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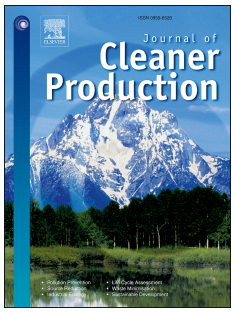

Re-Thinking Producer Responsibility for a Sustainable Circular Economy From extended producer responsibility to pre-market producer responsibility

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Author's name (typed)	Author's signature	Date
Eléonore Maitre-Ekern	EME	28 October 2020

Re-Thinking Producer Responsibility for a Sustainable Circular Economy

From extended producer responsibility to pre-market producer responsibility

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Re-Thinking Producer Responsibility for a Sustainable Circular Economy

From extended producer responsibility to pre-market producer responsibility

Abstract

The transition to a sustainable Circular Economy (CE) requires moving away from linear production processes and the throwaway mentality. Waste needs to be prevented and the consumption of new products must decline. In particular, this involves extending product lifetime (through maintenance and repair) and supporting second-hand trading (reuse). Such a transformation of consumption patterns requires a fundamental change notably in business models. The role of the law is to enable the change. For a long time, the objective of retaining the primary value of products has been linked to waste prevention, which is the main priority of the waste hierarchy as laid out in the EU Waste Framework Directive 2008/98/EC. However, waste law appears somewhat ill-suited to address these issues. The incentives provided by the extended producer responsibility (EPR) scheme are limited when it comes to promoting upstream design changes. In line with what Lindhqvist, the father of EPR in Europe, originally had in mind, the responsibility of producers should cover products' entire life cycle, not just their end-of-life. This article explores the current tensions between EU waste law and the objectives of the CE, and calls for incorporating a pre-market producer responsibility (PPR) within a legal framework for products in order to limit market access to durable, reparable and reusable products.

Keywords Circular Economy; sustainable circularity; EU waste law; waste prevention; extended producer responsibility; pre-market producer responsibility

1. Introduction

The European Union (EU) is committed to transitioning from a linear to a circular economy (CE) "where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised" (EU Commission, 2015, p.1). EU waste law is a major part of EU's environmental policy and a key element in efforts to develop a sustainable and resource-efficient economy. The waste hierarchy set out in the Waste Framework Directive 2008/98/EC (WFD) establishes a priority order from prevention, preparation for reuse, recycling and energy recovery and finally disposal that support recourse to the most environmentally sound processes to treat waste and divert it from landfills. In addition, the WFD sets out ambitious targets for the preparing for re-use and the recycling of waste materials such as paper, metal, plastic and glass from households (Article 11(2)(a)). In the CE, waste may be a resource that has the potential to replace primary raw materials from traditional extractive resources. However, despite continuous improvements in waste management, the Commission found that the EU is currently losing a significant amount of secondary raw resources (EU Commission, 2014). It estimated that out of the 2.5 billion tons of waste generated in the EU in 2013, 1.6 billion tons were not reused or recycled. The EU

also found that approximately 600 million tons could be reused or recycled in the future, still leaving a large portion to waste recovery (in particular energy recovery) and disposal (landfilling). Thus, even if waste management must further increase and improve, the best way to mitigate pollution from waste and take the transition to a CE seriously is to prevent waste from occurring altogether. Waste prevention includes measures to decrease consumption, design more durable and reparable products, use lesser resources in production, extend the lifetime of products through maintenance and repair, and promote reuse.

This article sets out to examine why current EU waste and CE policies do not align in promoting 'sustainable circularity', which refers to a circular model that ensures social justice within planetary boundaries (Raworth, 2012). In particular, the aim is to discuss how waste law – and the concept of 'Extended Producer Responsibility' (EPR) – fails to promote waste prevention. The European Commission states that "the way we collect and manage our waste can lead either to high rates of recycling and to valuable materials finding their way back into the economy, or to […] potentially harmful environmental impacts and significant economic losses" (EU Commission, 2015). However, whereas the main goal of the CE is to significantly reduce waste, the very broad definition of the term 'waste' coupled with very few measures aimed at product lifetime extension counters that objective. Introduced in EU waste law in the 1990s, EPR policies were expected to link product and waste by providing incentives to producers to improve product design and ultimately save waste management costs (Dalhammar, 2018). In reality, the scheme has had limited effect on waste prevention (Dalhammar, 2018), and it is the aim of this article to discuss an approach to producer responsibility based on prevention and limitation of market access.[1] This article breaks from typical literature on EPR in that it does not seek to discuss the future of the scheme, but suggests breaking out from the economic rationale that has partially justified its adoption (Steenmans, 2019, p. 114-115) and focusing developing a truly preventive approach.

At both EU and national level, an increasing number of legal initiatives are being adopted that aim to regulate product design for durability and reparability as well as to inform consumers, ensure access to repair and repair tools, and providing tax incentives. These initiatives are showing that new thinking is possible, and this needs to be pursued further. The success of the EU's eco-design scheme paved the way for addressing environmental damage from products directly at the source: that is in the conception phase. The strength of this scheme resides in the fact that it prevents the worst performing products (in particular in terms of energy efficiency) from entering the EU market altogether. The idea of a 'pre-market producer responsibility' (PPR) proposed in this article ensures that producers cannot pay their way out of selling products that fail prematurely, cannot be repaired or are sent to recycling instead of reuse. Instead, producers would have to care for what they place on the market as well as support repair and reuse activities. Although PPR-based measures would arguably encompass eco-design requirements for durability and reparability, the idea is that they would not be limited to that, but also include e.g. information requirements and take-back schemes for

[1] In this article, the term 'market' (or 'EU market') is used to refer to the sale of products or of product-based services in the EU single market. Thus, 'market access' means the ability to place or put into service a product on the EU market. In line with the Ecodesign Directive 2009/125/EC, 'placing on the market' and 'putting into service' are respectively defined as "making a product available for the first time on the [EU] market with a view to its distribution or use within the [EU]" and "the first use of a product for its intended purpose by an end-user in the [EU]" (Article 2 (4-5)).

repair and reuse. The aim of this article is to show how PPR could open the door for new ways of regulating the CE to enable and promote practices that contribute to extend product lifetime.

The following section (2) provides some background into the objectives and main features of the CE, and briefly introduces the origins of EU waste law as well as the concept of EPR. The article continues with a section (3) that presents some of the tensions between policies on waste and the CE, and the difficulties of adapting EPR to meet the challenge of the CE. Section 4 puts forward the need to establish a legal framework for products, and to develop a PPR that would ensure market access to durable, reparable and reusable products. The article ends with conclusions and points to opportunities for further research (5).

