags, the **use of bio-based materials for packaging** is of particular importance. Apart from the

well-established paper/cardboard packaging solutions, some companies are exploring new pathways. To name an example, one outdoor fashion retailer – Salewa – is integrating packaging into its business model by using parcel boxes partly made of grass (Salewa 2020). While grass-made packaging does not necessarily need to be the more sustainable alternative compared to paper and cardboard, such innovations can still be seen as effective means for awareness raising towards the consumer.

In all of the surveyed cases, the respective circularity and sustainability benefits of the raw materials are **communicated directly on the packaging**, delivering, for example, facts about the advantages of complementing the wood in paper with grass, specifically referring to water and energy savings as well as reductions in the use of chemicals. Furthermore, the quality of the packaging is often referenced, assuring the consumer that they are making a successful choice. The outdoor fashion retailer mentioned above also directly addresses the **social group** that shops in their store and most likely enjoys spending time outdoors. Individuals then not only feel part of a group that spends time outside but also one that is environmentally aware.

In addition to the on-pack communication, producers provide **more detailed information on their websites or through social media**, for example about the backgrounds of the various packaging types or grass as an alternative raw material. In doing so, the clarifying aspect of the communication is often merged with image and marketing elements, emphasising the firms' holistic approaches of integrating packaging into circularity and sustainability strategies. This could then be an example of salient information since consumers can easily access further information on the respective websites.

An additional illustration of how communication of raw material usage on packaging is implemented can be found when observing the **action taken to substitute plastic materials**. Numerous corporate actors have integrated alternatives to plastic in their packaging and communicate their progress on European (Coca Cola 2020) as well as non-European markets (Pilecco Nobre 2020). One case of the introduction of an alternative to plastic was found for bottles, for which sugar cane is the basic renewable resource used in a new material mix (Coca Cola 2020a). For more conventional materials such as wood and paper, similar approaches have also been identified, either relating to bio-based dimensions, such as the use of Forest Stewardship Council (FSC) certified wood or, even more circular, the recycled element, for example, the use of recycled Forest Stewardship Council certified wood. In all cases, the feature is mainly communicated on-product, often through labels or slogans. **Short, quantitative benefits**, such as “30 % renewable materials” complete the on-product information. The communication is further accompanied on the companies' home pages and social media channels.

A reason for this relatively strong focus on outlining of the use of bio-based materials for packaging can be found in product safety considerations. Currently the legal potential of packaging food items in materials that contain recycled materials is limited (European Commission, 2008). In the eyes of the consumer the product safety is fundamental to product packaging. Thus, the communication of circular input streams in packaging often contains additional messages with regard to product safety. All producers **assure** consumers that their **packaging** made from recycled or renewable materials **meets the highest quality standards**. In some cases, however, companies feel the need to increase consumer conviction. For grass-based paper or sugar-cane bottles this might not be of the highest relevance but there are also some more critical packaging ideas, such the substitution of cork or plastic with materials made from sugar cane for wine plugs (Vineventions 2020). Producers not only emphasise the circularity and sustainability benefits of using this new material, but also its quality advantages. In case of the wine plug, information on usability, hygiene and quality is described in detail. To underline these aspects, the product is designed to convince the consumer of its quality: natural, wood-like textures, a soft surface and a premium appearance in general are indirect measures to convince the consumer that a valuable product is sealed with valuable materials. This could be an example of how the communication of a product could evoke **positive emotions** in consumers as well as providing substantial **information and knowledge**. Optimally, this could lead to the consumer changing his or her behaviour.

4.1.2 Medium lifespan products

General

As already discussed, the German Blue Angel label is not only relevant for short lifespan products but is also used to certify ones with medium lifespans. Medium lifespan certified products include air conditioners, stoves, vacuum cleaners, lamps, textiles, writing utensils and many more (Blauer Engel 2020). As for short lifespan products, the label results in **salient information** being made available for consumers and provides the opportunity of benchmarking products to make a more informed decision regarding sustainability.

Electronics and information and communications technologies

Communication approaches highlighting circular principles are generally scarce in the electronics sector (Greenpeace, 2017). Several sector initiatives have, however, emerged in the past years from both big and small actors, focussing on communicating the circular features of their products and their distribution. This might be relatable in part to the implementation of regulatory instruments, such as the **Waste Electrical and Electronic Equipment (WEEE) Directive** in 2012, which puts the responsibility for taking back used devices on the manufacturers. While this does not directly induce the application of circularity principles, it may, nonetheless, foster such considerations in the design stage of a product as the manufacturer is motivated to improve the yield (in terms of retainable value) from old devices.

Fairphone, a small Netherlands-based manufacturer of smartphones with a focus on sustainability features, is a pioneer in this field. It publishes a **smartphone material report** (Fairphone, 2017), in which all relevant raw materials are systemically listed and assessed. The report is published on Fairphones' website and allows interested consumers follow the process of responsible sourcing decisions. Further innovative communication instruments provide additional information, such as an urban mining manual (Fairphone 2020) to raise awareness of the resources' origins and a video campaign (Fairphone 2020a) to create an emotional relationship between the potential customer and the phone's producers.

Another way of distributing more circular electronics is the **market for refurbished** products. The respective devices have been in use but have been renovated and equipped with some new components, such as batteries. In this field, consumer communication is extremely important as the consumer's perception of the devices depends to a high degree on the way the information on their earlier use is shared (De Jong et al., 2018). At the same time, consumers expect to pay significantly less for such products compared to new ones (Deshpande et al., 2018). Further modifications, for example to the product's design, can be enough to convince even hesitant consumers to choose refurbished products (Wallner et al 2019).

In practice, retailers seem to have accepted strategies for refurbishing electronics. One market leader in this sector offers free testing, significant price advantages and a one-year warranty (Refurbed 2020). Through these instruments, companies could bring about a **change in consumption habits** since the consumer is given **extrinsic incentives** to purchase more circular products instead of conventional ones. Indeed, extensive efforts are made to convince consumers of the quality of these refurbished products, backed up with information pages about their circularity and the sustainability benefits of choosing one (Backmarket 2020).

Some companies are also starting to raise consumer awareness of **remanufactured** products. One has recently started promoting Circular Computing™ (a certified remanufacturing process) carbon-neutral laptops to consumers alongside new models (Circular Computing 2020). A **mailing campaign** run in Denmark for a new laptop also featured the same model from Circular Computing™. Under the headline **'We believe in reincarnation'** the mailer explains that the remanufactured model looks and performs exactly like a new machine and comes with a full three-year warranty. The manufacturer highlights that it uses as high-quality materials and components as in the original build to ensure longevity and sustainability "because it is good business for you and the environment" (Circular Computing, 2020;

Rematec, 2020). Here the communication of extrinsic **incentives** through warranties is used to attempt a change in consumer behaviour. Additionally, through addressing the consumer directly, the **self-affirmation of the consumer** is placed in focus by appealing to the side of the consumer that wishes to consume sustainably.

Batteries

Major sustainability challenges remain in sourcing and use of materials in batteries (Elkind et al., 2020), and as a result there have so far been no significant communication on their circularity. To showcase a future-oriented approach, companies communicate about new investment in sustainable sourcing of materials, battery production (BMW 2020), standards setting for materials sourcing (Volkswagen 2020) and updates on innovation (dezeen 2020) through press releases. The main challenges are to further develop lithium-based battery technology in order to achieve higher performance, while increasing its sustainability and circularity (Mossali et al. 2020; Zeng et al. 2019). The fact that market participants are yet to reach the point at which they can unify these requirements leads to a situation in which product-oriented communication on circularity is rare. Instead, the focus is on communicating **project-oriented benefits**, through which progress on achieving more sustainable and powerful alternatives to current batteries is passed on.

While competition between companies leads to innovation, it can also be promoted by political intervention. The **BATTERY 2030+ initiative**, co-funded by the EU to identify sustainability potential in the battery sector, published a roadmap on how research should be bundled to realise significant corresponding progress. The outcomes might lead to future incentives or pressure on companies' performances – it has already extended producer responsibility (EPR) for battery waste (Edström 2020). This might motivate, as well as pressure, companies not only to improve the sustainability of batteries and their production, but also showcase and communicate progress.

Interestingly, another fundamental circular economy related feature of batteries, rechargeability, is not a communications focus of the main sectoral actors. Although rechargeable batteries are being sold by all actors, no specific communication on their economic and ecological benefits could be found. Rather, circular economy related communication is focused on **taking-back systems of single-use batteries** (Duracell 2020).

