European Liberal Forum
PUBLICATIONS

Policy Paper
October 2024

Developing Policies for a Smart and Inclusive Circular Transition in Europe

Abstract

The transition towards a circular economy (CE) relies on a supporting policy framework. The EU is currently recognised as a global leader in climate action and has adopted a comprehensive policy package to reach the objectives set out in its Circular Economy Action Plan. This paper examines current and planned CE policies, their key impact on industries – with a focus on established manufacturing industries – and where additional policy interventions are needed. It is recommended that the EU strengthens its policy framework in several areas, including the adoption of CE targets, product policy and law, standardisation, waste law, public procurement, and industrial policy. EU Member States can support the developments through complementary policies.

Carl Dalhammar
Associate Professor at IIIEE, Lund University

Mattias Lindahl
Professor at the Department of Management and Engineering, Linköping University

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Developing Policies for a Smart and Inclusive Circular Transition in Europe

1. Introduction

Humanity is facing multiple sustainability challenges, including climate change, biodiversity loss, rising waste levels, and resource depletion, all linked to our unsustainable production and consumption patterns. Traditionally, environmental policies have been siloed, but it is now clear that these challenges are interconnected. For instance, resource extraction and processing contribute to over 90% of biodiversity loss and water scarcity and about 50% of climate impacts globally (International Resource Panel 2019).

Our economic system consumes resources at a rate that drives growth of waste levels, with municipal waste expected to rise from 2.1 billion tonnes in 2023 to 3.8 billion tonnes by 2050 (United Nations Environment Programme 2024). Many products have shorter lifespans than they used to [1] or are barely used at all – textiles are often worn just 7–10 times (Ellen MacArthur Foundation 2021). "Product destruction", where new, unsold items are destroyed without ever being used, is common for both cheap and expensive textiles as well as electronics (Roberts, Milios et al. 2023).

Recycling rates for most materials remain low, even in advanced countries.[2] Much of what is today labelled as recycling is actually "downcycling", where material value and quality are lost due to poor management and flawed processes, especially for steel, aluminium, and plastics (Material Economics 2020).

Over the past 20 years, Europe has made significant progress in climate policy, with ambitious targets and pioneering policies such as the EU's Emission Trading Scheme (EU-ETS). [3] Yet, there are several reasons to expect that the climate transition will also affect resource use. Firstly, the climate transition requires minerals for grid components, such as batteries and electric vehicles (International Energy Agency 2021, Michaux 2021), which could create a resource problem. Additional mining may be required, leading to stakeholder conflicts. Circular economy (CE) strategies – such as extending product lifespans and improving recycling – can reduce the need for new resources (Raghavan, Nordelöf et al. 2023). In cases of scarce mineral deposits, innovation in material technology, including substitution, will be essential (Statens Offentliga Utredningar 2022).

1 It should be noted that this does not necessarily apply to all product groups and that statistics are hard to obtain; for an overview, see Dalhammar, Milios et al. (2021)

2 As an example, 22 percent of waste was materially recycled in Sweden in 2020; see Naturvårdsverket (2022).

3 For an overview of developments over time, see Dupont, Moore et al. (2024).

Secondly, climate policies can affect resource prices. For instance, the Carbon Border Adjustment Mechanism (CBAM), designed to protect EU base industries and material suppliers, might result in higher raw material costs for EU component manufacturers compared to their competitors outside the EU (Assous, Vanegas Hernandez et al. 2024). The main reason is that components and finished goods are not covered by CBAM, so they are not subject to its reporting and tariff obligations. As a result, EU-based component manufacturers will face higher raw material costs when the CBAM tariffs kick in, while non-EU manufacturers can continue to import materials from regions like Asia without paying these tariffs, giving them a cost advantage.[4]

Addressing resource use has become crucial in environmental policy, now framed under the umbrella term "circular economy". Transitioning from a linear to a circular economy ensures efficient resource use, maximizes reuse and recycling, minimizes waste, and reduces new resource extraction.[5] Essentially, it aims to decouple resource use from economic growth – a major challenge since past growth has relied on increased resource consumption. Despite existing waste and CE policies, the EU made no progress in reducing material consumption between 2010 and 2022 (European Environment Agency 2023).[6] Thus, while the transition to a CE has enormous economic potential (Lacy and Rutqvist 2015), the developments are slow, underscoring the need to accelerate the transition.

The standard ISO 59004 (2024) provides a general definition of a CE, introducing key principles[7] and formal concepts, such as circular business models (CBMs). The CE is defined as an *economic system that uses a systemic approach to maintain a circular flow of resources by recovering, retaining, or adding to their value while contributing to sustainable development.*

CBMs are essential for the CE transition (Nußholz 2020), focusing on extending product lifetimes (e.g., through new design, reuse, remanufacturing, and repair[8]), offering recycling solutions, developing sustainable materials (e.g., biobased plastics and wood), and promoting refillable parts, leasing, rental, and peer-to-peer sharing.