2. Background

2.1. A new paradigm for EU law: 'sustainable circularity'

There is no authoritative definition of CE (Kirchherr, Reike and Hekkert, 2017), but the most well-known is probably that put forward by the Ellen MacArthur Foundation (EMF, 2015, 46) of "an economy that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times." Thus, it is "an economy in which production and consumption are organised in such a way that the value of products, components, materials, and resources is maintained within the value chain and products' life-cycles" (Wysokińska, 2016, 57). Another definition is found in the CE Action Plan, in which the EU asserts that the CE is "an economy where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised" (EU Commission, 2015, p. 1). These two approaches seem to depart somewhat as to what waste is or should be. For the first, waste as such shall in principle not exist in the CE, for any 'waste' is a resource. For the other, waste is an environmental threat that shall be minimized.

As Ghisellini et al. (2016, 2) state, the CE has often been solely seen as "an approach to more appropriate waste management." The radical transformation of economic model that the CE requires is certainly daunting, and it is unsurprising that decision-makers first attempted to 'fix' the linear economy, namely by introducing recycling processes. Many continue to see waste management as the core element of the CE. In that sense, the Commission's assertion that "the way we collect and manage our waste" is determinant to achieving environmental protection is telling (EU Commission, 2015). Such a limited view of the CE cannot suffice, for reuse, recovery and recycling are not necessarily appropriate options in any given context. Recovery processes require energy and resources (such as water). Some technologies may prove expensive and environmentally impacting (Ghisellini et al., 2016). Strict rules on hazardous substances may prevent recovered products from re-entering the market or there may be no demand for them because consumers may be wary of their quality. Furthermore, according to the second law of thermodynamics, the amount of useful energy and matter is constantly declining. Thus, any process of recovery has an environmental impact; raw natural resources are eventually needed to compensate lost value, which remains within the Earth system as pollution (in accordance with the first law of thermodynamics; Georgescu-Roegen, 1971). This means that, however efficient processes may become, they will necessarily weigh on the Earth's regenerative and assimilative capacities (Pearce and Turner, 1990, 36-39).

A transition to a sustainable CE requires primarily that we remain within planetary boundaries (Rockström et al., 2009). This involves going beyond improving waste management; it necessitates waste avoidance and product life extension.

Early CE strategies have sought to improve *efficiency* in production in particular through materials and product design (Stahel, 2016; Baungart, McDonough and Bollinger, 2007). The objective of an efficiency strategy is to combines environmental protection and economic growth. The intent is to produce more "while using fewer resources and creating less waste and pollution" (Boulanger, 2010, 5). In other words, the aim is to ensure the growth of human-made capital (i.e. goods and services produced by human industries) while keeping the natural capital constant (Davie, 2013, 114; Barr, 2008, 44). An efficiency strategy relies particularly on improving technologies, increasing the energy efficiency of appliances, and developing lightweight products and packaging (Ghisellini et al., 2016). However, efficiency improvements do not necessarily lead to equivalent reductions in consumption and may even trigger an increase in use (Figge et al., 2014; Boulanger, 2010; Schettkat et al., 2009) – for instance, if the monetary 'gains' from using an energy efficient appliance are used to purchase more appliances.

In order to remain within planetary boundaries, CE policies must adopt another strategy that is *sufficiency*. The sufficiency strategy aims at an absolute reduction in both production and consumption in line notably with Daly's steady-state economy (2014) or Latouche's *décroissance* (2010). The premise of this article is that a transition towards a sustainable circular model requires producing and consuming fewer more durable products, keeping products in use longer, repairing, sharing, renting, and purchasing in priority second-hand and durable products (Maitre-Ekern, Dalhammar, 2019). This change in consumption patterns is required of every individual, but producers must lead the paradigm shift that the CE requires.

For some years, the EU and its Member States have come up with innovative ways of regulating production to promote incremental change. The Ecodesign Directive 2009/125/EC, which establishes a framework for the adoption of ecodesign requirements for energy-related products, is a particular example of using the law to make changes upstream at the very birth of the product. The adoption of the Energy Labelling Regulation (EU) 2017/1369 has contributed further to the success of the ecodesign scheme. Besides, from covering energy efficiency alone, the scope of ecodesign requirements has been progressively broadened to address an increasing number of environmental aspects, such as durability and reparability (Richter et al., 2019; Tecchio et al., 2018). At the national level, it may be noted in particular that France has amended its Consumer Code to promote the availability and access to spare parts, Sweden is providing tax deductions for household repairs, and several countries have expanded the timeframe of the legal consumer guarantee to foster extended useful lifetime. The literature is increasingly focused on means of improving patterns of production (Dalhammar, 2016, Maitre-Ekern and Dalhammar, 2016) and consumption (Maitre-Ekern and Dalhammar, 2019).

Nevertheless, waste law remains largely seen as a necessary ally to the goals of the CE. EPR, in particular, has long been expected to be a significant driver of design change, and much of the recent literature on EPR focuses on improving incentives to that end (Huang et al., 2018; Gui et al., 2018; Atasu, 2018; Kunz et al, 2018).

The path towards sustainable circularity does not end with planetary boundaries, however. The human and social component of 'sustainability' will be determinant for the success of a circular transition (Maitre-Ekern, Taylor and van der Velden, 2020). Product lifetime extension cannot succeed if consumers cannot afford durable products. Empowering consumers through better information and right to repair will be vain if people are struggling to make ends meet. Creating a CE in Europe at the expense of human and workers' rights in lower income countries is unacceptable. The element of social justice remains largely absent of any CE policies, and although it is not the aim of this article to address this issue directly, the use of the term 'sustainability' throughout this article refers to this dual environmental and social aspects that form the basis of a '*safe* and *just* space for humanity' (Raworth, 2012).

2.2. Historical overview and persisting tensions of EU waste law

At the outset of the European construction, waste regulation was seen as an issue for regional authorities, but in the 1970s and 1980s the EU started paying more attention to waste disposal (Malinauskaite et al., 2017, 68). Pollution from waste dumping was becoming a source of growing concern (e.g. landfill leachates; Brennan et al., 2017) and scandals arose (Seweso waste shipment). The EU legislators began to be wary that legal fragmentation due to a profusion of national legislation in waste would threaten the establishment of the internal market. The adoption of the first directive on waste in 1975 was hence justified by considerations for the internal market as well as the desire to create a level playing field for waste producers (Directive 75/442/EEC, Preamble; Malinauskaite et al., 2017). Directive 75/442/EEC defined the concept of waste, established general waste management principles and encouraged Member States to engage in prevention and recycling. However, prevention was initially not so much a matter of preventing at the source than at the point of impact. For example, early waste legislation focused on limiting to the necessary minimum activities of landfilling and waste incineration (see Landfill Directive 99/31/EC and Waste Incineration Directive 2000/76/EC) and diverting waste from landfills notably through separate collection and recycling in waste streams (Packaging Directive 94/62/EC; End-of-Life Vehicles Directive 2000/53/EC; Directive Batteries 2006/66/EC; WEEE Directive 2012/19/EU), as well as on controlling hazardous waste (Hazardous Waste Directive 91/689/EEC). There was little attention paid to limiting the generation of waste.