Textiles

In the textile sector, circular economy related communication focusses mainly on the **use of recycled contents**. **Labelling** is the method of choice here and it has been facilitated by the emergence of textile related labelling schemes that do not focus on conventional sustainability issues such as fair trade and organic materials, for example through the Global Organic Textile Standard (GOTS 2020) or Cotton made in Africa (CmiA 2020), but on circular features. Examples of such circular economy specific labels are Cradle to Cradle, the Global Recycling Standard (GRS) and the Recycled Claim Standard (RCS). Most manufacturers as well as retailers complement these with **communication streams on their homepages and/or online shops**, providing the interested consumer with further information on recycling. Those communications reflect the **salient information** and **eco-labelling approaches**, again stressing their relevance. Furthermore, some textile companies are using monetary **incentives** in the form of vouchers to encourage people to recycle their old clothing, no matter the brand (H&M 2020).

A further new concept within the textile sector is **upcycled garments** – made of repurposed, repaired, upgraded and remanufactured single products and materials in a way that increases their value (Singh et al., 2019). However, apart from sporadic individual sales (Etsy 2020), upcycled textiles are yet to be widely introduced. A lack of feasibility might be a reason for the limited implementation, while researchers stress the need for a stronger focus on upcycling in fashion design education (Cini, 2018). As a result, communication about upcycling remains in the niche (H&M 2020a).

4.1.3 Long lifespan products

General

Products with long lifespans can also carry the Blue Angel label, including wall paint, wallpaper and solar collectors (Blauer Engel 2020). Contrary to short- and medium lifespan goods, the requirements for long lifespan products are **not primarily focussed on the recycled content**, though this is still the case for wood-based products (Blauer Engel 2020a), but rather on aspects such as longevity and recyclability (Blauer Engel 2020b). For long-life products, communications concentrate on **salient information on design** and the possibility of **benchmarking products**.

Buildings and construction

Entered into force in 2013, the Construction Products Regulation (CPR) lays down harmonised rules for the marketing of construction products in the EU. It ensures that reliable information is available to professionals, public authorities, but also to consumers (European Commission, 2016). For such long lifespan products consumers more specifically refer to building users, facility managers and owners.

The **Declaration of Performance (DoP)** that provides information on the performance of a product is a key feature of the Construction Products Regulation. Each construction product covered by a European harmonised standard or for which a European Technical Assessment has been issued, **needs a Declaration of Performance and**, according to the Construction Products Regulation, **must have a circular economy marking** “affixed **visibly, legibly and indelibly to the construction product** or to a **label attached**” (European Commission, 2016). Furthermore, the Regulation indicates that Environmental Product Declarations (EPDs) should be used when available. Based on a lifecycle assessment (LCA), an Environmental Product Declaration is a standardized way of quantifying the environmental performance of a product, process or system and reporting on it. These Declarations are in fact **documentary proof of the environmental performance** of construction products (EnergyVille, in press). In addition, the ISO 14025 standard sets additional requirements on Declarations that are intended for business-to-consumer communication or are likely to be used by consumers. The ISO standard specifies that Environmental Product Declarations should be made **available to consumers at the point of sale** (EPD International AB, in press). In this sense Environmental Product Declarations provide the consumer with **credible and comparable information** at the point of purchase, based on approved and verified scientific principles of lifecycle analyses and specific rules ensuring that Environmental Product Declarations within the same category of products are calculated and presented in the same way (International EPD System, in press).

At the level of **specific building materials** such as cement or steel, **companies communicate circularity criteria**, explicitly referencing the circular economy with all its benefits, the company’s efforts to achieve circularity (LafargeHolcim 2020) and the circular attributes of their materials (Parker Steel 2020), backed quality assurances, both external such as ISO accreditations and internal ones such as warranties.

4.2 Use Phase

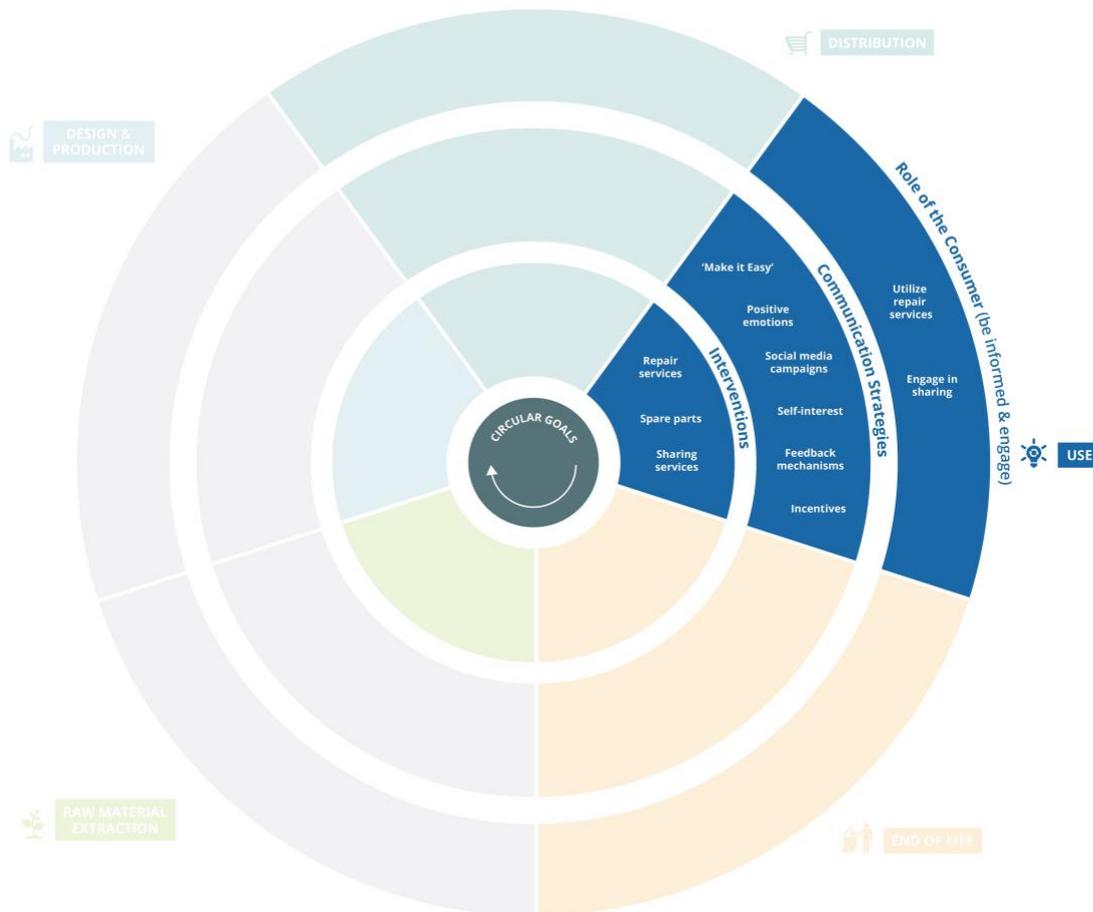


Figure 3: The role of an informed and engaged consumer in the use phase. Source: EEA and ETC/WMGE, Illustration by CSCP.

4.2.1 Short lifespan products

Communication approaches identified

- Reusable packaging solutions:
 - o providing information on the environmental benefits compared to single-use alternatives;
 - o providing information on the convenience of the service through success stories;
 - o engaging consumers with a reward system.
- Refillable packaging solutions:
 - o providing information on the compliance with the Cradle to Cradle certification process;
 - o engaging consumers with a reward system;
 - o engaging consumers in joining the reuse revolution through digital campaigns on social media involving influencers;

A Finnish company, Repack (2020) has designed a **reusable delivery packaging solution** for online commerce platforms. This solution is a packaging system where packages can be returned and then re-used. As consumers shop online and check out, they have an option to choose this delivery option instead of disposable packaging, by paying an additional fee. This solution is based on a **reward system**.

Consumers, thus becoming end-users of this solution, can get back the fee and **receive a voucher** whenever they return the packaging back via any local postal service. Using a **delivery as a service business model**, this Finnish company provides **quantitative information** (also including the impact of returning the product through postal return) on the environmental performance of their solution compared to single-use alternatives. The rewarding system is a communication approach based on a combined improvement of customer **experience and loyalty**. This system is convenient to the customers, as the packaging comes with an end-of-life guarantee and sustainability benefits arise as compared to current single-use alternatives. Their website is displaying **success stories**, especially based on **end-users feedback** (Repack, 2020). Other possible examples of reusable following the same logic e.g. for food delivery based on a digital deposit system (Niiji, 2019).