4 Given that CBAM rules include several "flexibilities", and all methods regarding calculations, etc., are not established, the EU has the opportunity to address this problem.

5 For a deeper discussion, see Kirchherr, Yang et al. (2023)

6 The material footprint provides a comprehensive measure of all materials extracted to satisfy consumption demand in the EU, including materials extracted outside the EU and then imported.

7 This is based on systems thinking, value creation, value sharing, resource stewardship, resource traceability, and ecosystem resilience.

8 Strategies to support longer lifetimes of products and components are often referred to as "R" activities and include reuse, repair, remanufacturing, refurbishment, reconditioning, and repurposing. In most cases (but not always), they are preferable to recycling as they can add more value.

2. Objective, Scope, and Outline

Public policy interventions at all levels – international, EU, national, regional, and local – are essential for the transition to a CE, with each level playing a distinct role.[9] EU regulations govern products, chemicals, and waste, while Member States can adopt policies such as environmental taxes, reuse and recycling infrastructure, and public procurement guidelines. Local policies on public procurement and recycling infrastructure can also support the transition.

The EU has embraced the CE concept through two action plans: strategies targeting waste streams and initiatives such as the Sustainable Products Initiative. CE is also integral to the Green Deal.

The EU can sometimes exert significant global influence through the "Brussels Effect", where its regulations shape global standards due to the size and importance of its single market (Bradford 2020). Many companies outside the EU comply with EU regulations, while policymakers in other jurisdictions often adopt similar policies to those in the EU. With the European Commission signalling a commitment to leading in standardisation (European Commission 2022b),[10] Europe may become well-positioned to shape the international agenda.

However, several trends may challenge the EU's future leadership (European Commission 2024): the single market's shrinking share of global GDP, sluggish growth in the EU, waning "hyper-globalization", and the resurgence of protectionism[11] and industrial policies as countries seek to secure supplies of strategic metals and minerals.

Given this context, it is a good time to evaluate what the EU and Member States have done to promote the CE and explore how Europe can lead in CE policy and standardisation while ensuring the competitiveness of its industries. This paper examines existing and planned CE policies, focusing on their impacts on large and established industries (incumbents), and suggests actions to strengthen the EU's CE framework. While research often focuses on small, emerging industries, this paper mainly applies to large incumbents. A key reason for this is that – for CE strategies to take off – incumbents must adopt them quickly, even if they often view CBMs as risky (Linder and Williander 2017).

Further, this paper focuses on industrial products, thus excluding sectors like agriculture. However, the discussions are still relevant to other sectors and smaller industries, as many of the policies discussed have broader applications. Given the limited format of the paper, the focus is on general recommendations in different policy areas rather than detailed recommendations.

9 See, for instance, Wilts and O'Brien (2019), Milios (2020), Lindahl and Dalhammar (2022), Hartley, Schülzchen et al. (2023)

10 More details on standardisation are provided later in this paper.

11 For an overview, see www.globaltradealert.org.

3. A Brief Review of European Policies for the Circular Economy

3.1 EU policies

The CE, as a distinct policy area, did not emerge in isolation. It builds on earlier policies addressing waste, resources, green growth, product regulation, and innovation; see Figure 1.

Figure 1. *Overview of EU policies relating to waste and resources. Source: Milios (2020).*

The EU has developed two CE action plans (European Commission 2015, European Commission 2020) that build on concepts from previous policies, such as life cycle thinking and improving recycling systems, while introducing several new elements:

- Larger focus on preserving resource value through reuse, repair, remanufacturing, and higher-quality recycling (Dalhammar, Maitre-Ekern et al. 2023).
- Integration of previously siloed product, waste, and chemical policies to resolve conflicts (European Commission, 2020).
- A life cycle approach covering production, consumption, and recycling, with regulatory and market interventions (Milios 2018).
- New policies, such as "recycled content" mandates for PEF bottles and batteries, which address past failures in recycled material demand, with further measures expected, especially for plastics (Brown and Börkey 2024).

- Amendments to existing waste policies and introduction of extended producer responsibility obligations for new product groups like textiles and fishing gear.
- More comprehensible policies to address the issue of plastics, most notably through the Single-Use Plastics Directive (The European Parliament and the Council of the European Union 2019), through bans, usage restrictions, and information.