EU waste law has progressively grown into an extensive legal framework governing industrial, commercial and household waste. At the heart of this framework today is the 2008 Waste Framework Directive (WFD), which defines key concepts, establishes core principles, and allocates responsibilities that apply across the board to the entire legal field. Figure 1 provides an overview of the timeline of EU waste legislation.

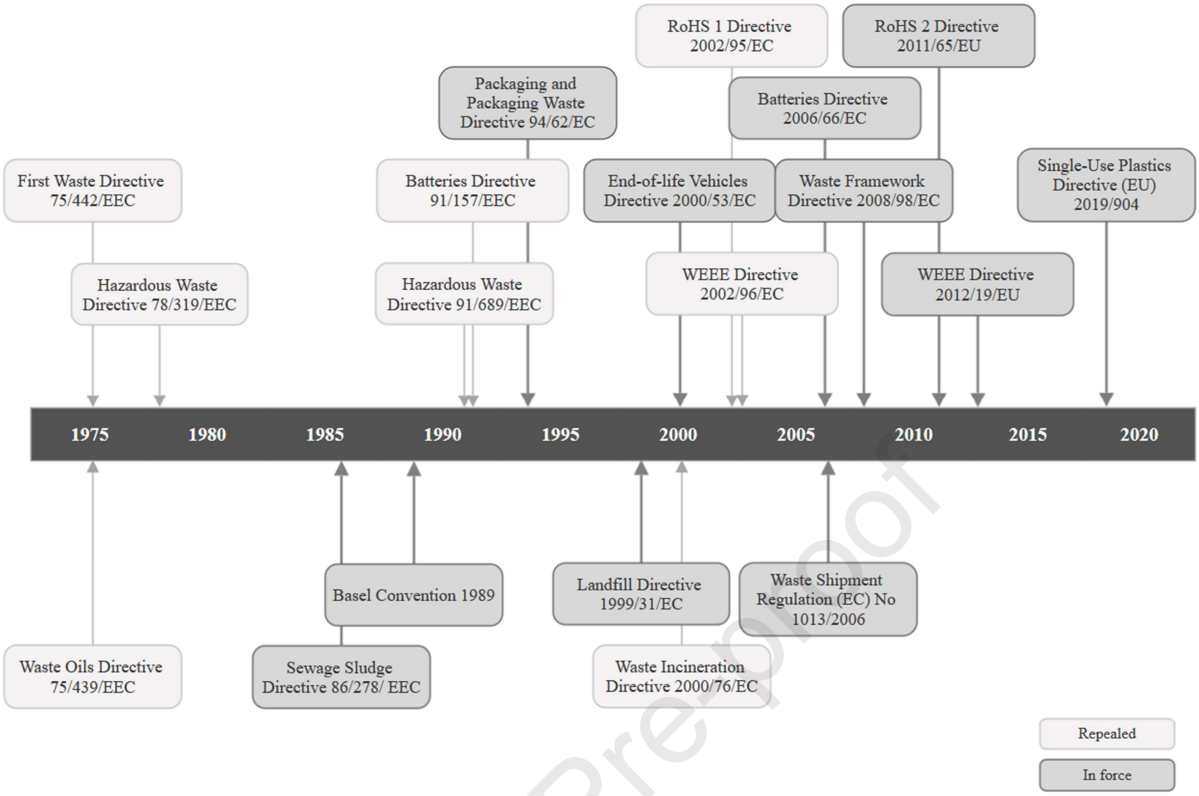

Figure 1. Overview of EU waste legislation timeline

The WFD sets out a 'waste management hierarchy' (Article 4), which comprises a priority order for waste management options based on assumed environmental impacts (Van Ewijk, Stegeman, 2016) (see Figure 2). At the top of the hierarchy is prevention. Waste prevention should encompass measures aimed at avoiding waste – that is, by reducing either the amount of waste being produced (quantitative reduction) or the content of harmful substances they contain (qualitative reduction) (WFD, Article 3(12); EU Commission, 2012, 28). Waste prevention measures may include design for durability and reparability, reduced consumption, maintenance and repair practices as well as second-hand retail (see WFD, Annex IV)

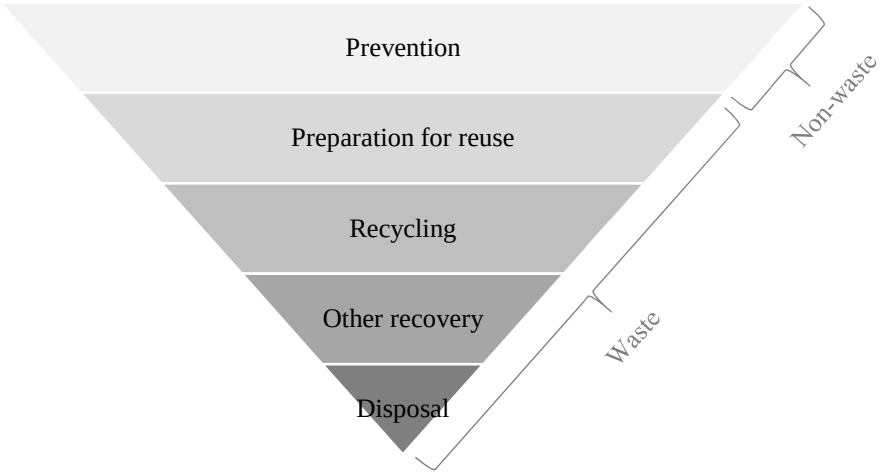

Figure 2. Waste management hierarchy (WFD 2008/98)

Paradoxically, "the regulatory provisions of the WFD apply only to those substances that have failed to meet this priority objective and are, in fact, waste" (Scotford, 2007, p. 374). The preventive principle materialises in the WFD as a system of supervision and control for materials that are waste (thus regulating waste to minimise its polluting points of impact), not as means to avoid waste altogether (i.e. preventing waste at source) (Scotford, 2007). Though discussed for over a decade, waste prevention targets were never established whereas recycling targets were set already in 2008 (Nash, 2009), and further revised in 2018 (Directive (EU) 2018/851).

With the rise of the CE and increasing focus on extending product lifetime to minimise resource use and waste generation, the tension between the two layers of prevention in EU waste law is growing; and the disproportion between the soft and limited measures adopted to address waste prevention at source and the binding and ambitious targets for recycling is proving increasingly problematic.