Most commonly used for cleaning, hygiene and beauty products, **refillable packaging** is also being implemented. Some brands are thus encouraging their customers to return their empty packaging to the stores. Complying with a cradle-to-cradle certification standard, a beauty brand, Beauty Kitchen (2020), has for instance developed a “Return-Refill-Repeat” scheme allowing their customers **to send their packaging back to be washed and reused**. Returning the packaging is **free of charge** for customers, and **discounts** on next purchases can be granted. In order to further engage their customers, this brand is for instance calling on their customers to **join the “Reuse Revolution”**, with **digital campaigns on social media** (e.g. Join the #ReuseRevolution) and **partnering with social media influencers** to promote their movement (BeautyKitchen, in press, in press).

4.2.2 Medium lifespan products

Communication approaches identified
<ul style="list-style-type: none"> - Progressive integration of reparability measures through the Ecodesign Directive is providing information on the availability of spare parts, maintenance and repair services and repair manuals. - Engaging consumers in extending products’ lifetimes through community action driving a cultural change: <ul style="list-style-type: none"> o involving local knowledge partners for raising citizens’ awareness; o providing free online repair manuals and supporting voluntary pledges; o organising local and voluntary collaborative repair events - Engaging consumers in becoming users of products rather than consumers: <ul style="list-style-type: none"> o emphasising the convenience of repair and refurbishment activities remaining as the responsibility of the producer; o providing information on environmental benefits associated with collaborative consumption; o leveraging feelings and understanding using story telling to bring about cultural change.

General

The earlier mentioned EU wide behavioural study on Consumer Engagement in a Circular Economy found that repair decisions are easily disrupted **if arranging repair requires effort**. These findings indicate that there is a large potential to close the gap between consumers’ willingness to engage and their actual engagement. According to this study, one suggested recommendation that should be explored is “Making repair easier” (see (European Commission, 2018)). Translated into requirements with regard to communication this means:

- Communicating that essential components of the product are replaceable by the consumer
- Providing repair instructions with the product (as well as on further channels)
- Providing adequate information on to where to get spare parts or services
- Communicating the provision of repair services by the manufacturer

Communication has a major role to play in contributing to closing the loop. Not only for providing information at the point of sale, but for actually engaging consumer in second-hand, service-based business models, such as renting, and repair services during the use phase.

Progressive reparability measures have been introduced through several Ecodesign Directives, implementing measures and voluntary agreements. These measures include requirements on the availability of spare parts for a minimum number of years, for example for fridges and freezers, the availability of repair and maintenance information, for example for imaging equipment, and the ease of disassembly of key parts for household washing machines and washer-dryers. For some products such as televisions, information on extending the product's lifetime is required by the EU Ecolabel; for other products, including furniture with components that contain plastic, details of the availability of spare parts are mandatory. Examples of EU Ecolabel requirements for product groups within the scope of this study are listed in the Annex 1.

To close consumers' attitude/behaviour gap and to increase their willingness to engage actively in a circular economy, information on product possibilities is key. The infrastructure and the SHIFT-principles (Section 2.2) create a supporting environment for such consumer behaviour. In this regard, the following developments are important elements.

Based on **local partnerships** with educational institutions, non-profit and voluntary organisations, the city of Munich has, for instance, set-up a **reuse living laboratory**. This **second-hand store** aims at extending the lifespan of useful items by offering citizens affordable used products, thereby strengthening citizens' environmental awareness (Eurocities, in press). The project team works with educational and community organisations to create activities that encourage people to be more environmentally aware: "From **sustainability seminars** to Saturday auctions, the store **shows what the circular economy looks like in action and how good it feels to be part of it**. At Halle 2 citizens can, for example, **learn how to fix their own bikes** and enjoy a cup of coffee at a repair café or buy a bike repaired by a social enterprise that provides vocational training for the young unemployed. They can purchase electronic devices that have been repaired and security checked by specialist social companies. Alternatively, they might **be inspired** to get creative by examples of upcycled products or linger over exhibitions of art made from waste" (Metropolis, in press). Considered as a key success factor by the project lead is the **early, inspiring** communication with potential social enterprise partners, **radio and print marketing campaigns** aimed at citizens, and research collaboration with university partners focused on optimising the area's recycling infrastructure to increase its recycling activities.

Electronics and information and communications technology

Collaborative movements and initiatives empowered by online platforms, social enterprises and community-based organisations have emerged to enable citizens to extend their products' lifetimes, and **engage them in a cultural change**.

- A **global online repair community**, the California-based iFixit (2020), is renowned for providing open-source repair manuals and product disassembly. **A wiki-based website that teaches people how to fix** almost anything is combined with a sales platform for tools and spare parts, creating a repair solution that helps millions of consumers every month and is relied upon by repair businesses around the world. To encourage consumers to join this movement, the community website created **a pledge** for sympathisers to commit to repairing a certain number of products in a year. The website also shows the number of people who have made the commitment and **lists action for people to actively help** the movement by, for example, printing a self-repair manifesto or donating used software writing repair guides (iFixit, in press).
- The UK's Restart project (2020) is a people-powered social enterprise that empowers and encourages citizens to use their electronics for longer by **sharing repair and maintenance skills through events in communities**. These free events are referred to as Restart Parties "because they have a fun, *ad-hoc* spirit where all are welcome to meet, mingle, and share in the **fun of repair**".

They are held in **different type of venues** such as pubs, churches, community centres or even art galleries. To disseminate their vision, the project website also publishes a list of talks and appearances (The Restart Project, in press).

- Repair cafés are community-centred repair workshops, where **volunteer fixers help members of the public to repair** and therefore extend the lives of items that might otherwise be disposed of and replaced. In addition to repair, many of the cafés provide assistance with product modification, particularly for clothing to improve fit and appearance (Charter, 2018). A study analysing people repairing products and organisers of repair cafés, explains that “while repairing is an old practice, what is new is that the act of repairing becomes public in repair cafés, and the actual repairing as well as the repair events are staged as **political action which strives for cultural transformation aiming at sustainability**”. Additionally it is stated that the “communicative practices in repair cafés are intertwined with the process of repairing, as the repairing of media technologies is not only a media practice but also a communicative one: **people repair their things together**” (Kannengießer, 2018).

Policy initiatives can also enhance consumers’ use of repair services. Some countries have implemented legislation to reduce the cost barrier to repairs, with Sweden reducing VAT on the repair of electrical and electronic equipment.

The rise of collaborative consumption suggests an **increasing consumer interest in having access to a product rather than owning one**. Developments in the field of digital technologies such as the Internet of Things (IoT) provide solutions to the technical challenge of monitoring the location, status and quality of the assets in use in the product-service system. The growth of the home delivery market, linked to online retail, provides opportunities for organising reverse logistics, enabling manufacturers to collect their assets during or at the end of a service contract (European Environment Agency, 2017). This includes placing the responsibility for repair on the producer or manufacturer, who retains ownership of the product, rather than on the consumer.

A French cooperative, Commown (2020) offers a specific Fairtrade gold certified, B Corp certified and gold Ecovadis medal holding brand of mobile phone designed to last longer and personal computers to private users on a monthly subscription, thus implementing product-as-service (PaS) business model. The cooperative's economic model relies on a **leasing system**, through which subscribers pay a set monthly fee to use rather than own the phone, and provides users with phones with no worries about durability, repairability or end-of-life disposal. When hardware issues arise, the cooperative rapidly provides a replacement and repairs the defective equipment itself and disposes of broken parts using specific mobile-phone companies’ take back systems (Commown, in press). Upgrades and continuous support are considered added benefits for the consumer. The home page of cooperative’s website carries the message “*Incarnez le changement*” (be the embodiment of change) and a link to their offer is then provided as a **solution to support the movement for sustainable electronics. Storytelling, leveraging feelings and cognitive psychological factors**, with positive and negative emotions, are all used for communicating their offer: the only option for a **cultural transformation** although the cooperative emphasises that the journey will be hard and that only by **working together** will it be possible. This addresses a broad range of strategies identified in Table 2.2, including **social norms, the individual self, feelings and cognition**.

Textiles

Rental models for baby clothes and maternity wear have already been launched. A Danish private baby clothing company, Circos (2020) offers a circular subscription model for baby clothes. Once clothes, made from organic fabrics, have been outgrown, they are returned to the company where they are dry cleaned in an environmentally friendly way and made available for another baby. This process optimises and increases the active use of the baby clothes. By increasing durability, centralising washing and quality control, and streamlining operations through electronic tagging, Circos circulates its baby clothes, on average, to five families (Ellen MacArthur Foundation, 2017). The online shop through which the clothes

are rented clearly addresses several consumer concerns, **providing clear and simple information on the convenience and relevance of their service**: “Save resources, save money, save space, save time” or “Shop, shine, swap”. Short slogans such as ‘Bye buy. hello borrow!’ are also used to **engage consumers** in shifting towards service-based models (Circos, in press).

