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The circular economy strategy as a way of designing more durable, repairable, and reusable products[1]

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ABSTRACT: The European Union's strategy for the circular economy seeks to change the current linear model of production and consumption, which involves the misuse of many resources and the production of huge amounts of waste. To this purpose, it is necessary to amend legislation on the ecodesign of products and introduce durability, repairability and reusability criteria. This article analyses the origins and evolution of ecodesign legislation, as well as the challenges that the circular economy poses to this legislation, pointing out the main limits and regulatory changes that should be considered.

KEYWORDS: Circular economy – durability – ecodesign – product law – repairability.

[1] This article is a translated and updated version of a previous one published by the author in the book *Redondear la economía circular: del discurso oficial a las políticas necesarias*, ed. Alba Nogueira López and Xavier Vence (Thomson Reuters Aranzadi, 2021).

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1. Introduction

Our economic system promotes a linear model of production and consumption based on the extraction of natural resources and mass production of products, which are subsequently consumed and discarded as waste. Growth policies encourage the demand for more and more products, so that a country's economy grows when its consumption and production increase.[2]

However, natural resources are limited, so the need for more efficient use has long been evident. The European Union (EU) has expressed this view since the publication of the *Roadmap to a Resource Efficient Europe*[3] and more decisively in recent years through the circular economy strategy.[4]

In 2015, the Commission launched the EU's first action plan for the circular economy, with the aim of promoting an economy in which the value of products, materials, and resources is maintained for as long as possible, and in which generated waste is minimised. This first planning instrument was accompanied by several legislative proposals that were ultimately embodied in a package of waste directives approved in 2018, which sought to advance the implementation of the waste hierarchy.[5]

However, a broader concept of the circular economy should not only include waste policies but should also extend to all phases of a product life cycle. The design phase should be especially addressed, as it is estimated that more than 80% of the environmental impacts of products are determined at this stage.[6]

It is necessary to rethink the ecological design of products and promote its implementation according to the new paradigm of the circular economy, as proposed by the EU second Action Plan for the Circular Economy.[7] Products must be designed to maximise their lifespan, for which it is necessary to act jointly in three crucial areas: combating planned obsolescence, ensuring the right to repair products, and promoting their reuse.

The development of legislation on ecodesign is a natural consequence of the principles of prudent and rational utilisation of natural resources[8] and prevention, both enshrined in Article 191 TFEU as guiding principles of European environmental law. The famous environmental axiom expresses the need for this approach: "*Environmental pollution is an incurable disease. It can only be prevented […],*"[9] *a warning that includes a less well-known but particularly relevant second part: "And prevention can only take place at the point of production.*"

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[2] Adriana Norma Martínez and Adriana Margarita Porcelli, "Un difícil camino en pos del consumo sustentable: el dilema entre la obsolescencia programada, la tecnología y el ambiente", *Lex: Revista de la Facultad de Derecho y Ciencia Política de la Universidad Alas Peruanas*, v. 14, no. 18 (2016): 333-378.

[3] European Commission, *Roadmap to a Resource Efficient Europe*, COM (2011) 0571.

[4] European Commission, *Closing the loop - An EU action plan for the Circular Economy*, COM (2015) 614 final.

[5] Beltrán Puentes Cociña, "An Analysis of the Circular Economy Legislative Package: A New Paradigm vs The Old Waste Law", in *Environmental Law for Transitions to Sustainability*, ed. Marlon Boeve et al. (Intersentia, 2021).

[6] European Commission, Directorate-General for Energy, Directorate-General for Enterprise and Industry, *Ecodesign your future – How ecodesign can help the environment by making products smarter* (2012).

[7] European Commission, *A new Circular Economy Action Plan For a cleaner and more competitive Europe*, COM (2020) 98 final.

[8] Principle that in domestic law is configured as a constitutional mandate addressed to the public authorities (Article 45 of the Spanish Constitution).

[9] Barry Commoner, "What is Yet to be Done", *New Solutions: A Journal of Environmental and Occupational Health Policy*, v. 8, no. 1 (1998): 75-87.

The circular economy strategy has emerged in recent years driven mainly by the EU – although not only –[10] with the aim of transforming current production and consumption patterns. If, until now, public policies had been concerned only with managing the excessive amount of waste generated by a consumerist society, the circular economy seeks to overcome this approach and proposes a paradigm shift towards a model based on reducing the use of new materials, reusing and valorising products and materials.[11] In the field of production, it is essential to establish clear ecodesign standards that oblige manufacturers to conceive more durable, easy-to-repair, and reusable products: more circular products.

2. Legislation on ecodesign

2.1. Origin and evolution of the legislation on ecodesign

EU and Member States' product policies over the past few decades have focused on managing the end-of-life of products. In the last 30 years, extensive waste legislation has been developed, which was still widely reformed in 2018 to promote a greater implementation of the waste hierarchy principle and introduce the principles of the circular economy.[12] However, this latest reform made it clear that waste legislation cannot address the more ambitious challenges of the circular economy strategy, which are focused on prevention, reducing the consumption of new materials, and acting on the early stages of the production cycle, especially in product design.

Product ecodesign policies are much more recent. The concept was incorporated into the EU's policy framework with the *Green Paper on Integrated Product Policy*,[13] a programmatic document stating that ecodesign should be promoted among companies to make products more environmentally friendly, while consumers should favour such products and use them in a way that increases their lifespan and reduces their environmental impact. This strategy was developed in the Communication on *Building on Environmental Life-Cycle Thinking*,[14] which proposed analysing the life cycle of products with the aim of reducing their cumulative environmental impacts (from conception to disposal).

The concept was incorporated into legislation with the approval of Directive 2005/32/EC of the European Parliament and of the Council, of 6 July 2005,

[10] See China's circular economy policies. The Asian country was the first world power to use the concept of circular economy, although with a different approach to the European one. A chapter dedicated to circular economy was included in China's Five-Year Plan No. 11 (2006-2010) and the Circular Economy Promotion Law was passed in 2008. *Vid.* Emilio Cerdá and Aygun Khalilova, "Economía circular", *Economía industrial*, no. 401 (2016): 11-20.