2.3. Extended Producer Responsibility

In waste management, 'Extended Producer Responsibility' (EPR) is a policy approach whereby producers are held responsible beyond sale for the end-of-life of their products. It reverses the underlying rights and duties in the product chain and changes the default rule for how waste is managed (Sachs, 2006). Thus, EPR pursues a dual objective: on the one hand, it intends to hold producers (and consumers) responsible for the cost of waste management instead of society (i.e. taxpayers). On the other hand, it aims to foster improvements in product design to minimize those costs (and associated environmental damage). The fact that waste management was previously a duty of municipalities implied "a right of manufacturers to design and produce their products without regard to end-of-life environmental impacts" (Sachs, 2006, 63). By imposing the cost of waste management on producers, EPR forced manufacturers to include environmental considerations into their business decisions (OECD, 2001).

The term 'EPR' appeared for the first time in Europe in the early 1990s. In a report for the Swedish Ministry of Environment from 1990, Lindhqvist and Lidgren (1990), defined EPR as follows:

> an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product.

Lindqvist envisaged four types of producer responsibility: physical, economic and informative responsibility, and liability (2000, 38-39). The idea was that producers would be required to cover all – or part – of the cost of collection, recovery and final disposal of the products it produces (*economic (financial) responsibility*), be involved in the actual management of the waste products (*physical responsibility*), or provide information to consumer about the disposal of products and recyclers about proper recycling processes (*informative responsibility*) (Tojo, 2004; Dalhammar, 2018). In addition, producers would be held responsible for environmental damage caused by their products (Steenmans, 2019, 114).

The later interpretation of the concept of EPR by EU policymakers was narrower however, and EPR schemes were developed in the realm of waste law thus focusing on the product's end-of-life. In addition, EPR schemes focused on the economic responsibility of producers,

leaving market forces to operate and organise (Sachs, 2006). The initial rationale of EPR as an all-encompassing environmental protection strategy did not fit well with the dominant economic theory at the time. Today the WFD only requires financial responsibility:

> 'extended producer responsibility scheme' means a set of measures taken by Member States to ensure that producers of products bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product's life cycle (Article 3(21)).

This focus on financial responsibility in EPR is evidenced of the historical development of EU waste law. The priority of establishing a healthy business interest in a sector previously unattractive to private sector investments shaped the environmental policy response to the issue of waste management (Van Calster, 2014). Policymakers increasingly favoured market-based instruments over prescriptive regulation (Sachs, 2006; Swaney, 1992). They relied on the ability of economic incentives, notably via taxation, to trigger positive environmental behaviour. EPR reflected the neoclassical economic approach based on an economic internalization of environmental externalities (Pigou, 1932). Producers were expected to take steps to reduce waste pollution (the externality) as a result of their being held responsible for (at least) the financial burden of waste management – that is, they would be incentivised to prevent waste in order to avoid waste management costs.

Directive 94/62/EC on packaging and packaging waste was the first piece of legislation to adopt an EPR-like scheme (Article 15). Other waste stream-specific directives on *inter alia* end-of-life vehicles (Directive 200/53/EC), waste electronic and electrical equipment (WEEE Directive 2012/19/EU), and waste batteries and accumulators (Directive 2006/66/EC) followed on in adopting similar obligations, and in 2008 the WFD elevated the concept of EPR to an overarching concept of EU waste law. It should be noted that EU law has adopted a wide definition of 'producer' for the purpose of EPR that encompasses 'any natural or legal person who professionally develops, manufactures, processes, treats, sells or imports products' (WFD, Article 8). In principle, all these actors have an extended responsibility that is at least economic.

Most EPR schemes leave open the possibility of requiring producers to carry out their responsibility individually or collectively. An *individual responsibility* consists in having each producer being individually responsible for its own products. A *collective responsibility*, on the other hand, designates the situation where all producers within the same product group (e.g. packaging) or the same waste streams (e.g. paper) are responsible for all the products within that particular industry without any distinction between the individual products (Kalimo et al., 2012). A collective scheme is based on equal contribution regardless of the specific recovery features of each product, thus providing little to no incentives to improving design. An individual responsibility is undoubtedly more effective to promoting better design, since producers are faced with the real costs of the end-of-life management of their products, but present various practical difficulties.

In Europe, Producer Responsibility Organisations (PRO) are usually set up to perform the actual EPR responsibility since it enables economies of scale in waste management operations. PROs have long privileged collective responsibility because individual responsibility (e.g. using differentiated fees based on products' properties) appeared difficult to manage in practice and led to insurmountable implementation costs (Toffel et al., 2008,

13). The shortcomings of collective scheme along with other limitations of EPR in view of fulfilling CE objectives are examined in the following section.

3. Tensions between EU policies on waste and the CE

The main clash between waste law and the CE comes from the fact that whereas the first wants to cover the widest possible scope to avoid environmental damage from reckless waste disposal, the second aims to divert as many materials as possible from becoming waste to avoid the environmental damage and loss of value that results from waste management. This section explores the reasons behind the difficult reconciliation of EU waste law with the objectives of the CE taking as point of departure the definition of 'waste' that reflects the concerns of a linear model, and further looking into the shortcomings of a market-based approach to EPR.

3.1. The wide scope of waste law

The point of departure of waste law is that waste is a *source* of pollution. The *risk* of harm is not inherent to waste, but results from the fact that the holder of a substance or object it no longer wants might carelessly dispose of it (Cheyne, 2002, 62; Tromans, 2001, 135). The action that characterises the disposal represents a threat to the environment (Cheyne, 2002). Thus, the definition of waste developed as an *action-based* concept given the inherent risk of pollution arising from waste disposal and regardless of the toxicity of the original materials (Scotford, 2007; Cheyne, 2002). Initially, EU law defined waste as a substance or object that is 'disposed of' by the holder (Directive 75/442, Article 1(a)). However, the meaning of the term 'dispose' appeared ambiguous as to whether it aimed to cover not just normal disposal activities (tipping and incineration), but also recovery operations (Tromans, 2001, 141). An amendment to the Directive in 1991 changed the definition to include "any substance or object which the holder discards or intends or is required to discard" (WFD, Article 3(a)). The replacement of the verb 'dispose' by 'discard' in the English version of the Directive confirmed the early interpretation of the definition by the Court of Justice of the European Union (CJEU) (Joined cases C-206/88 and C-207/88 *Vessoso and Zanetti*, para 8 ff.). Discarding, i.e. getting rid of something no longer useful or desirable (Oxford Dictionaries), is meant to embody a comprehensive notion of waste that includes both recovery and disposal (EU Commission, 2012).

It is clear that the broad interpretation of the term 'waste' by the EU legislators and the CJEU (Joined cases C-304/94, C-330/94, C-342/94 and C-224/95 *Euro Tombesi*; Joined cases C-418/97 and C-419/97 *ARCO*; Case C-252/05 *Thames Water*; Case C-188/07 *Commune de Mesquer*, 39; Case C-1/03 *Van de Walle*; Case C-457/02 *Niselli*) aimed to prevent the threat of waste pollution by ensuring that virtually all 'substances and objects' would fall within the scope of waste law and thus have to abide by its rules. However, as a result, the definition also encompasses materials that, although they may have no further use for the holder, constitute valuable resources for another user or production process. This all-encompassing definition of waste essentially defies the very core idea of the CE – that is, to do away with waste. The CE aims to extend useful lifetime through maintenance and repair, and ensuring the reuse of products and their recovery, while recycling is a less desirable option from an environmental point of view.