4.2.3 Long lifespan products

Communication approaches identified

- Mobility-service providers emphasising the convenience of renting instead of owning and developing user-friendly mobile applications

Vehicles

Car-sharing services have already become increasingly popular. Existing organisations are striving to set themselves apart from each other with their various partnerships and membership benefits, offering consumers greater options. It is now common for an organisation to cooperate with local governments to enable free city parking or fewer driver restrictions for its members. Many car sharing organisations are also integrating with local public transport, in efforts to minimise the “first mile last mile” problem that many commuters face. According to a research project especially aiming at understanding why people shift from car ownership to car sharing, as well as the new mobility attitudes and practices: technology and integrated digital platforms are also ways in which car sharing organisations are trying to make themselves more attractive. Features such as keyless entry, real-time parking options on mobile apps, and up-to-date global positioning system (GPS) maps have a growing presence as car sharing features (STARS project, in press). A joint venture between two major original equipment manufacturers, BMW Group and Daimler AG recently created a global mobility service provider (ShareNow, FreeNow, ReachNow, ParkNow, ChargeNow). Their website (Your-Now 2020) provides the **story** behind this joint venture, having ambitions to **create positive emotions** about a “*seamlessly connected and sustainable ecosystem*”. To engage consumers in using their services, with **short prompts**, the **easiness of the required action** is emphasised.

4.3 End-of-Life Stage

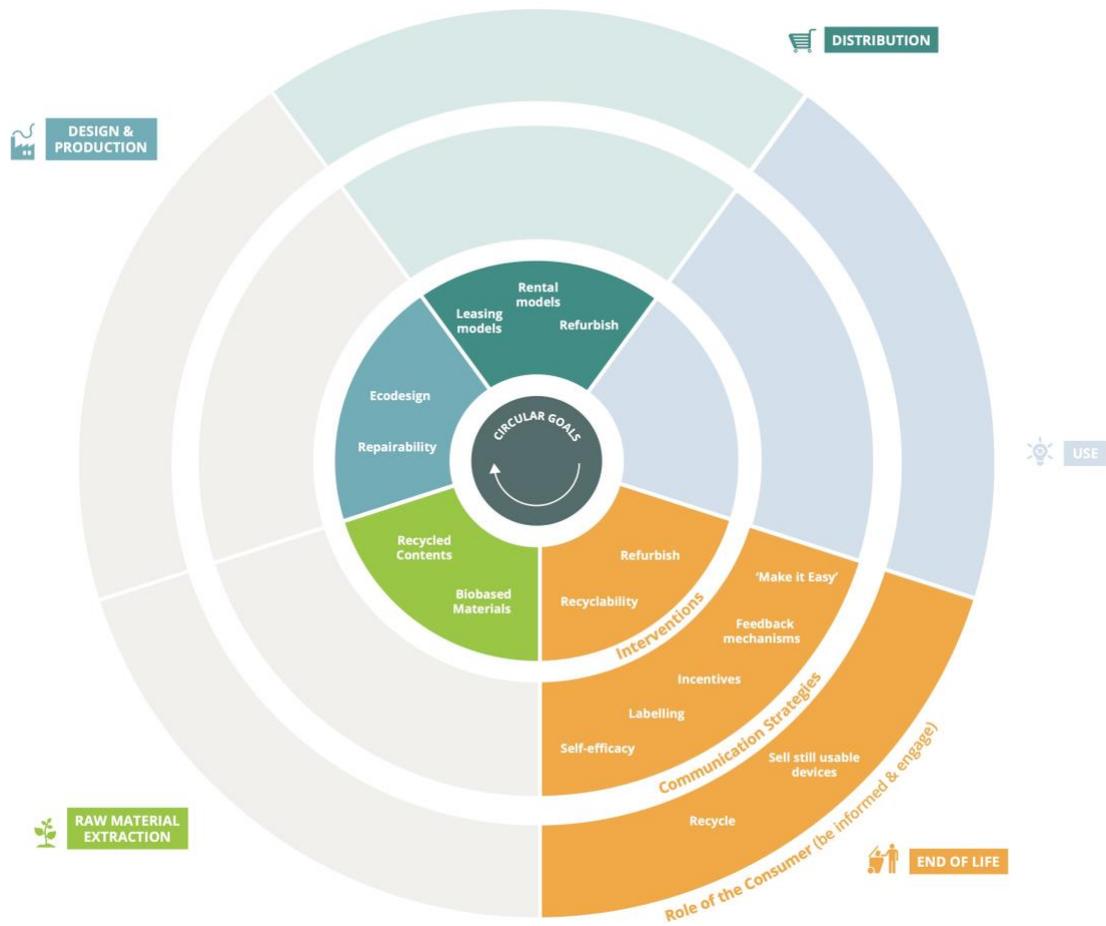


Figure 4: The role of an informed and engaged consumer in the end-of-life stage. Source: EEA and ETC/WMGE, Illustration by CSCP.

Lack of knowledge, for instance not knowing which materials to put in what container, or not understanding the local recycling systems, for example which are collection days, as well as **attitudes and perceptions**, such as not accepting that there is a need to recycle, or being insufficiently motivated to sort waste and recycle it, are considered as social boundary conditions for involving citizens in improving the performance of waste collection (Vanderreydt et al., 2018; Zero Waste Scotland, 2012). According to the Joint Research Centre’s (JRC) publication on *Best Environmental Management Practice for the Waste Management Sector* (Dri et al., 2018), the main objective of communication strategies applicable to a product’s end-of-life management is to **raise consumer awareness** for overcoming these barriers. Various methods and adequate communication channels have been identified to effectively encourage waste prevention, reuse and recycling (Dri et al., 2018). Within the next sections, the concrete applications of these communication approaches will further be elaborated – what to dispose, how and where –according to the product/generated waste included within the scope of this study and still following their expected lifespan.

A Brief snapshot on Extended Producer Responsibility:

Extended producer responsibility (EPR) is a policy approach under which producers are given a responsibility for the treatment or disposal of post-consumer products. Assigning such responsibility could in principle provide incentives to prevent waste at source, promote an environmentally-sound product design and support the achievement of public recycling and materials management goals (OECD, 2020).

Practical options for EPR implementation for producers:

- Individual responsibility of each producer to take back their own products
- Collective responsibility where producers in the same product group pay a variable
- Participation in a Producer Responsibility Organisation (PRO) against a fixed fee

In line with Member States legislations, and at local level, the PRO often becomes the entity (financially) contributing to communication and awareness-raising actions for citizens. Through PROs a system of contractual arrangements and operational solutions is created and referred to as an EPR system or scheme (Dri et al., 2018). These can be both mandatory and voluntary, imposing physical/organisational, financial or informative responsibility on producers.

Regulations and directives that introduce EPR are:

- End-of-Life Vehicles (ELV) Directive 2000/53/EC
- Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU
- Batteries Directive 2006/66/EC (European Commission, 2014)
- Waste Framework Directive 2008/98 (Article 8)

4.3.1 Short lifespan products

Communication approaches identified

- Protected trademark informing consumers on a producers' financial contributions to the waste management activities.
- Digital provision through websites and mobile applications of information on local waste sorting rules to raise awareness, improve sorting behaviour and convenience.
- Multi-channels campaigns targeting specific audiences to motivate and change waste-sorting behaviour.
- Raising citizens' awareness and improving sorting behaviour with tailored feedback and games for mobile applications.
- Engaging citizens through reward systems addressing their sorting behaviour.

Based on the principles defined in European Packaging and Packaging Waste Directive, the umbrella organisation for European packaging and packaging waste recovery and recycling is the general licensor of the **Green Dot trademark** for Europe. When a consumer sees the Green Dot it means that a financial contribution has been paid to a national packaging recovery company for this type of packaging. In Germany for instance, the Packaging and Packaging Waste Directive has been transposed into the German Packaging Act (VerpackG under which "*manufacturers who are first dealers of sales packaging which typically accumulate at the private end consumer are obliged to participate in a dual system*". Nine dual systems ⁽¹⁾ have now been approved in Germany which together use yellow bins and bags as well as bottle banks for collection of used sales packaging. Manufacturers participating in this dual system, use *Der Grüne Punkt* (the Green Dot), a **protected trademark**, for indicating to the end consumer that they have made a financial contribution to the German dual system for packaging recycling. In addition to this trademark, which could be considered a financial instrument but still appears on packaging, consumer information is also provided on the trademark's **online website** (Der Grüne Punkt, 2020b). Answers to such consumers' frequently asked questions as "What happens to my waste?", "Why are there regional differences in the collection of recyclables?", "Why separate?", etc are provided and categorised. **Brochures**, in German,

¹ Meaning a second (dual) disposal system besides the public-sector waste disposal service has been established.