[11] The disruptive nature of the circular economy concept with respect to the old waste policies and the transformation it implies for production and consumption patterns was addressed, among others, by Kirchherr, Reike and Hekkert, "Conceptualizing the circular economy: an analysis of 114 definitions", *Resources, Conservation & Recycling*, no. 127 (2017): 221-232; Leandro Javier Llorente-González and Xavier Vence, "Decoupling or 'Decaffing'? The Underlying Conceptualization of Circular Economy in the European Union Monitoring Framework", *Sustainability*, v. 11, no. 18 (2017); Ghisellini, Cialani and Ulgiati, "A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems", *Journal of Cleaner Production*, no. 114 (2016): 11-32.

[12] René Javier Santamaría Arinas, "Aproximación jurídica a las medidas de la Unión Europea para la economía circular", *Ambienta*, no. 117 (2016): 36-45.

[13] European Commission, *Green Paper on Integrated Product Policy*, COM (2001) 0068 final.

[14] European Commission, *Integrated Product Policy - Building on Environmental Life-Cycle Thinking*, COM (2003) 0302 final.

establishing a framework for the setting of ecological design requirements applicable to energy-using products. This law was amended on several occasions and finally recast in the current Directive 2009/125/EC of the European Parliament and of the Council, of 21 October 2009, establishing a framework for the setting of ecological design requirements applicable to energy-related products (hereinafter, the Ecodesign Directive).

Ecodesign is a relatively recent concept still in a phase of construction and development. Its emerging significance, as a fundamental part of product legislation, is due to several general trends in European environmental law.

On the one hand, it is consistent with the evolution that has occurred in the object of environmental law, which has rapidly developed extensive product legislation in recent times.[15] The production and consumption rates of contemporary societies have made it necessary to focus on new challenges and risks for environmental destruction that go beyond the mere need for the conservation of the natural environment or the control of polluting activities (typically industrial). In this sense, the large quantity and variety of products currently being put on the market make it necessary not only to control the externalities that occur in the industrial production phase itself (e.g., polluting emissions) but also to eradicate the adverse effects on the environment that products have throughout their life cycle and to limit the massive consumption of resources that occurs in the current extractive economic model.

The development of ecodesign products responds to the great potential of this instrument: its preventive approach. In previous stages, environmental policies have tended to focus on correcting damage, and the regulatory instruments developed have had a rather reparative character (requiring liability for environmental damage). Regulatory instruments or *command and control* measures aimed at the prohibition, limitation, or control of polluting activities (emissions, discharges, waste generation, etc.) were also developed.

However, these policies seeking to mitigate the damage caused by industrial activities contained a kind of general authorisation to pollute within certain limits (those set by the applicable regulations). Finally, an obligation to repair the damage when these limits are exceeded, or to manage the negative externalities of these activities (typically waste).

This general trend is particularly visible in the field of products. Until recently, any product that did not pose a serious, direct, and obvious risk to human health or the environment was allowed to be placed on the EU Internal Market, with the only additional requirement of managing the end of its life cycle – i.e., the waste status. Thus, the first steps of European product legislation were directed at managing the waste condition (the first Waste Directive was adopted as early as 1975)[16] and regulating the presence of harmful chemicals for human health or the environment, through standards that were developed first by different Member States (from the 1960s onwards) and which, at the European level, were consolidated in the early 2000s. These standards were systematically established in 2006 in the Regulation on the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH).[17]

[15] Eléonore Maitre-Ekern, Carl Dalhammar and Hans Christian Bugge, *Preventing Environmental Damage from Products* (Cambridge: Cambridge University Press, 2018).

[16] Council Directive 75/442/EEC of 15 July 1975 on waste.

[17] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

However, this approach does not consider the environmental effects of the massive consumption of natural resources and commercialisation of products. The challenges posed by the enormous number of products put on the market need broader and more precise regulation of their manufacture. In this sense, an essential objective of the EU circular economy strategy is to regulate the design of products more strictly, beyond the presence of chemical substances or the end-of-life management. An objective that, in practice, involves the introduction of new ecodesign requirements focused on durability, the possibility of repair and reuse, ease of disassembly, or the availability of spare parts.

2.2. The development of the Ecodesign Directive

The Ecodesign Directive does not establish directly applicable design requirements, but rather creates a regulatory framework that can be subsequently developed by the European Commission. The latter carries out the task of regulatory development through various planning and regulatory instruments.

Regarding planning instruments, the Commission adopts multi-year Working Plans that determine the categories of products to be subject to priority regulation in that period and propose some regulatory measures that could be applied. In accordance with these plans, the Commission undertakes Preparatory Studies by product categories to independent consultants. These studies, made with the participation of various stakeholders (consumer associations, environmental NGOs, and the industry itself), analyse the main environmental, technical, and economic aspects of the products and propose a series of ecodesign measures.

Both the Work Plans and the Preparatory Studies are methods to precisely define the priorities and objectives of the European legislator, in addition to properly analysing the development of the ideas in this subtitle, which are more associated with the regulatory development of the Directive. The way the title reads, the author should talk more about what the Directive is about current legal situation and the regulatory instrument to be adopted. This planning task represents a relevant step prior to the legislative drafting process.[18]

Ultimately, regulatory acts are approved, which can be either regulations adopted by the Commission itself based on a draft prepared by a Consultative Forum composed of experts from various stakeholders (there are currently ecodesign regulations for 31 product categories) or voluntary agreements agreed upon by the parties involved under the impetus of the Commission.

In conclusion, the Ecodesign Directive constitutes a regulatory basis on which to base the ecodesign requirements, which are set for each specific category of products both by Commission regulations (in the preparation of which the participation of stakeholders is foreseen) and by self-regulatory mechanisms and voluntary agreements (led by the industry itself).