Waste prevention is not, strictly speaking, merely an issue about waste. This is particularly apparent in the examples provided by the WFD of preventive measures that Member States

shall establish as part of the development of their waste prevention programmes (WFD, Article 29). Annex IV refers to product eco-design, eco-labels and economic incentives for the efficient use of resources and for cleaner purchases. Clearly, none of these examples has to do directly with waste management or would be regulated efficiently by each Member State separately. In fact, the EU has legislated on some of those issues, among others adopting eco-design and labelling requirements for energy-related products, and introducing some elements of sustainability in public procurement rules (Directive 2014/24/EU; EU Commission, 2008). These legal schemes now form an integral part of the EU's action plan for the CE.

The potential for reducing environmental impact and resource use through product maintenance, repair and reuse should make these a priority. The Ellen MacArthur Foundation refers to the 'power of the inner circles': "The closer the system gets to direct reuse, i.e., the perpetuation of its original purpose, the larger the cost savings should be in terms of material, labour, energy, capital and the associated externalities, such as greenhouse gas emissions, water, or toxic substances" (2013, 33). However, those key aspects of waste prevention remain largely underdeveloped in EU legislation. The promotion of repair activities is found neither in waste nor in product-related laws. On the contrary, several barriers hinder repair, including legal and non-legal barriers to accessing repair, cost and complexity of repair, and consumer attitudes not favouring repair (Svensson et al., 2018; Riisgaard et al., 2016; Wieser, Tröger, 2018). Removing legal barriers from e.g. intellectual property, contract and consumer laws is certainly fundamental, but establishing an environment in which repair becomes mainstream is also essential for realising the CE (Svensson et al., 2018).

The issue of reuse is one that is particularly telling of the tensions between waste law's aim to avoid pollution from unregulated waste management and the CE's objective to keep resources within the economy. The WFD defines *reuse* as a means of waste prevention. It is the process of using products again 'that are not waste' "for the same purpose for which they were conceived" (Article 3(13); EU Commission, 2012). This process is not directly included in the waste hierarchy, contrary to the preparation for reuse, which is the second priority. *Preparing for reuse* is referred to in Article 3(16) WFD as a waste management process whereby a product is checked, cleaned, repaired or recovered (that is, reconditioned and remanufactured, not recycled) so that it can be used again for the same purpose. The distinction between direct reuse and reuse following repair appears to depend on whether the product was discarded in the first place. Some municipalities or charitable organizations put up 'reuse containers' as alternatives to recycling bins, in particular for clothes. For the most part, however, consumers who want to get rid of their items have little choice other than to 'discard' them. Hence, for lack of better alternative, a majority of potentially reusable products will fall within the scope of waste law.

This is far from a trivial issue because, under the current system, the qualification of 'waste' has strong legal but also legal, practical and even psychological implications. Firstly, when a product becomes waste, there is a specific set of legal rules that applies to it. Chemical legislation does not apply to waste, but hazardous waste must be managed under strict conditions (WFD, Article 17). However, there is a current dichotomy between waste and chemical rules that may lead to hazardous substances being 'lost' when a product becomes waste, and information about toxicity not being adequately passed along to new manufacturers (Bernard, 2017).

Moreover, the conditions by which waste can cease to be waste and re-enter the industrial process are far from painless. The 'end-of-waste' status was introduced in the 2008 WFD recast to clarify when waste is deemed to have undergone a 'full recovery' and should no longer be legally considered waste (Van Calster, 2014, 18–19). Article 6(1) WFD stipulates that the substance or object hence created has to fill a specific purpose, respond to an existing market or demand, fulfil the technical and legal requirements, and shall not lead to overall adverse environmental or human health impacts. In effect, end-of-waste constitutes new products.

The waste hierarchy gives a priority order for management operations that should favour preparation for reuse. However, waste collection is not necessarily favouring reuse. Huisman et al. (2015, 18) found that poor disposal behaviour and scavenging of valuable components at collection points are causing invaluable loss, and effectively reducing the chances of keeping the integrity of a product and avoiding extensive treatment.

Finally, the reality is that waste is not well perceived in our society, which sees it as something dirty and potentially unsafe. There is considerable consumer resistance to buying second-hand and reused products, which are perceived to be of lower quality than new (Gåvertsson et al., 2018; Hazen et al., 2017; Guiot, Roux, 2010). In the linear economic model that developed with the industrial revolution, producers did not have to care for their waste products (Maitre-Ekern, 2018). Profits came from low manufacturing costs and sales volume. In spite of the introduction of EPR schemes, waste management has remained largely an issue for waste managers, and producers merely support the financial burden. They tend to overlook the potential of incorporating repair and reuse into their business models.

3.2. EPR and the Circular Economy

The evolution of environmental problems is challenging the traditional responses rooted in neoclassical economics that consider damage to the environment to be market failures. The polluter-pays principle (PPP) originally stems from Pigou's theory of externalities (Pigou, 1932). De Sadeleer (2002, 33–37) puts forward that, in the EU, the PPP has taken on four interrelated functions: a function of *economic integration* (instrument of harmonization in the internal market); a *redistribution* function (instrument of cost internalization); a *preventive* function (instrument of prevention); and a *curative* function (instrument of damage reparation). The concept of EPR provides a practical application of the PPP in view of both the redistribution and preventive functions of the principle. On the one hand, it aims to ensure that the cost of pollution is born by those responsible for it (producers and consumers) and that the burden does not rest on society (taxpayers) (Krämer, 2016; Jans, Vedder, 2012). On the other hand, it intends to promote the prevention of damage at the source (De Sadeleer, 2002; Adshead, 2018).

In other words, EPR aims not only to allocate the financial responsibility for waste management, but also to trigger changes upstream. Producers are expected to make improvements to their product design to reduce waste generation or facilitate recovery process, and ultimately make savings. Yet, if EPR has led to higher collection and recycling rates, its impact on product design appears more limited (Kunz et al., 2014). EPR schemes for packaging, in particular, have triggered the development of new packaging strategies (Dalhammar, 2018; Tojo et al., 2006). For example, cardboard packaging around toothpaste tubes has essentially disappeared. Some brands re-designed the tube with broad flat caps so

they can display them on store shelves standing on end, while others have them in large open boxes (Pledger, 2011). However, the problem may arise that different design options are synergistic, but they may also be creating trade-offs (Atasu, 2018, 2). For example, lightweighting has been used to minimize packaging volumes. What may seem like a positive improvement in reality resulted in packaging being neither reusable nor recyclable. Sturdy, built to last and highly recyclable packaging may prove a better means to close the loop (Dalhammar, 2018). Thus, it is very difficult for EPR schemes to promote durability, reuse and recyclability at the same time. EPR schemes coupled with stringent collection targets may drive producers to focus on recyclability at the expense of durability, whereas stringent recycling targets may have the opposite effect (Huang et al., 2018, 18).