Product policy developments

Product regulations are crucial for advancing the CE, with numerous policies adopted over the past 20 years to cover more environmental aspects (see table 1).[12]

Table 1. *Examples of existing EU product laws. Source: Dalhammar and Maitre-Ekern (2024).*

Type of intervention	Examples of EU laws
Removing toxic substances from products	REACH, RoHS Directive, Toy Safety Directive, Products Safety Directive, Battery Directive
Ensuring mandatory minimum energy performance standards for products	Ecodesign Directive
Ensuring that products are labelled according to energy performance.	Energy Labeling Regulation
Mandating extended producer responsibility: Producers pay for collection and recycling systems, e.g., for packaging, vehicles, batteries, electronics, and fishing gear	Directive on Packaging and Packaging Waste, ELV Directive, WEEE Directive, Battery Directive, Directive on the reduction of the impact of certain plastic products on the environment
Setting minimum requirements on durability/lifetime/repairability of products; relevant provisions exist for vacuum cleaners, lighting products, and mobile phones	Ecodesign Directive
Mandating producers to supply spare parts and repair manuals to professional repairers and consumers	Ecodesign Directive

Since the first EU CE action plan, current laws have started to address product lifetimes and repairability of products.[13] Three new EU laws are set to transform the product regulation landscape in the coming years:[14]

12 For an in-depth overview, see Dalhammar (2024).
13 For an overview, see Dalhammar et al. (2021).
14 The proposed revision of the Construction Products Regulation is also of relevance here as it aims to strengthen CE practices in construction.

- **The Ecodesign for Sustainable Products Regulation (ESPR) (adopted)**:[15] The ESPR replaces the current Ecodesign Directive with a wider scope, covering most product types. It sets ecodesign requirements to promote circularity, focusing on durability, reliability, recyclability, and recycled content. The ESPR also contains important legal provisions on disputed terms,[16] such as "remanufacturing" and "refurbishment". It introduces new tools such as Digital Product Passports,[17] which require that products sold in the EU must have an attached identifier that shares detailed information about materials used, manufacturing processes, and recyclability. Further, the ESPR bans the destruction of unsold or returned textiles and footwear.
- **The Battery Regulation (adopted)**:[18] Like the ESPR, this regulation targets batteries, introducing recycled content requirements and digital battery passports. It also contains rules aiming to extend battery lifespans, promote "second life" applications for batteries, and ensure that batteries be available as spare parts for several years after a product is released on the market.
- **Regulation on circularity requirements for vehicle design and on the management of end-of-life vehicles (proposed)**:[19] This proposed law contains some similar provisions – but related to vehicles – as the above, such as digital passports and recycled content requirements for new cars, particularly for plastics.

These laws create a new framework for products, batteries, and vehicles, focusing on extending lifetimes through repair, refurbishment, and remanufacturing, improving recycling markets with recycled content rules, and enhancing information sharing via digital passports.

While most policies target the supply side[20], there are also demand-side initiatives combatting greenwashing and ensuring accurate product information. The most important initiative is the proposed Green Claims Directive (European Commission 2023c), which 1) sets criteria for companies' environmental claims and labels, 2) requires independent and accredited verification, and 3) sets mandatory governance criteria for environmental labelling schemes, to ensure they are transparent and reliable.

Further, the EU has introduced new producer responsibility obligations for various product groups, including fishing gear, and is proposing to extend these to textile waste (European Commission 2023b). These obligations mean that an increasing number of product groups will need to manage collection and recycling obligations and assume greater responsibility for products at the post-

15 The European Parliament and the Council of the European Union (2024b).
16 These terms are disputed due to varying interpretations across industries and differences in legal and standards definitions. This can lead to confusion on how to classify a material, and in some cases, something will be classified as waste, which may hinder practices like reuse, repair, and recycling. See, for instance, Dalhammar et al. (2021).
17 These passports are introduced in Chapter 3 of the ESPR. There are several potential uses of such passports for industries, professional procurers, repairers, and consumers.
18 The European Parliament and the Council of the European Union (2023).
19 The European Commission (2023d).
20 Sometimes referred to as a "regulatory push".

consumer stage. The EU has also established right-to-repair (R2R) provisions in consumer law to make it easier for consumers to choose to repair items instead of buying new ones (European Council 2024).

Waste policy

The Waste Framework Directive (WFD) revisions require Member States to collect more waste – including construction, demolition, and textiles – and promote reuse. Additionally, specific policy packages are being developed for waste streams, including plastics, textiles, and construction waste.

The CE Action Plan (European Commission 2020) contains further planned policies to make production processes more resource-efficient, support industrial symbiosis[21], promote digital solutions to track resources, and support new collection and recycling technologies.

Standardisation

In terms of standardisation, the EU has stated its intention to lead developments, both within the EU and internationally (European Commission 2022b). In this paper, standardisation refers to the voluntary standards developed by standardisation bodies, for example, CEN, IEC, and ISO. Significant work is currently underway internationally and in Europe regarding standardisation.[22] [23] EU product standards – especially the "harmonised standards" – play a key role in ensuring that products, services, or processes are compliant with EU legislation.[24] This compliance, in turn, qualifies products for CE marking. Yet, there is currently a large need for standardisation in relation to the CE in the EU:

- Standards that create a common "CE vocabulary" are needed to regulate product lifetimes, repairability, and recyclability. The ISO 59000 standards have started to fill this gap, and forthcoming European standards are set to contribute as well. While EN 45550 standards provide a foundation, additional standards for specific materials and products are still required.
- As EU product regulations are often more progressive than international laws, the EU may need to lead in some areas of standardisation. However, whenever possible, internationally agreed-upon standards are generally more beneficial.