2.3. The first EU Action Plan for the Circular Economy (2015)

The first EU Action Plan for the Circular Economy, published in 2015 by the Commission, advanced some measures in the field of ecodesign, although the regulatory development of this plan has had little impact outside the scope of waste.

(REACH).

[18] Stefan Höfler, Markus Nussbaumer and Helen Xanthaki, "Legislative drafting", in *Legislation in Europe: a comprehensive guide for scholars and practitioners*, ed. Stefan Höfler et al. (Hart Publishing, 2017), 145-163.

The document referred to the need to review ecodesign regulation to adapt the product regulatory framework to the new circular economy strategy, although only two specific actions were contemplated: the introduction of new circular economy requirements in the development instruments of the Ecodesign Directive and the creation of economic incentives for ecodesign in collective extended producer responsibility systems.

2.3.1. Introduction of new ecodesign requirements

On the one hand, the inclusion of circular economy criteria in the development instruments of the Ecodesign Directive was proposed. A first step in this direction was the approval of mandatory design and marking requirements for electronic displays (flat panel computer screens and televisions), which was finally approved through Regulation (EU) 2019/2021. Apart from the requirements related to energy consumption, the Regulation also introduces circular economy requirements to facilitate repair, disassembly, and the availability of spare parts.

Furthermore, considering the process described in the previous section, further specification for the reference planning instrument in the field, the 2016-2019 Ecodesign Work Plan,[19] was postponed. This plan proposed the adoption of three instruments that were eventually adopted in the following years: a new Ecodesign Regulation for air heating and cooling products,[20] a Regulation on tolerances in verification to improve product testing and prevent fraud,[21] and a Recommendation establishing guidelines for self-regulation aimed at helping the industry to reach voluntary agreements.[22] However, none of these three instruments introduced any novelty in the field of the circular economy and requirements for durability, repairability, disassembly, or the availability of spare parts.

What did occur in this first 2015-2020 period was the approval in 2019 of a series of new ecodesign regulations for specific product categories, which will be commented on later.

2.3.3. Creation of economic incentives for ecodesign in the extended producer responsibility system

The second measure proposed by the 2015 Action Plan regarding ecodesign was the modification of the Extended Producer Responsibility (EPR) regime in order to create an economic incentive for manufacturers to design products that are easier to repair, reuse and recycle. Specifically, it was proposed to create a modulation of the financial contributions made by producers to collective responsibility systems based on the end-of-life costs of the products.

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[19] European Commission, *Ecodesign Working Plan 2016-2019*, COM (2016) 773 final.

[20] Commission Regulation (EU) 2016/2281 of 30 November 2016 implementing Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products, with regard to ecodesign requirements for air heating products, cooling products, high temperature process chillers and fan coil units.

[21] Commission Delegated Regulation (EU) 2017/254 of 30 November 2016 amending Delegated Regulations (EU) No 1059/2010, (EU) No 1060/2010, (EU) No 1061/2010, (EU) No 1062/2010, (EU) No 626/2011, (EU) No 392/2012, (EU) No 874/2012, (EU) No 665/2013, (EU) No 811/2013, (EU) No 812/2013, (EU) No 65/2014, (EU) No 1254/2014, (EU) 2015/1094, (EU) 2015/1186 and (EU) 2015/1187 with regard to the use of tolerances in verification procedures.

[22] Commission Recommendation (EU) 2016/2125 of 30 November 2016 on guidelines for self-regulation measures concluded by industry under Directive 2009/125/EC of the European Parliament and of the Council.

This measure was carried out in the review of the Waste Directives in 2018 that we have analysed in other works.[23] For the purposes of this article, Directive (EU) 2018/851 introduced a new Article 8a in the Waste Framework Directive (WFD) that requires Member States to adopt measures to ensure that, when producers opt for Extended Producer Responsibility (EPR) schemes, it is mandatory to offer incentives to producers to design their products in a way that makes them more durable and incorporates more options for repair, reuse, and recycling.

Until this reform, the link between EPR and product design was treated superficially and left to the discretion of the Member States. The previous wording of Article 8 WFD stated that "*Member States may take appropriate measures to encourage the design of products and components of products in order to reduce their environmental impact and the generation of waste*" (emphasis added). Now, the new Article 8a WFD establishes that "*Member States* ***shall take*** *the necessary measures to ensure that the financial contributions paid by the producer of the product to comply with its extended producer responsibility obligations: (…) b) in the case of collective fulfilment of extended producer responsibility obligations, are modulated, where possible, for individual products or groups of similar products, notably by taking into account their durability, reparability, re-usability and recyclability and the presence of hazardous substances, thereby taking a life-cycle approach*" (emphasis added).

The modulation of contributions to EPR systems can be a relevant step towards achieving more durable, repairable, and reusable products, and the reform could help overcome some criticisms received by an approach that "*helps to reduce costs but it lowers the ambition for the individual companies to develop more circular products: The company would have to bear the costs for design and production changes, while the benefits of the reduced end-of-life costs would be shared with all other companies in the market.*"[24]

Furthermore, this measure is in line with the essential idea of the EPR principle: creating ecological design incentives for manufacturers by establishing a link between product design and management costs.[25] On the other hand, the development of the EPR concept can be considered in the context of a general shift in environmental legislation and policy development "*from command and control towards instruments such as economic and informational tools, which leave more flexibility in how the set policy objectives are to be achieved.*"[26]

In this regard, the new version of the WFD also empowers the Commission to establish harmonised criteria ensuring uniform application in the different Member States. These criteria could modulate producers' contributions for each product or group of products in case of collective compliance with EPR obligations, in order to avoid distortions in the functioning of the Internal Market. Implementing acts should be adopted in accordance with the examination procedure provided for in Article 39(2) of the WFD.

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[23] Puente, *An Analysis of the Circular Economy Legislative Package*, 2021.

[24] Henning Wilts, Nadja Von Gries and Bettina Bahn-Walkowiak, "From Waste Management to Resource Efficiency–The Need for Policy Mixes", *Sustainability*, no. 8, 622 (2016): 12.