For most products, EPR has contributed to mitigating the impacts of waste management through better recovery processes, but not reduced the amount of waste generated (EU Commission, 2014). There are several reasons why EPR schemes struggle to influence product design as they were expected to do. The main difficulty is that the incentives for promoting design changes are simply insufficient for e.g. electrical and electronic equipment for which the recycling costs represent only a very small share of sales price (Kunz et al., 2018, 59; Kunz et al., 2014, 28). Moreover, incentives to recover waste materials for manufacturing new goods depends largely on the market price of commodities (such as gold, silver and steel), which are subject to fluctuation. If they are too low, recovered materials are no longer profitable as revenues gained do not cover the cost of collection and recovery (Kunz et al. 2018, 57).

Generally, an important reason behind the apparent failure of incentives for improved design is the lack of individualized responsibility. Most EPR schemes in Europe implemented waste requirements in national legislation allocating costs collectively on a market-share basis (i.e. based on their share of sales of a particular product category in a given year; Mayer et al., 2013, 187). Attempts to differentiate recycling costs within collective schemes to increase design incentives, notably using modulated fees, are proving technically complex (Dubois et al., 2016, 23, 31). For Palmer et al. (1997), a deposit-refund policy is the least costly and most favourable option for reducing waste.

Moreover, in the context of the EU market where most products placed on the market are manufactured abroad, cost differentiation would not reward producers directly. EPR costs are often paid by the importers and retailers, who fall under EU jurisdiction and who are not necessarily part of the same company as the manufacturers (Kunz et al., 2018, 60). Those who have the decisive power over the key features of the product (i.e. designers) are not directly affected by EPR scheme, and there are thus unlikely to be design changes. As Tojo (2004) put it:

> … the more control the manufacturers have over the downstream infrastructure, the more likely it is that measures belonging to the higher ladder of resource efficiency will be taken.

The incentivizing effects of the EPR scheme suffer additional limitations. On the one hand, producers tend to pass on a significant part of the EPR costs onto the consumers through sale prices, which decreases the burden and hence the incentives. On the other hand, producers have no guarantee that consumers will treat or sort their products properly, dispose of them at

an appropriate location (especially in countries that enforce EPR rules) and within a useful timeframe to ensure favourable return on investment.

Another problem with EPR schemes is that EU rules have to be transposed into national (and sometimes even regional) law, which leads to fragmentation and effectively prevents producers from pursuing a useful strategy. In the EU, there are several different transpositions of the WEEE Directive notably on measures aimed at improving product design (Report to the European Commission, 2018, 25). It also makes the Commission's task of ensuring proper enforcement and compliance with EU law particularly difficult (Kunz et al., 2018, 61).

Thus, EPR is showing clear limitations in providing (useful) incentives. Almost thirty years after the policy was first implemented in Germany (Töpfer Report, 1991) – and soon after throughout the entire Union (Packaging Directive 94/62/EC) – the preventive objective of EPR is under considerable strain. Kunz et al. (2018) write:

> Ultimately, without effective incentives for improved design, EPR is at risk of being used simply as a system to finance waste management, which is far from its intended purpose.

The question is: why not? In the words of Coopman (2014, 5),

> EPR is not a stand-alone policy measure. EPR should always be incorporated in a mix of environmental policy measures. […] product take-back should never be an automatic choice, as other instruments might be more effective to reach the goals mentioned above.

EPR may prove a successful scheme of costs allocation in that it ensures that the burden of waste management does not fall on society and that waste is properly processed. The purpose of improving design for prevention is certainly crucial, but it might not need to be the task of EPR schemes. Instead of trying to fix what appears to be intrinsic shortcomings of the EPR policy when it comes to waste prevention, it might be more fitting to confront these issues predominantly in another context, i.e. by regulating products rather than waste.

Moreover, the responsibility of producers in the CE goes beyond making design improvements. They shall be required to take practical steps to ensure that their products are indeed being maintained in use longer and repaired, that reuse is an attractive option, and processes leading to reuse are effectively prioritized over processes of material recovery (recycling).

4. Introducing a new form of producer responsibility

The transition to a sustainable CE should aim in particular to extend the durability and improve the reparability of all products, and provide access to repair and reuse market. Taking the sustainability objectives of the CE seriously requires adopting a precautionary approach and notably limiting access to the EU market to products that abide at least by durability and reparability standards, and progressively of all 'sustainable products' (i.e. products with life-cycle impacts that is compatible with social justice and planetary boundaries requirements).

The introduction of eco-design requirements for some product groups has shown the way to new forms of regulation that do not rely on economic incentives but on the ability of business to adapt to a new reality. The inherent tensions between the two layers of prevention in waste law and the lack of proper waste avoidance measures forty-five years after the adoption of the first waste directive is evidence of the need to think anew. Regulating waste management will

remain a decisive aspect of achieving sustainable circularity, but the EU legislators must make way for truly preventive and precaution-oriented CE policies. In particular, the focus must turn to developing product law in which producers are held responsible not just for their product's end-of-life, but especially for placing durable and reparable – and increasingly sustainable – products on the EU market, as well as for enabling access to repair and reuse.

This section recommends the development of a 'pre-market producer responsibility' (PPR) that aims to limit market access to minimum requirements of durability, repair and reuse, and thereby addressing the shortcomings of EPR. Further, the argument is that PPR should be part of the development of a more comprehensive legal framework for products, including a framework directive for products that would establish the principles and definitions to guide the pursuit of sustainable circularity in production and consumption.

4.1. A legal framework for products

The broad scope of EU waste law and the abundance of legislation on waste management have left little place for effective waste prevention. While the regulation of product durability in design is beginning to emerge, repair and reuse activities remain largely untouched by legislation. A wide definition of waste has a purpose that is to respond to the threat that inadequate disposal and management of waste poses on the environment. However, as demonstrated in the previous section, EU waste law is increasingly at odds with the CE transition and amending the existing legal framework would not suffice (Maitre-Ekern, Taylor and van der Velden, 2020). Instead, the EU should focus on developing a strong legal framework for products that would take on legislating products for the purpose of the CE without threatening the fundaments of waste law.

The idea of developing a legal framework addressing the environmental impacts from products is not new (Dalhammar, 2007; Maitre-Ekern, 2015). A 1999 report from the Swedish Environmental Protection Agency proposed to introduce just such a framework directive based on the Product Safety Directive as well as several daughter directives to lay out detailed product-specific requirements (SNV Report, 1999). In 2004, the European Environmental Bureau (EEB) introduced a similar proposal for a directive on the environmental soundness of products (Dalhammar, 2007). The Commission did not follow that approach, preferring to focus on the adoption of a new directive on the ecodesign of energy-using products (2005/32/EC) that later evolved to cover all energy related products (2009/125/EC). The success and increasingly broad scope of the Ecodesign Directive 2009/125/EC should not hide the fact that it was never meant to have the stature of a framework directive.