21 Industrial symbiosis is a process where actors, typically within industry, cooperate to make better use of resources in various ways. A typical example is where waste or by-products of one industry become a useful resource for another industry. See Mirata (2018).

22 In CEN, much of the work is performed in the CEN/TC 473 Subcommittees and Working Groups. Sweden has been given the task of coordinating efforts (CEN/CENELEC 2023). (Maybe: Sweden has been tasked with coordinating efforts (CEN/CENELEC 2023).

23 In relation to the digital product passport, an overview of relevant standards is provided in Gayko and Helfritz (2023).

24 For a deeper discussion on product rules and standardisation, see, e.g., European Commission (2022a) and Dalhammar (2024).

In addition to the areas mentioned above, other CE-related policies exist, although they are not always considered part of the formal "CE policy framework".

- Policies and laws[25] that identify and secure access to critical raw materials.
- Industrial policy frameworks that aim to support the green transition, including the Green Deal Industrial Plan (European Commission 2023a), with subsidy schemes and other incentives for establishing green industries.
- Various supply chain rules, including rules on specific product streams (e.g., minerals or imports of products that cause deforestation), supply chain governance and reporting (e.g., the Corporate Sustainability Reporting Directive (CSRD), and the CBAM that has implications for monitoring carbon emissions in international supply chains.

3.2 Member state policies

EU Member States have adopted various CE policies, with France leading development (Dalhammar and Maitre-Ekern 2024, Gros 2024) by introducing a mandatory Repair Index, Durability Index, stricter bans on single-use plastics, and a partial ban on destroying unsold goods (Roberts et al. 2023). However, these progressive national policies challenge both the EU and French industries, potentially distorting trade within the single market. In response, the EU has adopted similar standards, while France continues to advocate for broader adoption of its laws (Gros 2024).

This highlights the complexity of balancing environmental protection with free movement in the single market. Yet, Member States like France can act as "policy innovators", with their national policies sometimes paving the way for future EU-wide adoption (Dalhammar et al. 2023).

France is not the only Member State with progressive policies related to product repair and longer product lifetimes, as seen in Table 2.

25 Most notably, The European Parliament and the Council of the European Union (2024a).

Table 2. *Product policies among EU Member States. Source: This is an amended version of the table found in Dalhammar (2024).*

Consumer Information on Product Reparability	France has implemented a mandatory repair index for a range of products, including smartphones, laptops, televisions, washing machines, lawnmowers, vacuum cleaners, dishwashers, and pressure washers. This index, which ranges from 1 to 10, is displayed alongside the product's price tag in physical stores and online platforms. Several other EU countries are in the process of introducing similar measures.
Consumer Information on Product Durability	France intends to evolve its repair index into a durability index in 2024. This new index will assess factors such as product reliability or robustness (reflecting intrinsic performance, proper maintenance, and relevant consumer information) and upgradability (ensuring products remain functional over time despite technological advancements, including compatibility with software and hardware updates).
Criminalization of Planned Obsolescence	France has made planned obsolescence a criminal offense and has provided a legal definition of the concept.
Repair Fund	France has established a repair fund requiring producers to contribute to the repair costs of products outside the legal warranty.
Product Labelling and Information	A recent French law requires producers of certain product groups – including electrical and electronic items, packaging, and textiles – to label their products with various criteria such as reparability, sustainability, use of recycled materials, and presence of microplastics.
Eco-modulation	France has adopted a system of variable fees in extended producer responsibility (EPR) schemes based on the product's lifespan, reparability, and recyclability attributes.
Extended Mandatory Consumer Guarantees	Some European countries have extended the legal consumer guarantee period. For example, Sweden has recently introduced a three-year guarantee period for most products.
Tax Incentives for Repair Services	Certain countries and European regions have introduced tax incentives for repair services, including reductions in value-added tax (VAT) for repairs.
Regulations on the Destruction of Unsold/Returned Consumer Goods	Initiatives include partial bans on destruction (France), reporting requirements (Germany), and reduced VAT for donated items (Belgium).
Repair Vouchers	Some cities in Austria provide repair vouchers to subsidize consumer repairs at local service providers. Austria has introduced a national voucher scheme for electronic devices.
Supporting Infrastructure for Reuse	Numerous cities across Europe are encouraging reuse by offering infrastructure at recycling centres that facilitate the diversion of items from recycling to reuse.
Voluntary Eco-labelling Schemes	In addition to the EU's voluntary eco-labelling scheme, there are various national and regional eco-labelling initiatives. These range from government-established schemes (such as Germany's Blue Angel) to those developed by industries or non-governmental organizations.