Arabic, English, French, Italian, Polish, Russian, Spanish and Turkish are also downloadable as printable documents for providing further assistance (Der Grüne Punkt, 2020a).

Similarly, companies that place packaging material on the Belgian market can join the nationally accredited producer responsibility organisation for the collection and recycling of household packaging waste and pay an annual contribution, the Green Dot Tariff, which is based on the quantity and type of their packaging. Using an **online engagement** awareness-raising method mainly targeting consumer convenience, a collaboration between this organisation and with others respectively in charge of the disposal of batteries and waste electronic equipment developed an **app** Recycle! (2020) covering waste collection planning, sorting assistance and location of collection points (RECYCLE!, in press).

In 2019, a French private company, Citeo (2020) in charge of the extended producer responsibility scheme for household packing and graphic papers launched a **communication campaign** entitled *Trier, c'est donner* (Sorting, it's giving) (Citeo 2020a) targeted at 20-24 year olds. One objective of this campaign was to **change attitudes and perceptions** and **motivate** this age group to separate their waste. The campaign emphasises several issues including "sorting is easy thanks to the proximity of collection points", "even if it involves a small effort, sorting raises others' awareness that we are all responsible" or again that "sorting decreases pressure on resources". In addition to a website, several channels were used such as **exhibitions** and **outdoor events**, **radio** and **TV** advertising as well as **social media** such as Youtube (L'Info Durable, 2019)

In addition to extended producer responsibility schemes, the revised Waste Framework Directive considers pay as you throw (PAYT) schemes as an effective way of reaching high quality recycling targets and providing clear financial incentives to citizens to sort recyclables, including packaging, from mixed wastes. Pay-as-you-throw schemes, which are well-established in EU Member States aim to implement the polluter pays principle fairly by charging users of the waste management systems according to the amount of waste they generate. In Italy, for instance, a 2016 decree established criteria for pay-as-you-throw tariffs, and by 2018 more than 500 municipalities had adopted the scheme. Awareness-raising is an important element for these systems – if citizens are aware, well-informed and supportive of the system, they will contribute to its success (Dri et al., 2018). To that end, a Horizon 2020 project, Waste4Think ⁽²⁾ developed a know-as-you-throw (KAYT) model. This project uses radio frequency identification technologies to monitor residual waste fractions at the household level. Based on collected data, Waste4Think produces analytics concerning waste production per household with 1–5 or more than residents. Citizens' sorting performance is monitored by sampling their refuse bags and feedback is provided through an **app**. **Serious games** are used to **empower citizens and familiarise them with different sorting scenarios** and **improve their behaviour** (Waste4Think, 2019). Waste4Think concludes that while pay-as-you-thro schemes usually provide information, which might be considered negative as it is in the form of an invoice, once a month, the know-as-you-throw model gives **individual, detailed and frequent feedbacks**. With this, citizens feel monitored and **improve their habits** accordingly. This access to real time data can allow **specific and tailored sensitisation campaigns**. PlastiCircle (2020), another Horizon 2020 project that uses radio frequency identification, has a similar approach for monitoring domestic plastic packaging waste. In this case, however, citizens' sorting is guided by a characterisation protocol, and they receive eco-point rewards if they sort their waste correctly (H2020 PlastiCircle, 2017).

One of the commonest short lifespan products are plastic carrier bags. In 2017, a Finnish retailer added circular-economy carrier bags to its food-store selection. They were sold for the same price as the conventional plastic carrier bags, but were made from more than 90 % recycled materials and produced by a domestic packaging supplier (Amerplast, 2020). In addition to the rather ordinary on-product communication and online information, two remarkable strategies aimed at **changing attitudes and**

² The Waste4think project seeks to design solutions based on the use of information and communication technologies that would enable the improvement of all waste management stages, adopting a global approach and particularly focusing on citizen participation in order to build more sustainable, eco-friendly cities.

perceptions could be observed. First, the fact that the recycled plastic originated from Finnish private households was highlighted. This was one of the core communication topics, **addressing the importance of waste separation**. By offering the recycled bags, consumers could, for once, see what happened to plastic waste if it had been separated and collected properly. Second, the communication **was amplified by installing eco-take back points**. These bins were erected close to or on the customers' ways to the grocery stores, inviting them to dispose of their plastic waste, sensitising consumers even when they were not in the store.

4.3.2 Medium lifespan products

Communication approaches identified
<ul style="list-style-type: none"> - Compliance with criteria defined by the EU Ecolabel in some product groups imply the provision of consumer information on an adequate product disposal. - Raising consumer awareness on recycling possibilities and engaging communities in returning their waste products through: <ul style="list-style-type: none"> o digital communication campaigns on social media; o local initiatives, competitions and reward systems.

As listed above, **product labelling** is considered as a communication tool for raising consumer awareness towards the end of life. Currently being revised, neither the current nor the proposal on EU Ecolabel criteria for rinse-off cosmetic products, considered as a short lifespan plastic-containing product, include information for consumers to adequately sort and dispose their waste. Criteria on information appearing on the EU Ecolabel proposes that the optional label with box shall contain the following information “[...], Fulfills strict biodegradability requirements, and limits packaging waste” (Garrido Candela et al., 2020). This communication approach rather refers to interventions which occurred at early design and manufacturing stages. Clothing and textiles as well as Electronic Equipment, and respectively more specifically Footwear, Textile products and Televisions are product groups currently within the scope of the EU Ecolabel. As a plastic-containing product, furniture is also an addressed product group. For qualifying for the EU Ecolabel those products groups have to comply with some criteria providing consumer information on an adequate product disposal. For instance, the criteria on user instructions for applying to the EU Ecolabel for televisions precise that “information shall include, as a minimum, end-of-life instructions for the proper disposal of the product at civic amenity sites or through retailer take-back schemes as applicable, which shall comply with Directive 2012/19/EU of the European Parliament and of the Council”. Annex 2 summarises the identified criteria to be met for applying the EU Ecolabel to these specific product groups, and providing relevant consumer information towards end-of-life management.

PROs play an important role for communicating information to consumers for textiles, electric and electronic equipment and packaging waste. France is the only EU Member State in which a nationwide mandatory EPR scheme for textile products has been implemented. Subsequently, every company that introduces clothing, household linen and footwear on the French market has to set its own internal collecting and recycling program (which needs to be accredited by French authorities) or has to pay a contribution to this scheme, Refashion (2020). A part of the contributions received by this PRO is invested in communication campaigns to motivate and change consumers behaviours and habits towards textile waste sorting. In 2019, this PRO launched a one-week **digital communication campaign** (Refashion 2020a) called “#RRR” for Repair, Reuse, Recycle (“Réparons, Réutilisons, Recyclons”). The aim of this campaign was to **raise citizen’s awareness about the second life of textile products**. **Social media** such as Facebook, Instagram, Twitter, LinkedIn, Snapchat, Pinterest, Youtube as well as 3.300 retailing points of the 66 involved textile brands were used as communication channels. With regards to the recycling aspect of the campaign, **information on textile collection points** but also punctual collection events were provided on the website, together with **concrete facts and figures** (e.g. 41,7% of collected textile are recycled) as well as **best practices examples** (e.g. mentioning specific brands using recycled content in their products). According to this PRO, about 27% of French citizens heard about the campaign, 15 000 collaborators were

mobilised, 89% new visitors on the website. Based on this first edition, this PRO is now aiming to repeat this campaign on an annual basis (Re_fashion, 2019).

For WEEE, in many Member States, PROs are required to finance communication campaigns. In order to engage with the community and raise citizens awareness on issues related to WEEE, a Portuguese WEEE PRO is organising **yearly communication campaigns** (Electrao Quarter 2020) for collecting WEEE. As one example, a campaign under the form of **competition among districts** is organised to collect all types of electrical equipment (washing machines, toasters, microwaves, computers, mobiles phones etc.) and financially **awarding winners** (Electrão Quarter, 2020). In Italy, the WEENMODELS Life project (2020) has completely modified a municipality WEEE collection system. The project was involved in the testing of a mobile collection system of WEEE in 6 locations for 5 months from September 2015 to February 2016 in order to understand if citizens would appreciate such collection systems. The communication campaign has increased awareness about the separate collection of WEEE. **Workshops and laboratories** were for instance organized for **young participants to increase their knowledge** on the concept of circular economy (Vanderreydt et al., 2020).

4.3.3 Long lifespan products

Communication approaches identified

- Providing information on the environmental benefits associated with the sound treatment of end of life vehicle.