[25] Carl Dalhammar, "Extended Producer Responsibility', in *Principles of Environmental Law, Elgar Encyclopedia of Environmental Law Series*, eds. Ludwig Krämer and Emanuela Orlando (Edward Elgar, Northampton 2018), 208-218.

[26] Harri Kalimo, Reid Lifset, Chris Van Rossem, Atalay Atasu, Luc Vanwassenhove and Kieren Mayers, "Greening the Economy through Design Incentives: Allocating Extend Producer Responsibility", *European Energy and Environmental Law Review*, vol. 21, no. 6 (2016): 274.

Finally, the Implementation Report of the EU Action Plan for the Circular Economy was published in 2019.[27] This report presents a positive assessment of the measures implemented in the 2015-2019 period that we discussed. In this context, it was accompanied by a working paper on product policies[28] that analysed options for better articulating the various existing regulatory instruments on products at the EU level and their contribution to the circular economy. Among the proposals was the possibility of extending the application of the Ecodesign Directive to non-energy related products, which would be the subject of the second EU Action Plan for the Circular Economy approved in 2020.

2.4. The second EU Action Plan for the Circular Economy (2020)

The ecological design of products should be given greater prominence in the current mandate of the von der Leyen Executive, as it is one of the key parts of the second EU Action Plan for the Circular Economy,[29] approved as part of the much-publicised European Green Deal.[30]

The plan proposes ambitious objectives to implement the circular economy in the field of ecological design, including the proposal for a future revision of the Ecodesign Directive that expands its scope beyond energy-related products. However, the Commission did not accompany the plan with a legislative proposal (as it had done with the 2015 plan when it also presented a package of waste-related regulatory proposals).[31]

The document also proposes the introduction of new circular economy criteria in the Ecodesign Directive and its development regulations with the aim of promoting product durability, repairability, and reusability and updating capacity; addressing the presence of hazardous chemicals; intensifying energy and other resource efficiency; increasing the recycled content of products; enabling high-quality remanufacturing and recycling; reducing carbon footprint and ecological footprint; limiting the use of single-use products and countering premature obsolescence; prohibiting the destruction of durable goods that have not been sold; encouraging "*products as services*" or similar models in which producers retain ownership of the product or responsibility for its performance throughout its life cycle; mobilising the potential of digitising product information, incorporating solutions such as digital passports, labelling or digital watermarks; or rewarding products based on their different sustainability outcomes, for example by linking high-level performance to economic incentives.

The document shows some self-complacency in analysing how EU regulatory instruments contribute to the ecodesign of products consistent with the circular economy strategy. Although its future update is proposed, the plan mentions that the

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[27] European Commission, *Report on the implementation of the Circular Economy Action Plan*, COM (2019) 190 final.

[28] European Commission, *Sustainable Products in a Circular Economy. Towards an EU Product Policy Framework contributing to the Circular Economy*, SWD (2019) 91 final.

[29] European Commission, *A new Circular Economy Action Plan. For a cleaner and more competitive Europe*, COM (2020), 98 final.

[30] European Commission, *European Green Deal*, COM (2019) 640 final.

[31] Later on, the European Commission approved a Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC [COM(2022) 142 final], as part of a Sustainable Products Initiative.

Ecodesign Directive already successfully regulates some features of product circularity, whereas these elements had hardly been addressed until the adoption of the most recent Ecodesign Regulations.

3. The challenges of ecological design in the circular economy strategy

Ecological design has been defined as the process of designing a product that considers the overall environmental impact of the product throughout its life cycle, including its end of life, and strives to minimise that impact through improved product design.[32]

In the same vein, Article 2 of the Ecodesign Directive defines "*ecological design*" as the integration of environmental aspects in the design of the product to improve its environmental performance throughout its life cycle, with "*product design*" being the set of processes that transform the legal, technical, safety, functional, market, or other requirements that the energy-using product must meet in the technical specification.

Based on the definition of ecological design, it is worth asking whether we can speak of "*circular design*" of products and which new elements it can introduce. This concept of circular design, which already appears cited in some documents and reports related to the circular economy,[33] can be defined as the process of ecologically designing the product that particularly integrates those environmental aspects that promote the extension of the product's life cycle, to improve the environmental performance of the product and especially the conditions of durability, repairability, and reusability. These three would be thessentiall elements that ecological product design should enhance within the framework of the circular economy strategy.

3.1. Product durability and measures against planned obsolescence

The durability of a product may be related to a variety of factors, but there is undoubtedly one decisive element that transcends them all: the producer's decisions. It is naive to think that the lifespan of a product depends on factors beyond one's control, such as luck or the wear of its materials because the reality is that it is always the result of business choices.[34]

The issue of product durability is inextricably linked to the issue of planned obsolescence: companies design products with a limited duration, thus forcing consumers to replace them more quickly than they would have wanted or needed.[35]

Planned obsolescence can be defined as the intentional production of goods and services with a limited lifespan in such a way that consumers are encouraged to repeat their purchases too frequently[36] and can be due to technological or aesthetic reasons. In the latter case, we speak of psychological obsolescence, as it is more related to the consumer's feeling and stimuli from advertising campaigns than with the defects that the product itself may have, which is why it has also been called

[32] C. Luttrop and J. Lagerstedt, "EcoDesign and the Ten Golden Rules: generic advice for merging environmental aspects into product development", *Journal of Cleaner Production*, no. 16 (2006): 1396-1408.
[33] *Vid.* Circle Economy, *The circularity gap report* (2021).
[34] Mariateresa Maggiolino, "Planned Obsolescence: A Strategy in Search of Legal Rules", *International Review of Intellectual Property and Competition Law*, no. 50 (2019): 405-407.
[35] Jurgita Malinauskaite and Fatih Bugra Erdem, "Planned obsolescence in the Context of a Holistic Legal Sphere and the Circular Economy", *Oxford Journal of Legal Studies*, vol. 41, no. 3 (2021): 1-31.
[36] Bernard London, *Ending the Depression Through Planned Obsolescence* (University of Wisconsin, 1932).