In similarity to the WFD, a framework directive for products should contain some common definitions and principles, especially on the producers' responsibility to extend the lifetime of their products and ensure reuse (Maitre-Ekern, Taylor and van der Velden, 2020). Specific rules applicable to certain product groups or life-cycle aspects may then – as is the case today – be regulated through different daughter directives.

As part of a new product's legal framework, the responsibility of producers for their product would have to be revisited. The introduction of the concept of EPR in EU waste law was a crucial step towards increasing the concern of producers for the environmental impact of their products. It came at a point when the priority was to prevent the increasing damage caused to the environment by untreated waste. The need for the concept is still alive today, yet other pressing issues have arisen since that EPR appears not specifically well fitted to tackle. The

throwaway culture requires legislators to focus on reducing the amount and impact of products, extending their lifetime, and facilitating second-hand retail. This necessitates a re-thinking of the responsibility of producers, and extending it not just downstream, but indeed also upstream.

4.2. Introducing the concept of 'pre-market producer responsibility'

The development of '*pre-market* producer responsibility' (PPR) shall aim to ensure that producers held responsible for placing products on the market and thus for the impacts they cause on the environment, human health and social justice. Rather than focusing on requirements about the end-of-life of products, however, the PPR would establish the basis for imposing environment-oriented measures upon placing products on the market. Thus, the concept of PPR would not be based on a financial responsibility (and the polluter-pays principle), but on a duty of care deriving in particular from the precaution principle that is at the heart of EU's environmental policy (O'Riordan and Jordan, 1995, 193). In other words, the PPR should make producers responsible for taking measures to limit the environmental impact of the products and extend their lifetime in accordance with the CE objectives prior to placing them on the EU market. Figure 3 illustrates, on the one hand, where PPR-based policies would exercise their influence (that is at the product design and production stages) and how they would effectively restrict product placement on the market), and o th r hand, where EPR-based policies operate (that is at the product end-of-life stage , where the priorities must be to avoid and reduce products impacts throughout thei e cycle, a precautionary approach requires adopting measures as early as possible in t life, and thus limiting at dealing with th f mass production.

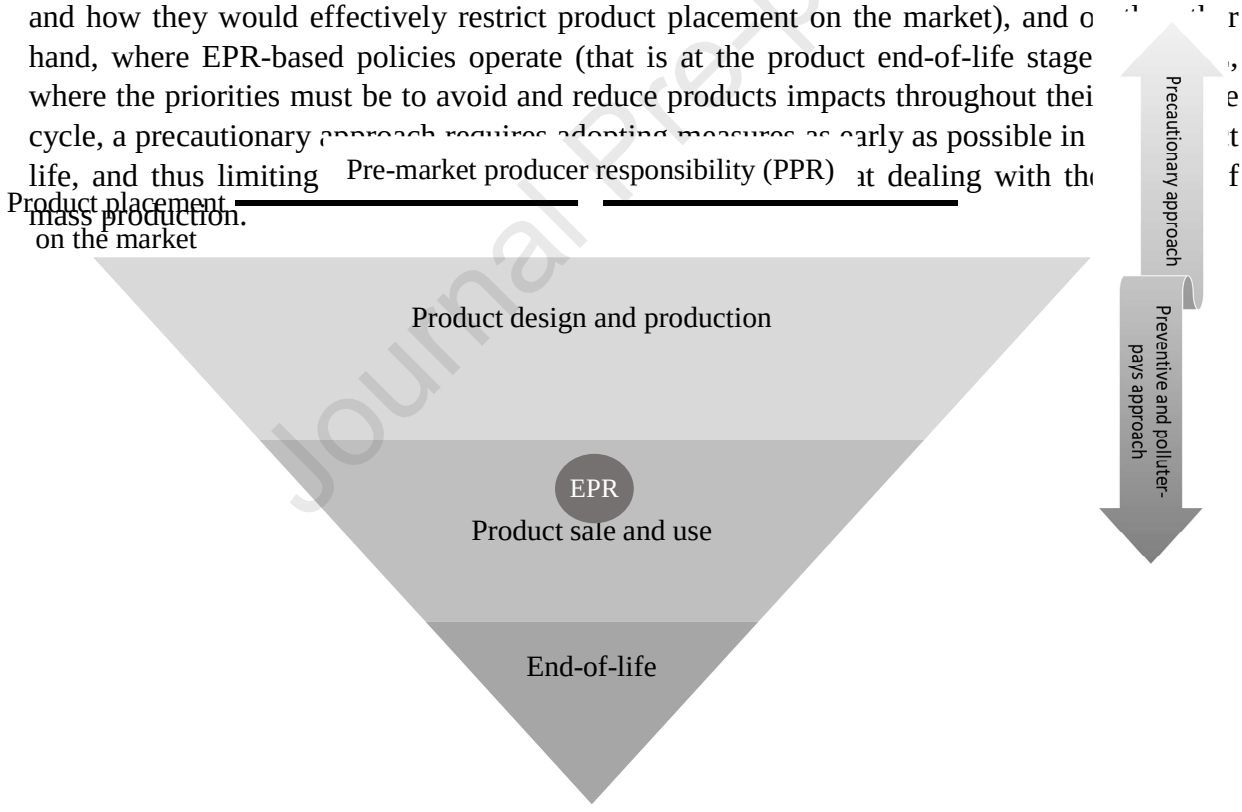

Figure 3. Pre-market producer responsibility (PPR) v. extended producer responsibility (EPR) in light of CE priorities

Waste prevention (including maintenance and repair) and reuse have to become the new pillars of the economy, and the role of the law is to make them both accessible and mainstream. Thus, it is important to compel changes in business models. Producers can no longer focus solely on sales. They must transition to other means of profit that do not require the production of a new product. It is equally necessary that the law promotes the culture of

repair and handing-in products for reuse by consumers. Discarding faulty or unwanted objects remains too common, and alternatives have to be made more accessible and visible.

The following are examples of possible PPR and are meant to illustrate the discussion:

1. *No data no market*. Knowledge is power. This aphorism is certainly relevant to products, and not only for enabling consumers to exercise their purchasing power and make informed decisions (Gåvertsson et al., 2018; Thøgersen, 2005). It is also significant for producers, who can directly influence the composition, characteristics and features of their products, and thus their environmental impacts (Maitre-Ekern, Dalhammar, 2019). Too often, however, producers are insufficiently aware of or interested in their product's life-cycle impacts. An essential starting point has to be to ensure that producers acquire and provide a certain amount of information as a precondition for placing their products on the market. This information should comprise, in particular, the expected lifetime of the products, disassembly characteristics, the reparability of the product (including the availability of essential spare parts), or even the content of primary or secondary materials. The availability of this information is expected increase the attractiveness of the more environmentally friendly products, as well as force producers to compete on and improve those aspects.