Other CE policies adopted at the national, regional, or local levels across Members States include:

- **Circular public procurement:** Some agencies and cities have started to buy more circular solutions, including remanufactured furniture (Öhgren, Milios et al. 2019), remanufactured ICT products (Crafoord, Dalhammar et al. 2018), and biobased plastic products (Sveriges kommuner och landsting 2019). Several countries have also started to develop criteria and pilot projects for circular procurement. The level of maturity in criteria development varies by product group, and there are differences among EU Member States regarding what products and services are in focus. For example, municipalities in Finland and Sweden are increasingly procuring wood-based buildings.
- **Infrastructure for reuse:** Several countries are working to develop infrastructure that supports reuse,[26] including reuse options at recycling stations,[27] and reuse markets for e.g. building materials.[28]

3.3 Current policy approaches – weak points

This section outlines some key shortcomings in current CE approaches.

Lack of overall targets for the circular economy

The EU has a monitoring framework with indicators for the CE[29], but has not set any overall binding targets. Lessons from climate policy show that the 20-20-20 targets were very important for many actors, not least cleantech companies (Colleen and Lidgren 2012), as they knew the targets would lead to additional policies with large market impacts, providing more business opportunities for fossil-free technologies. Companies with circular business models want policymakers to set targets for resource efficiency (Milios 2021), as they would likely lead to additional policies and influence public procurement to favour circular solutions.

Product regulation

By introducing the ESPR and similar rules for batteries and vehicles, legal tools covering most product groups and most R-activities,[30] such as reuse and remanufacture, are now in place. Thus, the EU's product policy framework is becoming more comprehensive and holistic, positioning the EU as a global leader in product regulation. The EU will likely continue to lead the way and may influence companies and policymakers in other jurisdictions to comply with EU laws or adopt similar ones (the Brussels Effect) (Bradford 2020). However, there remain some concerns related to EU product regulation, including:

26 Eskilstuna has created the world's first reuse and recycling shopping mall, ReTuna; see www.retuna.se/english.

27 For instance, when citizens go to the recycling station to recycle used products, they are offered to instead put products that may be of interest to other citizens in a specific "reuse" station, where other people can pick up the goods. Alternatively, the goods can be sold by special outlets. The practice with "reuse" options is increasingly also used by large housing associations, not least where many students live; tenants can place things they no longer want in reuse spots.

28 This includes specific spots where citizens and businesses can buy used things like bricks, radiators, doors, windows, and toilet seats; one example is www.malmoabd.se

29 ec.europa.eu/eurostat/web/circular-economy/monitoring-framework.

30 Regarding the 'R' activities, see above footnote 8.

- **Legal compliance and market surveillance:** EU product rules sometimes contain loopholes, and effective market surveillance, especially in e-commerce (Molteno and Long 2023), can be difficult. Not all EU Member States devote enough resources to market surveillance, and the global rise of counterfeit products, which can be dangerous and contain toxic substances, is concerning (Webster 2024). This points to the need to close loopholes, devote more resources to market surveillance – particularly in e-commerce – and cooperate with countries outside of the EU on these issues.
- **Legal design:** Some recent product rules were introduced under severe time pressure. While industry stakeholders often support the intentions behind the laws, they have concerns about how the requirements are formulated (Dalhammar, Richter et al. 2024). For example, the Battery Regulation requires manufacturers to design electronics with removable batteries, but for products like in-ear headphones, there is a risk of contamination and negative health issues. Also, the requirement to supply batteries as spare parts can be costly. There may be alternative solutions, such as ensuring that over 95% of batteries meet a minimum specified lifetime. As such, an overall conclusion is that EU product regulation may be overly detailed. Fewer rules, with stringent targets, would be preferable.
- **Conflicting rules:** Product rules and ecodesign requirements may conflict with rules on safety, cybersecurity, and data protection.[31] For instance, if electric vehicle batteries are repurposed for energy storage after their initial use, access to data on their previous usage is needed for optimizing functionality. However, battery manufacturers may seek to delete this data to protect business secrets. According to industry experts, EU regulations on cybersecurity and equipment handling could mandate specific practices in such cases, potentially leading to conflicting requirements. Ensuring that all relevant rules are well-coordinated is thus becoming an increasingly important task.
- **Challenges in regulatory coordination:** Despite attempts by the European Commission to coordinate rules on products, waste, and toxic substances, problems persist that undermine R-activities.[32] Toxic substance regulations often hinder recycling and repair, and the waste hierarchy does not promote R-activities (The European Parliament and the Council of the European Union 2008). For example, some materials may not be feasible to recycle if they contain excessive levels of toxic substances, making them unsuitable for use in new products due to mandatory substance limits. Another challenge arises when an object is classified as waste by an agency, as this often restricts what can be done with it. In such cases, options like reuse, repair, or remanufacturing may no longer be viable, even if they would support more effective recycling.

31 The research on these issues is yet limited. Another example concerns the potential for manufacturers to monitor how users use a product (e.g., a speaker or earphones). Such monitoring may enable design for longer lifetimes, but monitoring practices must comply with rules related to handling of personal data and other relevant rules.