"*forced fashion*".[37] This type of obsolescence would require greater efforts in terms of information obligations, consumer awareness campaigns, or even prohibitions on certain promotions that companies use to encourage the mass marketing of their products.

In this article, due to its special connection with product design, we focus on the first assumption, technological obsolescence induced through product design in such a way that its use is only allowed for a certain period or on a certain number of occasions. This assumption also includes the difficulties for repair created by the manufacturer or software updates that render the device unusable.

European regulations are clearly insufficient, and the EU circular economy strategy does not seem to address the problem with due depth, so it is necessary to adopt stricter measures that prohibit planned obsolescence. The first Action Plan barely mentioned the willingness to finance an independent testing program to detect practices of planned obsolescence, and the 2020 Plan only refers to the need to "*counteract premature obsolescence*" as one of the objectives to be achieved in a future reform of the Ecodesign Directive which, as we have stated, has not yet been promoted.

So far, three types of measures have been adopted to overcome technological obsolescence and enhance product durability: the classification of planned obsolescence as a criminal offence in France, the revision of European consumer protection regulations, and the introduction of new circular economy requirements through the most recent ecodesign regulations.

3.1.1. Classification of planned obsolescence as a criminal offence

The classification of planned obsolescence as a criminal offence and the provision of a penalty with a high number of fines had a great impact when it was approved, already in August 2015, as a prelude to the Paris Climate Summit, by Law 2015-992 of August 17, on Energy Transition for Green Growth. The law incorporated into the French Consumer Code, the penalisation of planned obsolescence of products, defined as a process whereby a trader deliberately seeks to reduce the life cycle of a product to increase its replacement rate.[38] The law provides for fines of up to 300,000 euros and two years imprisonment.

This roadmap marked by the French legislator has not been followed by the European institutions despite the social pressure that exists to combat planned obsolescence, especially from consumer associations and environmental associations. The political power of the EU has been reluctant to regulate a matter that may be contrary to the economic interests of the industry.

3.1.2. The reform of the European legislation on consumer protection: the new Directive (EU) 2019/771

Consumer guarantees and the durability conditions of goods were strengthened with the approval of Directive (EU) 2019/771 on the sale of goods,[39] although the

[37] Paul M. Gregory, "A Theory of Purposeful Obsolescence", *Southern Economic Journal*, vol. 14, no. 1 (1947).
[38] Currently, Article L441-2 of the Consumer Code, following the amendment operated by Ordinance No 2016-301 of March 14, 2016.
[39] Directive (EU) 2019/771 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the sale of goods, amending Regulation (EU) 2017/2394 and Directive 2009/22/EC, and repealing Directive 1999/44/EC.

reform was not as ambitious as might have been expected from positions more favourable to consumer and environmental protection.

Article 7, in regulating the objective conformity requirements between seller and buyer, prescribes that goods subject to sale will have the characteristics, particularly regarding durability, functionality, compatibility, and safety, which goods of the same type normally present, and which the consumer can reasonably expect, given the nature of the goods and taking into account any public statements made by the seller in previous stages of the transaction chain, especially in advertising or labelling. This introduces durability as a new and "*promising criterion of conformity not contemplated in the previous Directive 1999/44/EC*"[40] although the same author adds that the definition of the concept of durability is quite concise "*in that it makes no mention of the passage of time.*"

On the other hand, both the two-year warranty period and the one-year period from the delivery of the goods during which any lack of conformity will be presumed to have existed at the time of delivery of the goods have been maintained, with the burden of proof being assigned to the seller to demonstrate otherwise. The opportunity to set a longer period in general or an extended period for certain categories of non-perishable products has been missed, although the possibility is considered that Member States may substitute the mentioned deadlines for a higher period, without limitation in the case of warranties and for a maximum period of two years in the case of the reversal of the burden of proof.

Finally, the possibility for the consumer to choose between the repair or replacement of the goods with non-conformities is also maintained. This solution is contrary to the environmental requirements of the circular economy, as it equates two options – repair and replacement –, which have very different implications for the rational use of resources. While repair simply corrects any defect the device may have, the replacement of the goods involves the delivery of a completely new product by the seller and therefore, a greater consumption of resources.

3.1.3. The introduction of ecodesign requirements related to durability

Although the above incentives for the manufacture of products that respect a minimum life span are interesting, and whilst we could discuss negative incentives for the programming of products that become obsolete after a certain period of time or after a certain number of uses, the measures discussed in the previous sections are not the appropriate means to address the problem of planned obsolescence. Both sanctions and the obligation to repair the device during the warranty period are elements that should motivate better design by the manufacturer, but it is difficult to control *ex post* – at a later stage of the process –, when the damage has already been caused, in which cases malpractice has been carried out.

In this sense, the assertion made in Recital 32 of Directive (EU) 2019/771 on the sale of goods regarding its complementary nature with respect to product legislation is interesting, as it is configured as the most appropriate means to introduce durability requirements:

> "*Ensuring longer durability of goods is important for achieving more sustainable consumption patterns and a circular economy. Similarly, keeping non-compliant products out of the Union market by strengthening market surveillance and providing the right incentives to economic*

[40] Mónica García Goldar, "Propuestas para garantizar modalidades de consumo y producción sostenibles (ODS 12)", *Revista De Fomento Social*, no. 299 (2021): 91-114.