Implementation and enforcement of the ELV Directive being in the hands of national authorities, different types of EPR schemes have been implemented by Member States. Netherlands is for instance the only MS where a Producer Responsibility Organisation for ELVs in the EU has been implemented (Williams et al., 2020). In order to raise consumer awareness and engage them in a sound disposal of their ELV, this PRO is for instance providing **authorised treatment facility locations on its website, supported with clear prompts explaining how the consumer is benefiting the environment**. Their website also includes **a blog providing weekly news** about developments and innovations in car recycling (ARN, in press).

5 Concluding Remarks

Key messages identified

- Communication should both aim at informing as well as on engaging the consumer
- Informing the consumer is most applied during distribution stage
- Communication to engage the consumer is mostly taking place during product use and in end-of-life
- Digital technologies are effective enabling tools, especially in regard to communication fostering engagement
- As shown by the SHIFT framework, communication needs to address several factors in order to be effective (e.g. refer both to social identities and the individual self, addressing both feelings and cognition).
- Capitalising on and improving existing policy instruments (e.g. the Ecodesign Directive) will be essential for enabling the further deployment of effective communication approaches towards consumers

To enhance consumers participation in a circular economy, trustworthy and relevant information should be made available. The EU wide behavioural study showed that while consumers are generally willing to engage in circular economy practices, there is **still a large potential to close the gap between their willingness and their actual engagement** (European Commission, 2018). The analysis conducted in this paper provides a non-comprehensive inventory of existing communication approaches towards consumers in a circular economy. This categorised inventory can serve as a **pre-requisite for detecting commonalities and eventual success factors** as well as, in a next step, **assessing their effectiveness** for subsequently identifying best practices to be disseminated among Member States.

This analysis has clearly shown that existing communication approaches are heavily dependent on the moment (or life cycle stage) in which they are communicated and are specific to a products lifespan. The analysis reflected that communication of ‘circularity interventions’ at the point of sale, **during the distribution stage**, focus on the **provision of information more than on engaging the consumer**. **Engaging consumers** in maximising product and/or material functionality, for instance by applying SHIFT-factors in the communication to highlight repair or recycling properties of the product, mostly happens **during the use phase and/or when the product is intended to be discarded**. Identified communication approaches for products having a short lifespan, focus on the importance of closing materials loops, while those targeting products with a longer lifespan prioritize the importance of extending product functionality (focus on inner circles). Clear distinctions on the focus of communication aiming to enhance sound product disposal have also been detected. While for products with a short lifespan, information is provided for improving sorting behaviours, communication approaches targeting products with a longer lifespan (such as electronics and ICT and textiles) focus on raising awareness and engaging consumers in bringing their product back to the producer to be disposed of properly.

Commonly, the **successful development and uptake of digital technologies** seems to be a transversal enabler of several identified communication approaches. User-friendly applications are being developed for enabling more informed consumer choices (e.g. product environmental impact benchmarking), for enabling the deployment of car-sharing services or again raising citizens’ awareness on their sorting behaviour. Providing the technological solutions for merging physical and digital worlds, the **IoT has been listed several times as an enabler** of product-service systems and/or for generating specific and tailored information to be communicated to the consumer. Again, **online communities are making use of digital events for communicating and initiating a societal cultural change**.

This analysis also reflected the **multi-dimensional character and necessity of approaching the circular economy transition in a systemic way**. To empower the citizens’ role in this transition, it is clear that the provision of relevant information and actual engagement cannot be dissociated from the technical, business and policy dimensions of a circular economy. This analysis has identified several existing

communication approaches, applicable to several product groups, claiming the benefits of specific ‘circularity interventions’ compared to the existing linear alternative for addressing the above-described consumer concerns (Table 2.1). In order to unlock and replicate the potential of those approaches it will be essential to ensure the trustworthiness of those claims. The **EC will propose that companies substantiate their environmental claims** using Product and Organisation Environmental Footprint methods.

The analysis indeed reflected the clear and already existing **role for EU initiatives and legislation to empower consumers in this transition**. The progressive **integration of repairability measures**, not only with regards to the availability of spare parts but also for instance through the provision of maintenance information through the Ecodesign Directive is a concrete illustration. Ecodesign Directives implementing measures and voluntary agreements can thus **play a significant role at the point of sale** but also for **enabling consumer engagement during the use phase**. The analysis also shows that existing waste-related policy instruments and their successful national and territorial enforcement can lead organizations in financing communication campaigns aiming to improve sorting behaviours but also emphasizing the citizens’ role in contributing to an effective deployment of reuse and recycling systems.

Capitalising on and improving existing policy instruments will be essential for enabling the further deployment of effective communication approaches towards consumers. Several key actions announced within the new CEAP should clearly play an enabling role. As reflected with the upcoming sustainable product policy legislative initiative, the importance of designing sustainable products is higher than ever on this political agenda. As the core of this initiative will to be widen the scope of the Ecodesign Directive further communication-related requirements will be implemented. In line with this initiative and for further integrating sustainability principles since design, several product groups discussed under the scope of this study will logically be targeted. In 2021, the Commission will review the PPWD to reinforce the mandatory essential requirements for packaging to be allowed on the EU market, to ensure that all packaging on the EU market is reusable or recyclable in an economically viable way by 2030. As shown with identified approaches, communication will thus play a significant role, not only for **supporting a consumer in his/her decision-making process** at the purchasing stage, but also for adequately **engaging the consumer** in a successful and efficient uptake of such reusable product designs (e.g. through the implementation of reward systems). Establishing a “right to repair” is also a key aspect of this envisaged product policy framework, supporting already widely implemented bottom-up initiatives currently driving societal cultural change (e.g. communication engaging citizens in participating to repair cafés). Considering new horizontal material rights for consumers about the availability of spare parts or access to repair is becoming more important and will be directly applicable to textile and electronics, especially through the upcoming Circular Electronics Initiative and EU strategy for textiles. Targeting product referred as long lifespan products under the scope of this study, the EC committed to release in 2021 a comprehensive Strategy for a Sustainably Built Environment. This strategy aims to promote measures to improve the durability and adaptability of built assets in line with the circular economy principles for buildings design (EC, 2020). Several of these defined circular principles targeting building users, facility managers and owners are **referring to the role of consumer information as a key action for their implementation** (e.g. “Information on what is possible through reversible building design and how to do it is crucial to inform the users and facility managers of the potential of the building”, “Information and guidelines should help users, owners, and facility managers to make modifications to the building and so have a lower impact on waste generation”). The inclusion of these circular principles and information needs in the revised CPR are currently being investigated in the on-going review process (European Commission, 2020). Also considered as a long lifespan product in this study, vehicles are a key component of recent European strategies. The Comprehensive European Strategy on Sustainable and Smart Mobility will look into enhancing synergies with the circular economy transition, in particular by applying product-as-service solutions.

The new CEAP is also clearly stressing that despite efforts at EU and national level, the amount of generated waste is not going down and each citizen produces on average nearly half a tonne of municipal waste per year. **Waste prevention needs to be further addressed in legislation**, together with a better

implementation of waste laws (EC, 2020). While European waste management targets currently relate to the weight of waste, it is their quality that determines their value as secondary raw materials in the circular economy. High quality recycling is relying on the performance of waste collection systems from which the citizens societal acceptance and participation are a key parameters (Vanderreydt et al., 2018). **Communication for engaging citizens will become an essential aspect of upcoming waste-related policy initiatives.** The Commission will indeed enhance: “the implementation of the recently adopted requirements for extended producer responsibility schemes, provide incentives and encourage sharing of information and good practices in waste recycling” and aspects such as “common bin colours, harmonised symbols for key waste types, product labels, information campaigns and economic instruments” will be also be considered. As shown in the analysis, **PROs are already playing an important role for providing information and engaging consumers.** As a concrete illustration of the above-quoted initiatives targeting a product group under the scope of this study, EC is aiming to provide guidance to achieve high levels of separate collection of textile waste, which Member States have to ensure by 2025, especially by encouraging industrial applications and regulatory measures such as extended producer responsibility (EC, 2020).