32 See, for example, Gustavsson, Adriaan de Bruijne et al. (2021), Milios (2021) and Lindahl and Dalhammar (2022).

Furthermore, producer responsibility rules primarily incentivize recycling over better alternatives like reuse. Rules related to trade and transport of waste can also hinder cost-effective recycling both within Europe and internationally (Kommerskollegium 2023). Lastly, EU Member States interpret EU waste rules differently, which further complicates the situation (Flack, Redmo et al. 2023).

- **Standardisation:** Compliance with EU product rules are conditional upon standards, not least the harmonized standards. However, there are concerns that the pace of standardisation cannot keep up with the rapid introduction of new laws, thereby potentially creating a bottleneck (CEN/CENELEC 2022). The European Commission, therefore, should prioritise this issue rather than assume that the necessary standards will naturally emerge.[33]
- **Dealing with an "avalanche" of EU laws:** Upcoming EU laws will impose significant reporting and information-gathering requirements on companies, including rules related to products, the Taxonomy, and supply chains, e.g., the CSRD and CBAM. It is crucial that industries, especially SMEs, receive adequate support and tools from the EU, national agencies, and industry associations to manage these obligations. Potential synergies should also be sought between the information required by digital passports and other types of information requirements. For instance, forthcoming product law requirements, such as recycled content in new products, will also require information from supply chains (Dalhammar 2024).

33 As an example, people in the electronic industry we have talked to have stated that there is much standardisation work in relation to the Battery Regulation that has not commenced, where many actors believe (wrongly) that we can rely on older standards.

4. Strengthening the EU Circular Economy Policy Framework

The needs of companies with a circular business model vary by sector (Milios 2021), but several policies have broad support from industries and industry associations (Milios 2021, Flack et al. 2023, Dansk Industri 2024, Svenskt Näringsliv 2024), including several of the policies outlined below.

4.1 Target-setting

A first, fundamental step is establishing CE targets and associated indicators to measure progress. Such targets will allow for a strategic direction in policymaking and guide the development of supportive policies that reward companies' CE solutions (Milios 2021). Here, we expect a development similar to that in climate and energy policy. 25 years ago, setting mandatory EU targets for greenhouse gases, renewables, and energy efficiency was unthinkable. However, these targets have since been adopted and guided the subsequent adoption of more progressive climate policy packages, leading to increased cleantech innovations and a greater willingness among investors to finance new solutions (Colleen and Lidgren 2012).

Targets may take different forms, including absolute limits of resource use or decoupling GDP growth from material use.[34] Some goals may be controversial at this stage in time,[35] but the key issue is to start discussing such targets and see what we can learn from the process of developing our climate and energy targets. It would also be beneficial to consider the justice dimension, for instance, by exploring how much of the world's resources are consumed by Europeans (Lembachar, Marsden et al. 2022). Furthermore, it is crucial to visualise how the CE relates to climate change and biodiversity loss, ensuring that targets and indicators reflect this (Paleari 2024).[36] While the EU has taken steps in this direction, much remains to be explored (Paleari 2024).

4.2 Product policy, law, and standardisation

As previously discussed, the EU's product policy framework is becoming more comprehensive, but several areas require attention:

- **Legal frameworks must be coordinated:** There are emerging concerns about potential legal conflicts between laws on cybersecurity, data protection, and intellectual property rights on the one hand and rules related to the reuse and repair of products on the other. Such conflicts need to be identified and resolved early.
- **The need for flexibility in lawmaking:** Effective coordination likely requires laws to incorporate flexibility, allowing for adjustments as circumstances change. For example, the new Battery Regulation includes provisions for electric vehicle batteries that may be based on outdated assumptions about

34 For an overview, see, e.g., Morseletto (2020).
35 In the long run, a target for resource use (e.g., tonnes per capita) will probably be necessary, given ecological trends, but it is most probably unfeasible at this stage.
36 Cirkelar, Azote et al. (2024).

battery technology. With lithium iron phosphate (LFP) batteries expected to increasingly replace current technologies, these assumptions may no longer hold true. Future batteries, for instance, may contain fewer valuable materials and have significantly longer lifespans. The EU, along with the European Commission, must ensure robust monitoring systems are in place to identify 1) conflicts between regulatory frameworks and 2) the need for legislative changes in response to technological and economic developments. Some recent EU laws, like the CBAM Regulation, include language that allows for legal adaptations or complementary policies, offering a model for future product regulations. A key challenge moving forward will be ensuring flexibility without compromising other principles of good governance, such as stakeholder representation.