> *operators is essential in order to increase trust in the functioning of the internal market. For those purposes, product-specific Union legislation is the most appropriate means of introducing durability and other product-related requirements in relation to specific types or groups of products, using for this purpose adapted criteria. This Directive should therefore be complementary to the objectives pursued in such Union product-specific legislation, and should include durability as an objective criterion for the assessment of conformity of goods.*"

It is therefore considered that the greatest possibilities of achieving a real paradigm shift lie in adapting ecodesign requirements to the circular economy model through the introduction of clearer requirements for the durability and repairability of products. In this area, the first steps have been taken with the approval of several development regulations of the Ecodesign Directive passed in 2019, which incorporate the perspectives of the circular economy into ecodesign requirements.[41]

Most of these regulations have been partially modified with the recent Regulation 2021/341, which can serve as an example of the direction in which ecodesign parameters are advancing within the framework of the circular economy. In this sense, the same requirement is introduced in several of the regulations approved in 2019 (specifically, those for domestic refrigeration appliances, light sources, electronic displays, dishwashers, and washing machines) to prevent firmware or software updates or their rejection from having a negative impact on product performance, a matter that often leads to premature obsolescence of the device. The text of the introduced norm is eloquent:

> "*The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No performance change shall occur as a result of rejecting the update.*
>
> *A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.*"[42]

3.2 The right to product repair

A second element to consider in the ecological design of products is repairability. This is one of the conditions that most directly affects the lifespan of products: repair allows for the extension of a product's life, while the inability to repair is a strategy used by manufacturers to limit the duration and shorten the lifespan of products.

[41] Regulation (EU) 2019/424 of 15 March 2019 laying down ecodesign requirements for servers and data storage products; Regulation (EU) 2019/1781 of 1 October on electric motors and variable speed drives; Regulation (EU) 2019/1782 of 1 October on external power supplies; Regulation (EU) 2019/1783 of 1 October on small, medium and large power transformers; Regulation (EU) 2019/1784 of 28 October on welding equipment; Regulation (EU) 2019/2019 of 1 October on refrigeration appliances; Regulation 2019/2020 of 1 October on light sources and separate control gears; Regulation (EU) 2019/2021 of 1 October on electronic displays; Regulation (EU) 2019/2022 of 1 October on household dishwashers; Regulation (EU) 2019/2023 of 1 December on washing machines and household washer-dryers; and Regulation (EU) 2019/2024 of 1 October on refrigeration appliances with a direct sales function.

[42] Commission Regulation (EU) 2021/341 of 23 February 2021 amending Regulations (EU) 2019/424, (EU) 2019/1781, (EU) 2019/2019, (EU) 2019/2020, (EU) 2019/2021, (EU) 2019/2022, (EU) 2019/2023 and (EU) 2019/2024 with regard to ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function.

In this regard, the EU Action Plan for the Circular Economy (2020) states that "*the Commission will work towards establishing a new 'right to repair' and consider new horizontal material rights for consumers for instance as regards availability of spare parts or access to repair and, in the case of ICT and electronics, to upgrading services*".

Several conditions can hinder the right to product repair,[43] including the impossibility of disassembly or difficulty in finding replacement parts. Regarding this second issue, the Directive on the Sale of Goods provides that sellers may use spare parts to fulfil their repair obligations in case of non-conformity at the time of delivery. The Directive does not require sellers to guarantee the availability of spare parts for a specified period as an objective conformity requirement, which represents a significant waiver by the European legislator in terms of regulating the obligations to be imposed on sellers of products placed on the Internal Market. However, this obligation has been addressed by the 2019 Ecodesign Regulations, which establish a 10-year period for the availability of spare parts.

Another relevant issue is the Commission's renunciation of limiting the marketing of products that cannot be disassembled and cannot therefore be repaired, which the Commission's[44] services have highlighted as a particularly relevant obstacle to advancing towards a true circular economy, for example, in the field of luminaires:

> "*The Energy label for luminaires provides information to consumers about the possibility of removing the contained light source, but this is not enough to avoid unwanted waste because non-dismountable products hamper replacement and recycling.*
>
> *The problem is even bigger when considering all the non-dismountable furniture products containing a light source (e.g. shelves, mirrors, etc.).*
>
> *The current regulations impose ecodesign requirements on light sources wherever they are contained. But in practice MSAs may not be able to test them because they cannot access them. In practice, those light sources cannot always be monitored, and this creates an unfair level playing field compared to the same light source type which is accessible (e.g. because it is sold separately).*
>
> *Addressing the issue of non-dismountable luminaires, and other products containing light sources, would help the development of products that are dismountable, and thus reparable, better recyclable and with the option to replace the contained light source. This will contribute to a Circular Economy*".[45]

Recently, it was reported that the Spanish Ministry of Consumer Affairs is developing a Repairability Index, a new consumer information tool that will classify electrical or electronic products on a scale of 1 to 10 based on criteria such as the ease of dismantling the device, the availability of spare parts, the information provided by the manufacturer for repair or assistance, and the ease of software restart. The initiative aims to help consumers make better purchasing decisions, combat planned obsolescence, and promote the circular economy. This initiative follows in the footsteps of France, which implemented this system[46] in January 2021, in compliance with Article 16-I of Law 2020-105 on the fight against

[43] Sahra Svensson, Jessika Luth Richter, Eléonore Maitre-Ekern, Taina Pihlajarinne, Aline Maigret and Carl Dalhammar, "The Emerging 'Right to Repair' legislation in the EU and the U.S.", (paper presented at Going Green Care Innovation, Vienna, November 26-29, 2018).

[44] European Commission, "Commission Staff Working Document – Impact Assessment", Brussels, 1.10.2019, SWD(2019) 357 final.

[45] European Commission, "Commission Staff Working Document – Impact Assessment", 13.

[46] The Repairability Index is available on: https://www.ecologie.gouv.fr/indice-reparabilite.

waste and a circular economy[47] and in clear harmony with the recommendations of the European Parliament.[48]

3.3. The capacity for product reuse and recycling

Here we refer to the operations of "*preparation for reuse*" and "*recycling*" contemplated by the WFD and other waste legislation. These are operations on products that have acquired the status of waste, that is, actions for managing the end of the life cycle.

In this sense, it is worth differentiating between "*preparation for reuse*", an operation carried out on waste to remove the product from its waste status, and mere "*reuse*," a concept not defined in community regulations that involves extending the life cycle of a product without it becoming waste (in the jargon of the WFD, it falls within the scope of "*prevention*").