6 References

- Amerplast, 2020, (<https://amerplast.com/products-packaging-solutions/retail-packaging/carrier-bags/#:~:text=Amerplast%20manufactures%20carrier%20bags%20made,separately%20collected%20from%20Finnish%20households>) accessed 30 September 2020.
- ARN, 'About Green Light' (<https://greenlight.nl/about-green-light/?lang=en>) accessed 5 October 2020.
- Backmarket, 2020, (<https://www.backmarket.de/about-us>) last accessed 18 December 2020.
- BEUC, 2020, (https://www.beuc.eu/publications/beuc-x-2019-070_beuc_5_keys_to_make_eu_trade_strategy_work_for_consumers.pdf) accessed 18 December 2020.
- BeautyKitchen, 2020, 'About Us' (<https://beautykitchen.co.uk/pages/about>) accessed 5 October 2020.
- BeautyKitchen, 2020a, 'Join the #ReuseRevolution' (<https://beautykitchen.co.uk/blogs/news/a-reuserevolution-for-plastic-free-july>) accessed 5 October 2020.
- Blauer Engel, 2020, (https://www.blauer-engel.de/en/products_A-Z) accessed 18 December 2020.
- Blauer Engel, 2020a, (<https://www.blauer-engel.de/de/produktwelt/bauen-heizen/bodenbelaege-panele-tueren-aus-holz-werkstoffen>) accessed 18 December 2020.
- Blauer Engel, 2020b, (<https://www.blauer-engel.de/de/produktwelt/bauen-heizen/bodenbelaege-elastisch>) accessed 18 December 2020.
- BMW, 2020, (<https://www.bmwgroup.com/en/responsibility/sustainable-stories/popup-folder/sustainable-batteries.html>) accessed 18 December 2020.
- Brusseau, M. L., 2019, 'Chapter 32 - Sustainable Development and Other Solutions to Pollution and Global Change', in: *Environmental and Pollution Science*, Elsevier, pp. 585–603.
- Charter, M., 2018, 'Repair cafés', *The Journal of Peer Production* 3(12: Makerspaces and Institutions), 37–46.
- Circos, 2020, 'Circos.co - Kids & maternity clothing rental service' (<https://circos.co/>) accessed 2 October 2020.
- Circular Computing, 2020, 'Circular Computing™ Officially Certified' (<https://circularcomputing.com/officially-certified/>) accessed 2 October 2020.
- Citeo, 2020, (<https://www.citeo.com/>) accessed 2 October 2020.
- Citeo, 2020a, (<https://www.citeo.com/le-mag/rejoignez-le-mouvement-trier-cest-donner/>) accessed 2 October 2020.
- CmiA, 2020, (<https://cottonmadeinafrica.org/en/>) accessed 18 December 2020.
- Coca Cola, 2020, (<http://www.plantbottle.info/chde/index.shtml>) last accessed 18 December 2020.

Coca Cola, 2020a, (<https://www.coca-colacompany.com/faqs/what-is-plantbottle-packaging>) last accessed 18 December 2020.

Commown, 2020, 'Commown - La SCIC de l'électronique responsable -' (<https://commown.coop/>) accessed 2 October 2020.

Cradle2Cradle, 2020, (<https://www.c2ccertified.org/get-certified/product-certification>) last accessed 18 December 2020.

Der Grüne Punkt, 2020, 'Media library' (<https://www.gruener-punkt.de/en/politics-and-society/media-library/downloads.html>) accessed 30 September 2020.

Der Grüne Punkt, 2020a, 'Our goal: Closing loops – together for our environment!' (<https://www.gruener-punkt.de/en/>) accessed 30 September 2020.

Dezeen, 2020, (<https://www.dezeen.com/2020/01/06/ibm-research-sustainable-battery-sea-water/>) accessed 18 December 2020.

Dri, M., Canfora, P., Antonopoulos, I. and Gaudillat, P., 2018, *Best environmental management practice for the waste management sector*, JRC Science for Policy Report EUR 29136 EN, Publications Office of the European Union, Luxembourg.

Duracell, 2020, (<https://www.duracell.de/challenge/>), accessed 18 December 2020.

EC, 2020, A new Circular Economy Action Plan For a cleaner and more competitive Europe. COM (2020) 98 final.

Electrão Quarter, 2020, (<https://www.electrao.pt/campanhas/quartel-electrao/?lang=en>) accessed 30 September 2020.

Ellen MacArthur Foundation, 2017, *Circular fashion – a new textiles economy: redesigning fashion's future*.

EnergyVille, 'Environmental product declarations (EPDs) for construction products | EnergyVille' (<https://www.energyville.be/en/research/environmental-product-declarations-epds-construction-products>) accessed 1 October 2020.

EPD International AB, 'EPD applications - Business-to-consumer communication - The International EPD® System' (<https://www.environdec.com/What-is-an-EPD/Applications/Business-to-consumer-communication/>) accessed 1 October 2020.

Etsy, 2020, (https://www.etsy.com/de/market/upcycled_clothing), accessed 18 December 2020.

Eurocities, 'Munich develops a secondhand store to kickstart its local circular economy' (<https://circulareconomy.europa.eu/platform/en/good-practices/munich-develops-secondhand-store-kickstart-its-local-circular-economy>) accessed 2 October 2020.

European Commission, 2016, 'Declaration of Performance (DoP) and CE marking' (https://ec.europa.eu/growth/sectors/construction/product-regulation/performance-declaration_en) accessed 1 October 2020.

European Commission, 2018, *Behavioural Study on Consumers' Engagement in the Circular Economy*, Final Report Specific contract – No 2016 85 06 Implementing Framework Contract – CHAFEA/2015/CP/01/LE.

European Commission, 2020, (<https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12467-Empowering-the-consumer-for-the-green-transition>) accessed 18 December 2020.

European Commission, 2020a, Review of the construction products regulation (CPR) survey on future options - Analysis of replies, GROW.DDG1.C.4.

European Commission, 2020b, (<https://ec.europa.eu/environment/ecolabel/>) accessed 18 December 2020.

Fairphone, 2020, (<https://www.fairphone.com/de/2019/06/28/urban-mining-digging-for-treasure-in-your-old-phone/>) accessed 18 December 2020.

Fairphone, 2020a, (<https://www.fairphone.com/en/2019/12/09/your-phone-isnt-born-in-a-store-meet-the-makers/>) accessed 18 December 2020.

Garrido Candela, V.-A., Kaps, R., Fernández, A., Faraca, G. and Wolf, O., 2020, *Revision of the EU Ecolabel criteria for rinse-off cosmetics*, JRC Technical Report, European Union, Seville, Spain.

GOTS, 2020, (<https://www.global-standard.org/>) accessed 18 December 2020.

H&M, 2020, (https://www2.hm.com/de_de/hm-sustainability/lets-change.html/close-the-loop) accessed 18 December 2020.

H&M, 2020a, (<https://hmgroupp.com/sustainability/circular-and-climate-positive/recycling.html>) accessed 18 December 2020.

H2020 PlastiCircle, 2017, 'PlastiCircle | Home' (<https://plasticircle.eu/home/>) accessed 6 November 2020.

Henry, M., Bauwens, T., Hekkert, M. and Kirchherr, J., 2020, 'A typology of circular start-ups: Analysis of 128 circular business models', *Journal of Cleaner Production* 245, 118528 (DOI: 10.1016/j.jclepro.2019.118528).

iFixit, 2020, 'Repair Pledge - iFixit' (<https://www.ifixit.com/Pledge>) accessed 2 October 2020.

International EPD System, Communicating environmental product declarations, International EPD System.

Kannengießer, S., 2018, 'Repair Cafés as Communicative Figurations: Consumer-Critical Media Practices for Cultural Transformation', in: *Communicative Figurations*,.

L'Info Durable, 2019, 'Citeo lance la campagne 'Trier, c'est donner' pour faire progresser le recyclage en Franc' (<https://www.linfodurable.fr/environnement/citeo-lance-la-campagne-trier-cest-donner-pour-faire-progresser-le-recyclage-en>) accessed 30 September 2020.

LafargeHolcim, 2020, (<https://www.lafargeholcim.com/circular-economy-recycling>) accessed 28 December 2020.

Metropolis, 'Halle 2: recycling, repair and reuse using a circular economy approach' (<https://use.metropolis.org/case-studies/halle-2-recycling-repair-and-reuse-using-a-circular-economy-approach>) accessed 2 October 2020.

Nijji, 2019, 'Eat and Back: reusable bento boxes and deposit scheme' (<https://circulareconomy.europa.eu/platform/en/good-practices/eat-and-back-reusable-bento-boxes-deposit-scheme-zero-waste-take-away-meals>) accessed 28 October 2020.

Parker Steel, 2020, (<https://www.parkersteel.co.uk/Matrix/32/Circular-Hollow-Section>), accessed 18 December 2020.

Plasticcircle, 2020, (<https://plasticcircle.eu/home/>) accessed 18 December 2020.

Pilecco Nobre, 2020, (<https://pileconobre.com.br/lancamento-da-embalagem-com-o-selo-im-green/>) last accessed 18 December 2020.