- **Address market surveillance and e-commerce:** Effective market surveillance is crucial, especially as e-commerce grows in volume. EU Member States must allocate sufficient resources for surveillance and impose penalties for non-compliance. The EU must, however, close the legal loopholes that unserious market actors may exploit and consider how the ESPR can address these issues (Molteno and Long 2023).
- **Support companies to address the "avalanche of laws":** The increasing number of regulations will first affect larger companies but, over time, smaller ones as well. As legal requirements are transferred through supply chains, SMEs will need more support to understand and comply with these laws. Effective communication on the forthcoming requirements will be needed, and supporting tools and frameworks for reporting and compliance should be developed. Synergies between obligations in product laws (e.g., information requirements for digital product passports) and other laws should be explored to the extent possible to try and avoid double work.
- **Simplify regulations:** While progressive laws are necessary, overly detailed rules can be restrictive. Companies should thus be given flexibility in how they meet performance goals. For example, the Battery Regulation could create complications with its detailed requirements for batteries in electronic products. A focus on broader performance targets may offer better outcomes. We should, of course, acknowledge how hard it is to design such laws in practice, but several new laws could have benefitted from a more exhaustive legislative process.
- **Pay more attention to standardisation:** The EU must ensure that standardisation efforts keep pace with new regulations, as delays in standard-setting could create bottlenecks. Further, old standards can block circular practices. For example, old standards require more chemicals like PFAS[37] in electronics than necessary, given the safety performance of current batteries. This makes material recycling more costly or even impossible. However, changing these standards is hard due to resistance or limited interest in change from various stakeholders.

37 According to discussions we have had with people in the electronics industry. See also Lay, Keyte et al. (2023).

- **Engage with other jurisdictions:** There will probably be cases where EU consumers get access to spare parts for their products but where producers cannot offer such spare parts outside the EU because of the high costs of certifying these in some countries (Dalhammar et al. 2024). This example highlights the need for the EU to engage with other jurisdictions to promote circular solutions outside the EU.

4.3 Waste laws

As noted, waste laws and their inconsistent application across the EU are significant barriers to companies. Many waste laws are rooted in an old paradigm focused on controlling waste flows, which often hinders circular activities. Yet, we still need to control waste flows, making the transition to a more circular waste law a difficult task. Nevertheless, the EU should aim for a shift towards "resource management" and "value preservation", including:[38]

- Identify evident areas where waste laws act as barriers to circular activities.
- Modify rules on producer responsibility schemes to support reuse, remanufacturing, and repair, not just recycling (WEEE Forum 2024).
- Offer a more consistent interpretation of waste laws across Member States.
- Rethink waste law to enable a more strategic perspective on materials. For instance, producer responsibility laws should be reconsidered in order not to counteract measures to prolong the lifespan of products and components (WEEE Forum 2024).

While the European Commission is already addressing some of these issues, more attention should be given to revising existing laws.[39] Administrative burdens related to waste transport are a concern both within Europe and internationally, especially given the issue of illegal waste. The EU could work to establish "green channels", where less administration is granted to actors that have been certified as credible (Milovantseva and Fitzpatrick 2015).

4.4 Circular public procurement

Circular public procurement is mainly practiced at the national, regional, and local levels. That is where the main action needs to happen. The EU supports this through various mechanisms, including collaboration projects. Notably, the new Ecodesign Regulation (the ESPR) allows the Commission to set "minimum requirements in the form of technical specifications, award criteria, contract performance conditions or targets."[40] We would recommend that such initiatives continue.

4.5 Industrial policy

Another building block concerns the need to move beyond individual CBMs and see the industrial ecosystem. Industrial policy is back on the EU agenda in response to China's industrial developments and the Biden administration's

38 See, e.g., Lindahl and Dalhammar (2022) and Svenskt Näringsliv (2024).
39 Waste laws should also be revised at the national level; see Svenskt Näringsliv (2024).
40 ESPR, Article 65.

adoption of the Inflation Reduction Act – a massive program for investments in green industries, including EV batteries and hydrogen solutions (Stokes 2024).

The EU has adopted a green industrial plan (European Commission 2023a) and is currently planning various activities to support "industries of the future", including electric vehicles, battery manufacturing, and hydrogen solutions. This is, however, complicated by the fact that industrial policy is a highly controversial topic.[41]

In this complex landscape, we would like to point out that much focus is currently on climate-friendly technologies. In some cases, it would make sense to integrate circularity aspects: electric vehicles, batteries, and other climate-friendly technologies will use large amounts of natural resources, and it is important that this technology supports circularity. This can be done in various ways: for some metals and minerals, it may be important to have high levels of recycling. For scarce materials, there may be a need for further research into possible substitution pathways. Different ways to store energy can also have very different implications for material needs (cf. batteries vs. waterpower through pumps).

In other cases, there may be interesting CE solutions that have no direct relation to climate technologies but may lead to solutions with high environmental and commercial potential, such as nutrient recycling solutions, landfill mining, and urban mining. While most of the focus of policymakers in the EU/US/China is on climate-friendly technologies, we can expect that resource-related solutions will increase in commercial potential in the coming years.[42] Thus, a focus on CE solutions would avoid a situation where we put "all eggs in one basket".

A recent interview study with Swedish[43] stakeholders confirmed the need to complement climate-technology industrial policy approaches with CE approaches. Suggested policy mixes include green tax shifts, differentiated VAT, circular public procurement, funding schemes, and an improved institutional framework (Ekdahl, Milios et al. 2024). The main criteria for choosing which solutions to support in national policy were their potential environmental impact, competitive advantages, and alignment with EU policies.