2. *Availability (and affordability) of spare parts*. Repair is an essential element of product lifetime extension. The longer consumers are meant to use a product, the more likely they will have recourse to repair. This is particularly true for electronic products, which may have a long lifetime as a whole product but with some parts necessarily failing earlier and needing replacement. The most obvious example is the battery. The requirement that producers make available some essential spare parts for (a portion of) the duration of the expected lifetime of the product is a way of promoting repair (Maitre-Ekern, Dalhammar, 2019).

3. *Take-back scheme for repair and reuse*. Most of the Scandinavian countries have established take-back scheme to fulfil their EPR obligations for certain types of products. In Norway, producers and importers of beverages participate to a deposit-refund system for plastic bottles and cans. Consumers pay a deposit fee upon purchase, which they get back when their return the empty bottles and cans to a retailer (such as a store or a kiosk; Infinitum). This system ensures very high rates of collection and waste management. A similar system, out of waste law, could be aimed at repair and reuse by requiring producers to set up a take-back system for broken items, for the purpose of repair, or preparation for reuse. Such a scheme would contribute to diverting products from the waste containers and to getting producers involved in less impacting activities, and indeed in developing new business models.

4. *Second-hand and reuse section in store*. There is considerable consumer resistance to buying second-hand and reused products (Gåvertsson et al., 2018; Hazen et al., 2017). They are not part of mainstream consumption, which remains focused on the purchase of new items, and are usually found only in specialized stores. Thus, they are less accessible and their comparison to new products (whether in terms of performance or price) is made more complicated. Mainstreaming reuse may be promoted through more visibility and accessibility. Requiring that second-hand and reused products be offered alongside new could be a step in that direction, and a useful complement to the take-back obligations.

Table 1 below shows how PPR-based requirements would contribute to the CE objectives of extending product lifetime in contrast to EPR-based measures that are targeted towards waste management.

Table 1. Comparison of EPR and PPR contribution to key CE objectives

CE Objective	Extended Producer Responsibility	*Pre-market* producer responsibility
Reduced production of new products	N/A	Incentives to focus on maintenance and repair services, and invest in reuse instead of production and sale of new products
Improved design	Limited incentives to improve disassembly, recovery and recycling	Ecodesign requirements about e.g. durability and reparability
Better information	About disassembly, recovery and recycling	No data, no market – mandatory information about durability, reparability, spare parts and content
Access to repair	N/A	Take-back for repair system
Reuse	Limited incentives	Take-back for reuse system
Promotion of second-hand products and materials	N/A	Second-hand and reuse section in store

5. Discussion and conclusions

Policies on waste and the CE are often featured together as aiming towards the same goal of achieving more sustainability. In reality, underlying policy tensions and diverging objectives make for a disorderly and inadequate response to the challenges humanity face if to ensure safe and just living conditions in the long-term. It is certainly true that well-designed waste legislation could contribute to the objectives of a sustainable CE; notably by limiting environmental impacts of products through environmental sound waste management and the creation of markets for secondary raw materials; and by reducing social impacts linked with waste dumping on lower income countries. However, EU waste law remains entangled in the conflicting approaches of preventing waste at source or at the point of impact, with the balance consistently titling in favour of the latter.

This imbalance may be explained from an historical perspective as EU waste law has developed at a different time and in a different context than the CE. Waste avoidance and product lifetime extension are relatively new priorities. The initial aim of the legislator and the CJEU was to regulate waste for the purpose of avoiding pollution from waste dumping, landfilling and other improper waste treatment that constituted the most significant threat in the 1970s. This led notably to a broad definition of waste that encompasses anything that is required or intended to be discarded, leaving little to no space to the development of secondary markets for products. In addition, the inclusion of waste prevention as a priority of EU waste law led to the appropriation of a theme that would arguably have been best regulated from a product perspective.

In addition, as waste management became a competitive market, waste law was increasingly expected to enable market actors to make profit from material recovery and recycling. The influence of a certain conception of environmental policymaking that dominated throughout the 1990s and 2000s and that is based on economic incentives is undeniably strong in waste legislation. Hence, one of the flagship concepts of EU waste law, namely EPR, is a result of the predominance of market-based instruments in policymaking. The view that economic incentives would necessarily trigger upstream changes, in particular in product design, did not materialize in practice.

With the rise of CE policies and increasing focus on product lifetime extension, the dominance of mechanisms to boost waste management over waste avoidance is startling. The transition to a sustainable CE requires changing the very functioning of the economy by making the traditional concept of waste redundant, and limiting overall life cycle impacts of products notably through product maintenance, repair and reuse. The broad scope of waste appears to defeat this purpose, and to offer little to no room for promoting such practices, not even though EPR schemes. Indeed, the expectation that EPR will promote better design or repair and reuse activities is unlikely to materialise, and new thinking is needed around the regulation of producer responsibility.

The argument made in this article is that new thinking is needed to develop legislation that will promote sustainable circularity. The EU continues to struggle with the legacy of a regulatory framework made in and for a different paradigm. Developing a strong legal framework for products would be the opportunity to start a new narrative, one in which accessing the EU market is no longer a given, one in which producers are held responsible for the product they make, and one in which they must plan for waste avoidance, not waste management. It is proposed that the concept of PPR be developed as a product policy and encompass measures that strengthen the producers' duty to care for what they place on the market, and to prevent their products from having to be 'discarded'. For example, PPR obligations could include requirements to know and inform consumers about a product's content and features (no data, no market), to establish take-back schemes for repair and reuse, to offer second-hand along with new products, and to reflect their use of primary raw materials in the price.

This article presented how waste legislation emanating from the logics of the linear economy is largely ill-suited to respond the main objectives of the CE that aim at extending product lifetime. The idea of PPR to require that products meet certain requirements prior to entering the market is meant to open the door to new ways of regulating products in a sustainable CE. Further research is required notably to determine what types of measures would be most appropriate and effective at the task. Such inquiry may be particularly relevant to pursue in connection with the growing strand of literature on circular business models.

Finally, whereas this article takes a strong environmental focus due in particular to waste and current CE policies targeting primarily environmental protection, the need to include human and social considerations into the equation was also established. Changing paradigm is a process and establishing PPR obligations linked to product durability and reparability appear a necessary first step. However, in light of the urgency of sustainability challenges, PPR policies should increasingly be used to effectively avoid unsustainable products being placed on the EU market. The next priorities, means of achieving this objective and broader considerations of social justice should be closely examined in the future.

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Declaration of interests: Eléonore Maitre-Ekern

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