In practice, reuse occurs when a product changes ownership, either through donations or in second-hand stores, thus extending the life of the device. Issues related to the application of consumer regulations that may arise from such practices go beyond the scope of this work, so we will refer exclusively to the "*preparation for reuse*" of waste.

Of interest here, the design of a product conditions and limits the possibilities of reusing or recycling a product, which is why the impacts related to the end-of-life phase should be considered when planning or designing them. This can be inferred from a combined reading of the Ecodesign Directive, the WFD, and other waste directives, as highlighted by Svensson and Dalhammar[49] in the interconnection between the Ecodesign Directive and the Directive on Waste Electrical and Electronic Equipment.

The WFD regulates both operations together, setting common objectives for preparation for reuse and recycling. The regulatory reform of the bulk of the Waste Directives carried out in 2018 was not used to introduce differentiated objectives for preparation for reuse, as we had the opportunity to comment[50]. This is why we once again see how environmentally preferable objectives are relegated when legislating on products. It is worth recalling that preparation for reuse is a much more beneficial operation in terms of the environment and resource consumption, which is why the WFD places this operation at the top of the waste hierarchy, preceded only by prevention (an operation that, as mentioned, is not carried out on waste but in the design and use phases of products to extend their life and prevent them from becoming waste).

Abandoning the possibility of introducing differentiated objectives for preparation for reuse, in the reform of waste regulations in 2018 – the result

[47] Loi n° 2020-105 du 10 février 2020 relative à la lutte contre le gaspillage et à l›économie circulaire [JORF nª 0035 du 11 février 2020].

[48] Report on the theme "Towards a more sustainable single market for businesses and consumers" (2020/2021(INI)) of the Committee on Internal Market and Consumer Protection of the European Parliament of 3.11.2020 [Rapporteur: David Cormand].

[49] S. Svensson and C. Dalhammar, "Regulating Recyclability under the Ecodesign Directive", in *Preventing Environmental Damage from Products*, ed. Maitre-Ekern, Dalhammar and Bugge (Cambridge University Press, 2018), 229-252.

[50] Beltrán Puentes Cociña, "Gestión y prevención de Residuos de Aparatos Eléctricos y Electrónicos (RAEE): una propuesta para promover la economía circular", *Actualidad Jurídica Ambiental*, no. 84 (2018); and Beltrán Puentes Cociña, *An Analysis of the Circular Economy Legislative Package*, 2021.

of the first circular economy legislative package – we find only one interesting measure regarding the ecological design of products: the introduction of incentives for ecological design in extended producer responsibility systems, through the obligation to establish modulations in the contributions of different producers based on the ecological design measures adopted for the products they place on the market (see above, section V.1).

4. Limits of the legislation on ecological design

The legislative framework on the ecological design of products faces several limitations related to the legal basis, the scope of application, the purpose of regulation, and the role of self-regulation.

4.1. Legal basis

Firstly, European standards on the ecological design of products have not been enacted based on the EU's environmental competencies (Article 192 of the TFEU) but in accordance with Articles 114 and 194 of the TFEU. The former refers to "*the approximation of laws, regulations, and administrative provisions of the Member States relating to the establishment and functioning of the internal market,*" serving as the basis for the harmonisation of national laws, while Article 194 stipulates that the Union's energy policy shall aim, among other things, to promote energy efficiency and energy saving.

This can lead, on the one hand, to a discouraging effect on innovation policies in the circular economy, as the most innovative and beneficial solutions in terms of circularity can be limited by the demands for harmonisation at the European level. On the other hand, the absence of sufficient grounds to promote material use efficiency policies is also evident, which would find better accommodation in Article 192 and, by reference to the latter, in the principle of prudent and rational use of natural resources enshrined in Article 191.

However, Article 114(2) of the TFEU provides that when the adopted rules concern environmental issues, a high level of protection will be promoted. In this regard, "*positive harmonisation*" (defined as the establishment of common standards that replace or coordinate national regulations, as opposed to "*negative harmonisation*" which would imply merely removing barriers to trade) can also have positive effects for better integrating environmental considerations into product policy.[51]

4.2. Scope of application

Moreover, we must consider that the ecological design requirements established under the Ecodesign Directive framework are only applicable to certain energy-related products covered in the various applicable product categories. This concept includes products that use, generate, transfer, or measure energy – typically, appliances –, and products that, although they do not directly use energy, can contribute to significant energy savings during their use, such as products used in construction, like windows, insulation materials, or some water-related products, like faucets or showerheads.

The Ecodesign Directive provides in Article 21 that the Commission, when reviewing the application of the standard, will assess the desirability of expanding its scope to non-energy-related products and, as appropriate, will submit reform

[51] Maitre-Ekern, Dalhammar and Bugge, *Preventing Environmental Damage from Products*, 11.

proposals to the European Parliament and the Council. In this sense, the 2020 Action Plan fort the Circular Economy contemplated the adoption of legislative initiative to expand the scope of the Ecodesign Directive beyond energy-related products, so that the ecological design framework is applicable to the widest possible range of products and fosters circularity. In this regard, the Commission has recently approved a Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC [COM(2022) 142 final].

4.3. Purpose of regulation

Another important limitation is that the ecological design requirements approved in the last 15 years under the Directive have largely been aimed solely at improving the energy performance of appliances. Thus, the implementing regulations of the Ecodesign Directive for the different product categories have focused on establishing energy efficiency requirements. It is worth noting that Article 1 of the Directive, when establishing the purpose of the standard and its contribution to environmental goals, only mentions that the standard "*contributes to sustainable development by increasing energy efficiency and the level of environmental protection, while increasing the security of energy supply.*"

Meanwhile, other aspects more related to the circular economy – durability, reusability, reparability, availability of spare parts, or ease of disassembly – have systematically been left out of the ecological design requirements until recently. This is a reality that has begun to change with the impetus of the circular economy strategy and the changes introduced by the latest ecodesign regulations approved in 2019 but which, in any case, will need to be effectively implemented in future reforms of the Ecodesign Directive[52] and increase its ambition in the new regulations adopted for the various product categories.