41 However, given the concerning trends for EU manufacturers, it is necessary to develop strategies; see, e.g., Packroff (2024).

42 It is also important to diversify the types of green industrial developments, as many countries aim to provide support to, e.g., industries involved in hydrogen solutions, EVs, and batteries. The EU should also try and develop commercial opportunities in other fields.

43 Sweden has invested in several high-profile, controversial industrial policy projects related to climate technologies, most notably Northvolt, Hybrit, and H2 Green Steel (in some cases, the projects have also been financed by EU funds).

5. How EU Member States Can Support and Complement EU Policies

As stated previously, policies at different levels play different roles. EU Member States have the dual task of 1) working at the EU level to help design and support appropriate EU policies and 2) complementing EU policies by adopting additional national policies. Several industry associations have recently proposed comprehensive national policy packages to support the CE transition (Dansk Industri 2024, Svenskt Näringsliv 2024).

Key policies and measures that Member States should consider introducing, or developing further, include:

- Enforcing EU rules through proper market surveillance and effective sanctions.
- Developing circular public procurement by establishing procurement criteria, supporting pilot projects, and developing methods such as life cycle costing.[44] States could also consider setting up "innovation funds" and educational activities to encourage CE-related procurement.
- Coordinating targets, indicators, and policies across different areas – climate change, CE, and biodiversity – to avoid "silo" thinking.
- Revising national waste laws and issuing clear guidelines to prevent inconsistent interpretations by regional and local agencies.
- Building infrastructure for reuse and recycling to support circular practices.
- Adopting best practices from other Member States, such as VAT reductions for reuse, repair, and sharing activities, as well as repair vouchers and funds.
- Developing targeted policy packages for key materials streams, including construction waste.

44 Life cycle costing typically includes considering not just the purchasing cost of a solution but the costs of e.g. maintenance, which can increase the attractiveness of energy-efficient and resource-efficiency solutions that have a higher purchasing price than other solutions. EU case law has opened up possibilities to also consider socioeconomic costs and benefits in public procurement.

6. Conclusions

This paper has reviewed EU policies aimed at promoting the CE, focusing on policies relevant to industrial products. Achieving a CE transition will require policy interventions at both the EU and Member State levels, respectively. An appropriate policy response must involve 1) revising or replacing outdated laws and policies to enable circular solutions and 2) adopting new solutions. Key areas include product law, waste law, and standardisation.

We foresee that CE policies will need to be increasingly integrated with climate policy developments, as resource use and impacts on climate and ecosystems are often closely related. Furthermore, CE policies are likely to gain geopolitical importance in the future, as they can help reduce Europe's dependence on resource imports.

To maintain its leadership in CE developments globally, the following action points are critical for the EU and its Member States:

- Taking the lead in setting clear targets and indicators for the CE and integrating them with those related to climate change and biodiversity loss.
- Designing effective product regulations that avoid overly detailed rules and focus on outcomes.
- Providing businesses with clear information and tools to help them comply with the forthcoming "avalanche" of laws. Where possible, synergies between these laws should be identified to ease compliance.
- Ensuring effective market surveillance by designing robust laws and devoting sufficient resources for enforcement.
- Leveraging demand-side potential through the development of circular public procurement practices.
- Integrating CE-related technologies into the industrial policy framework, which is currently focused on climate-friendly technologies.

Looking ahead, the EU should also consider incorporating dimensions of justice, such as how much of the world's resources are consumed by the EU and ways to share these resources more equitably. Given the dire global outlook for the environment and the global inequalities related to carbon emissions and resource use, such perspectives may be necessary (Kartha et al. 2020, United Nations Environment Programme 2024).

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Author bio

Mattias Lindahl: Since 2003, Mattias Lindahl is a professor at Linköping University, specializing in EcoDesign, Product Service Systems (PSS), and Circular Economy and in October 2023, he began a guest professorship at Luleå University of Technology. He has led major research projects such as the Mistra REES program, a 180 MSEK initiative promoting the transition of Sweden's manufacturing industry towards a circular economy. He has contributed to international ISO and IEC standards and chairs the SIS committee responsible for circular economy. He has also been a member of Sweden's circular economy delegation and serves as an associate editor for the Journal of Cleaner Production.

Carl Dalhammar: Associate professor at IIIEE, Lund University. In his research he has analysed numerous environmental laws and policies, including the Ecodesign Directive, Circular Economy policies, right-to-repair policies, planned obsolescence, EU energy efficiency laws, government procurement programs, and product destruction. Carl teaches environmental law and politics in several European and Swedish master and undergraduate programs. He is a member of the Research Council at the Swedish Competition Authority, and board member of the Swedish national innovation program Re:Source.

Editor bio

Anna Willman is a Climate Policy Expert at Fores and holds a Master's degree in Environmental Economics and Climate Change from London School of Economics.

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