RECYCLE!, 'Welcome to Recycle!' (<https://recycleapp.be>) accessed 30 September 2020.

Re_fashion, 2020, 'Campagne #RRR - La campagne annuelle nationale de sensibilisation autour de la répartition, réutilisation et recyclage' (<https://refashion.fr/citoyen/fr/campagne-rrr>) accessed 6 November 2020.

Refurbed, 2020, (<https://www.refurbed.de/vorteile/>) last accessed 18 December 2020.

Rematec, 2020, 'Demand during COVID-19 makes reman go mainstream | Rematec' (<https://www.rematec.com/news/high-demand-during-covid-19-makes-remanufactured-go-mainstream/>) accessed 2 October 2020.

Repack, 2020, 'Reusable packaging service for ecommerce | RePack' (<https://www.originalrepack.com/>) accessed 24 June 2020.

Salewa, 2020, (<https://www.salewa.com/en-gb/sustainability-at-salewa-grass-box-for-shipping/>) last accessed 18 December 2020.

Sustain Europe 2020, (<https://www.sustaineurope.com/the-eu-ecolabel-as-a-driver-to-circular-economy.html>) last accessed 18 December 2020.

The Restart Project, 2020, 'Upcoming Parties' (<https://therestartproject.org/parties/>) accessed 2 October 2020.

Vanderreydt, I., Nelen, D. and Condamine, P., 2018, *Identification of main boundary conditions for better performing waste collection systems*, This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 776745 COLLECTORS project Deliverable 2.2.

Vanderreydt, I., Nelen, D., Le Blevenec, K. and Winterstetter, A., 2020, *Assessment of implemented solutions in the 12 selected case studies for tackling systemic and technical boundary conditions*, Horizon 2020 COLLECTORS Project Report.

Vinventions, 2020, (<https://www.vinventions.com/de/nomacorc>) accessed 18 December 2020.

Volkswagen, 2020, (<https://www.volkswagenag.com/en/news/stories/2019/09/battery-cell-assembly--pilot-line-started.html>), accessed 18 December 2020.

Waste4Think, 2019, (<https://waste4think.eu/three-mobile-games-about-waste-management-now-available>) accessed 30 September 2020.

Weenmodels, 2020, (<http://www.weenmodels.eu/EN/index.html>) accessed 30 September 2020.

Williams, R., Keeling, W., Petsinaris, F., Baron, Y. and Mehlhart, G., 2020, Supporting the Evaluation of the Directive 2000/53/EC on end-of-life vehicles, Trinomics.

Queensland Government, 2020, (<https://www.business.qld.gov.au/running-business/marketing-sales/marketing-promotion/innovation/categories-customers>) accessed 18 December 2020.

Your-Now, 2020, (<https://www.your-now.com/our-story>) accessed 18 December 2020.

Zero Waste Scotland, 2012, *Improving Recycling Through Effective Communications*, Zero Waste Scotland Communications Guidance.

7 Annex

Product group	Products	Identified criteria	Policy instrument, Source document - Status - Year
Electronic equipment	Household washing machines and household washer-dryers	<p>9. Information requirements</p> <p>(3) the user instructions shall also include instructions for the user to perform maintenance operations. Such instructions shall as a minimum include instructions for:</p> <ul style="list-style-type: none"> (a) correct installation (b) correct usage of products and consequences of misuse (c) foreign object removal from the machine (d) periodic cleaning (e) door opening between cycles (f) periodic checks of filters (g) identification of errors and how to proceed (h) how to access professional repair (i) any implications of self-repair or non-professional repair for the safety of the end-user and for the guarantee (j) the minimum period during which the spare parts are available 	<p>Ecodesign Directive, Repealed by (EU) 2019/2023 – in application from 1 March 2021</p>
Electronic equipment	Refrigerating appliances	<p>4. Information requirements from 1 March 2021, instruction manuals for installers and end-users, and free access website of manufacturers, importers or authorised representatives shall include the following information:</p> <p>[...]</p> <ul style="list-style-type: none"> (g) instructions for the correct installation and end-user maintenance (j) access to professional repair (k) relevant information for ordering spare parts (l) the minimum period during which spare parts are available (m) the minimum duration of the guarantee of the refrigerating appliance 	<p>Ecodesign Directive, Repealed by (EU) 2019/2019 – in application from 1 March 2021</p>
Electronic equipment	Imaging equipment	<p>Commitments Part III – Information Requirements for End-Users</p> <p>6.3 Information on repair User instructions and/or manufacturer’s freely accessible web sites shall include information facilitating access to professional repair.</p>	<p>Recognised VA under the Ecodesign legislation, Industry voluntary agreement to improve the environmental performance of imaging equipment placed on the market -</p>

			Draft FY19 v. 4 for discussion – 2019
Electronic equipment	Televisions	<p>Updated proposal for criterion 6.1 – User instructions</p> <p>The electronic display shall be sold with relevant user information that provides advice on its proper environmental use.</p> <p>The information shall include, as a minimum, the following information (when applicable): [...]</p> <p>(e) Information that extension of the product’s lifetime reduces the overall environmental impacts.</p> <p>(f) The following indications on how to prolong the lifetime of the product: (i) Clear disassembly and repair to enable a non-destructive disassembly (ii) Information to let the user know where to go to obtain professional repairs</p> <p>Assessment and verification: The applicants shall declare the compliance of the product with these requirements to the competent body and shall provide a link to the online-version or a copy of the user instructions / repair manual to the Competent Body.</p>	EU Ecolabel, Ongoing revision - 2020
Furniture and bed mattress	Furniture	<p>Criterion 10 – Consumer Information</p> <p>A single consumer information document shall be provided with the product which includes information in the language of the country where the product is placed on the market, relating to the following aspects: [...]</p> <p>–Relevant information regarding the terms and conditions of the product guarantee as per the requirements of criterion 9.2.</p> <p>–Relevant contact information regarding provision of spare parts as per the requirements of criterion 9.3.</p> <p>–Well illustrated assembly and disassembly instructions as per the requirements of criterion 9.4</p> <p>Assessment and verification: The applicant shall provide a copy of the consumer information document that is to be provided with the product that shows compliance with each of the points listed in the criterion, as appropriate.</p>	EU Ecolabel, Future revision not started - 2016

Annex 1: Examples of Ecodesign requirements and EU Ecolabel criteria providing consumer information on repair and availability of spare parts

Product group	Products	Identified criteria	Source document - Status - Year
Clothing and textile products	Footwear	<p>10.1. User Instruction</p> <p>The following information shall be supplied with the product: [...] — ‘Please dispose of your footwear in the appropriate local collection point.’</p> <p>Assessment and verification: the applicant shall provide a packaging sample or the proposed artwork of the packaging showing the user instructions that will be supplied with the product.</p>	Future revision not started - 2016
Clothing and textile products	Textile products	n/a	Future revision not started - 2013
Electronic equipment	Televisions	<p>Updated proposal for criterion 6.1 – User instructions</p> <p>The electronic display shall be sold with relevant user information that provides advice on its proper environmental use. The information shall be located in a single, easy-to-find place in the user instructions as well as on the manufacturer’s website.</p> <p>The information shall include, as a minimum, the following information (when applicable): [...] (g) End-of-life instructions for the proper disposal of the product at civic amenity sites or through retailer take-back schemes as applicable, which shall comply with Directive 2012/19/EU of the European Parliament and of the Council.</p> <p>Assessment and verification: The applicants shall declare the compliance of the product with these requirements to the competent body and shall provide a link to the online-version or a copy of the user instructions / repair manual to the Competent Body.</p>	Ongoing revision - 2020
Furniture and bed mattress	Furniture	<p>Criterion 10 — Consumer Information</p> <p>A single consumer information document shall be provided with the product which includes</p>	Future revision not started - 2016

		<p>information in the language of the country where the product is placed on the market, relating to the following aspects:</p> <p>[...]</p> <ul style="list-style-type: none"> — A detailed description of the best ways to dispose of the product (i.e. reuse, take-back initiative by the applicant, recycling, energy recovery) shall be given to the consumer, ranking them according to their impact on the environment. <p>[...]</p> <ul style="list-style-type: none"> — Information regarding the type of glass used, any safety information, its suitability for contact with hard materials such as glass, metal or stone and information regarding the correct disposal of the glass, for example its compatibility or non-compatibility with post-consumer container glass. <p>Assessment and verification: The applicant shall provide a copy of the consumer information document that is to be provided with the product that shows compliance with each of the points listed in the criterion, as appropriate.</p>	
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Annex 2: Identified EU Ecolabel criteria providing consumer information on an adequate product disposal

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The European Topic Centre on Waste and Materials
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