4.4. The role of self-regulation and industry interests

It is important to consider the decisive role played by self-regulation mechanisms in product design, as EU legislation is based on a criterion of minimal intervention and considers self-regulation by the industry itself as a priority course of action "*[…] likely to deliver the policy objectives faster or in a less costly manner than mandatory requirements*" (Recital 18 of the Ecodesign Directive). This model has received criticism questioning the scope of a transition to the circular economy framed in a context of neoliberal environmental governance that relies on the private sector.[53]

In practice, most product design and manufacturing features are regulated through standards approved by various standardisation agencies, of which manufacturers themselves are part (ISO[54] at the international level or CEN[55] and

[52] In this regard, the European Commission has approved a Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC [COM(2022) 142 final] on 30 March 2022, as part of a Sustainable Products Initiative.

[53] Andrew Flynn and Nick Hacking, "Setting standards for a circular economy: a challenge too far for neoliberal environmental governance?", *Journal of Cleaner Production*, no. 212 (2019): 1256-1267; Alba Nogueira López, "Cuadrar el círculo: el complejo equilibrio entre el impulso de la economía circular y unas reglas de mercado expansivas*", InDret, revista para el Análisis del Derecho*, no. 3/19 (2019).

[54] International Organization for Standardization.

[55] European Committee for Standardization.

CENELEC[56] at the European level). The very nature of standards implies that they are voluntary, binding only those parties that wish to adopt them.

Among the different interests that may motivate the development of standards, economic interests undoubtedly play a very relevant role above other environmental or social aspects, as access to certification and the distinctive standardisation norms allow companies to increase their market positioning, constituting an operation of green marketing.[57] This system has also been criticised for its potential to promote a truly innovative vision of the circular economy through standards in this neoliberal governance.[58] In this regard, the same authors emphasise the need for policies such as standardisation to challenge existing neoliberal market relationships rather than simply follow them.

There is a phrase often attributed to Otto von Bismarck (though it is originally from the American poet John Godfrey Saxe) that defines the subject of this work well: "*Laws, like sausages, cease to inspire respect in proportion as we know how they are made.*" As we delve into the process of developing ecodesign standards, we discover that the legislator's reasons are not as consistent with their statements as one might think and, in many cases, are driven by hidden interests of the manufacturing industry. Ecodesign requirements still lack the necessary ambition today to promote a more rational use of natural resources and, ultimately, greater environmental protection.

The latest regulatory reforms driven under the framework of the circular economy strategy are no exception. After the analysis carried out in previous sections, we observe that the approved ecological design requirements are like sausages: as we come to know how they have been made and what standards they integrate, they lose their appetising charm. Many of the product ecological design standards respond to the interests of a strong industrial sector consistently organised in pressure groups, which has managed to lower the environmental requirements of several of the latest approved regulations, while the objective of making the products placed on the Union market more circular (durable, resistant, repairable, and reusable) has occasionally been relegated to the background.

5. Conclusion

The analysis of the regulatory changes that have occurred in recent years in the EU leads us to conclude that the ecological design of products is a legislative sector that is undergoing a process of evolution and development. The circular economy strategy has provided a decisive impetus for the necessary review of ecodesign legislation, with the aim of introducing new requirements for product durability, reparability, disassembly, availability of spare parts, and reuse. However, the ambitious goals do not always correspond to the progress of the reforms.

A first limitation detected is the legislative basis on which ecodesign policies are based (the development of the Single Market and the removal of barriers to trade, Article 114 TFEU), although, as mentioned, there is sufficient basis in Articles 191-192 TFEU to develop ecodesign criteria that respond to purely environmental

[56] European Committee for Electrotechnical Standardization.

[57] Pilar Dopazo Fraguío, "Eco-innovación en procesos y productos: eco-diseño", *Revista Aranzadi de Derecho Ambiental*, vol. 17, no. 1 (2010).

[58] Flynn and Hacking, *Setting standards*, 2019; Alba Nogueira, "Cuadrar el círculo: el complejo equilibrio entre el impulso de la economía circular y unas reglas de mercado expansivas", *InDret, revista para el Análisis del Derecho*, no. 3/19 (2019).

objectives. Furthermore, in future treaty revisions, it might be interesting to include the circular economy and ecodesign among the guiding principles of EU economic and environmental policies.

Secondly, we note that the development of the circular economy strategy highlights the need to regulate in more detail the ecological design of products, which could result in what we have coined as circular product design. It is necessary to introduce the main requirements of the circular economy (durability, reparability, disassembly, reuse, availability of spare parts, obligations to provide information to independent repairers, etc.) in the ecodesign legislation, starting with a review of the Ecodesign Directive that extends both its scope of application beyond energy-related products and its purpose beyond the energy efficiency of products.[59] In this sense, the regulations that develop the Directive for the various product categories are the key instrument in the matter, although they have not yet been adopted with the necessary degree of ambition (as we have seen with several of the regulations adopted in 2019).

Finally, we consider that many of the reforms that can be considered in the field of ecological design, the fight against planned obsolescence, and the reparability of products are limited by the prevalence of economic interests of manufacturers over environmental protection objectives. Some relevant examples that we have brought up include the reluctance of European institutions to legislate against planned obsolescence, the equivalence made by the Sales of Goods Directive between product replacement and repair, the lack of incorporation in this Directive of an obligation to provide spare parts by sellers, or the waiver to develop ecodesign requirements to ensure the ease of disassembly of some electrical and electronic devices.

These considerations lead us to conclude that there is still a long way to go in the field of product ecodesign. However, the implementation of the circular economy strategy and the future review of ecodesign legislation proposed by the Commission, with the aim of introducing circularity parameters, are elements that, if approved with due ambition, suggest a change of model towards a new circular product design.

[59] In this regard, the European Commission has approved a *Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC* [COM(2022) 142 final].