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**Sustainable Products in a Circular Economy - Towards an EU Product Policy
Framework contributing to the Circular Economy**

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1. INTRODUCTION

1.1. Background

The way we design, produce, use, distribute and discard products has a strong impact on our economy, society and environment. There is at least a perception amongst many stakeholders and consumers that products in use today are not optimised to be repaired, upgraded or remanufactured, resulting in premature obsolescence¹. Over the whole life cycle of the product, the use of resources is often suboptimal². At the end of their service life, most products are discarded and their materials not sufficiently recycled, causing valuable resources to be wasted, including critical raw materials³. This problem is driven in particular by the fact that prices of products do not always reflect their environmental and societal costs, which reduces the incentives to produce and consume sustainably. Missing or unclear information for consumers on the environmental performance of products, including a proliferation of unverifiable or even misleading 'green' claims, further contributes to the problem.

In the framework of the Circular Economy Action Plan⁴, the EU is working on the transition to a carbon neutral, circular economy. Taking a circular approach towards products holds large potential in terms of sustainability in the broadest sense, benefiting people, planet and prosperity. In a circular economy, products maintain their potential to create value for as long as possible. Products have a long lifetime, due to a durable design. In case a product breaks, it is repaired. When a consumer no longer needs a product, it is passed on and reused by another consumer, or products are shared from the outset. Products that are discarded after their first technical or economical lifecycle are updated or refurbished and begin another life cycle, or if this is not possible their materials are recycled with a minimum of remaining resources ending up in energy recovery. During production and use, products consume the minimum amount of resources such as energy or water that is needed to fulfil their functions. Consumable products such as food, drinks, cosmetics and detergents are also produced with the minimum impact on resources and consumed so as to leave as little waste as possible. Emissions into the environment and impacts on the climate are minimised across the whole life cycle. As a whole this results amongst others in less use of resources, less waste, more jobs in repair and recycling sectors and monetary savings, while maintaining the services provided by products.

The value of a circular approach is recognized not just in the EU. The International Resource Panel (IRP) of the United Nations Environment Programme (UNEP) has produced a large

¹ See for example www.beuc.eu/publications/beuc-x-2015-069_sma_upa_beuc_position_paper_durable_goods_and_better_legal_guarantees.pdf

² See for example: www.eea.europa.eu/publications/circular-by-design or www.ellenmacarthurfoundation.org/publications/achieving-growth-within

³ Report on Critical Raw Materials and the Circular Economy - Commission Staff Working Document SWD(2018) 36 final.

⁴ Closing the loop - An EU action plan for the Circular Economy (COM (2015) 614)

body of evidence of the economic and environmental advantages of such an approach. For products in particular, the IRP emphasizes the importance of ‘value retention processes’ (remanufacturing, refurbishment, repair and direct reuse) in complementing recycling⁵. The European Commission has co-organized workshops to discuss these matters in the context of events organized by the G20 group of countries⁶. All these activities contribute to a global effort in pursuit of the Sustainable Development Goals, in particular SDG12 on sustainable production and consumption⁷. The ‘Reflection Paper Towards a Sustainable Europe by 2030’⁸ amongst others discusses EU progress towards the SDGs, noting that as concerns overall average progress, SDG12 is the second lowest ranking SDG for the EU Member States. This highlights the potential for more circularity in this field.

Many EU policies contribute to the transition to a circular economy by influencing how products should be designed, produced, used or treated at their end-of-life. Given the diversity in products, which include technologies and services, these policies are necessarily also diverse as they address different product groups, environmental impacts and phases of the product life cycle, and have diverse objectives and methods to achieve them. While many policy instruments addressing products and services on the EU market predate the Circular Economy Action Plan, most of them pursue objectives that contribute to the transition to a circular economy. Regular policy reviews of such policy tools indicate they are delivering significant results, while also identifying potential for improvement⁹. Moreover, available data on valuable materials still contained in discarded products and subsequent waste streams indicate that important potential for circularity in terms of growth, jobs and environment is left untapped. This document explores these issues in general and across a number of product groups, and analyses to what extent EU policies for products are contributing to solving these problems by supporting the transition to a circular economy.

1.2. Approach

The analysis contained in this document serves to explore to what extent EU policies affecting products already contribute to the transition to a circular economy, and where there is potential for a stronger contribution, for example through more consistent implementation across different policy instruments, better synergies between policy interventions or better coverage of products by policy instruments.

Chapter 2 of this document presents an overview of the main elements of the EU product policy framework, in particular as relevant for the circular economy. Chapter 3 investigates the most relevant processes that should close the loop for products in a circular economy.

⁵ <http://www.resourcepanel.org/reports/re-defining-value-manufacturing-revolution>

⁶ http://ec.europa.eu/environment/international_issues/relations_g20_events_en.htm

⁷ <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-12-responsible-consumption-and-production.html>

⁸ COM (2019), 22

⁹ see: https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en

A comprehensive overview of all products and all policy tools covering them is beyond the reach of this analysis. To obtain an illustrative insight into how the EU policies operate in different sectors, while still covering a significant circular economy potential, this analysis is focused on product categories where earlier studies have identified priority sectors for the circular economy. A 2014 scoping study¹⁰ analysed which materials¹¹ have the biggest impact from a circular economy perspective, and identified the following priority materials: agricultural products and waste, wood and paper, plastics, metals and phosphorous. Subsequently, the study assessed which product categories contain large quantities of these materials, or for which much of these materials are used in their production, indicating high potential for circularity. This led to the identification of priority products and sectors, which the study found to include: packaging; food; electronic and electrical equipment; transport; furniture; buildings and construction, apparel and fabrics and cleaning and cosmetics. Table 1 on the next page, taken from that study, shows how the high-potential product categories were identified based on their use of materials.

Chapter 4 contains an analysis of the priority sectors and products identified in the scoping study, with a view to gaining further insights into what potential there is for circular economy, what policies already tap into this potential and which potential remains. Within the sectors covered by the analysis, further pragmatic choices of focus are taken and explained in the relevant sections. It is important to note that the choice of product categories discussed here does not represent an 'in or out' scoping decision for any future work based on this analysis. It merely represents a pragmatic starting point to get an indication of the contribution to circular economy of the EU policies affecting products.

Consumer decisions have an enormous impact on the transition to a circular economy, and consumers need to be empowered with consumer rights and access to reliable information to be able to play their role in the circular economy to the full extent. Chapter 5 therefore looks at policies protecting and informing consumers and how they interact with product policies. Chapter 6 presents the Environmental Footprint Methods, as developed by the Commission in recent years. A number of horizontal developments and their interaction with Circular Economy are discussed in chapter 7. Finally, Chapter 8 draws conclusions from the analysis.

¹⁰ Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains, IVM et al for the European Commission, 2014

¹¹ The study assessed in particular agricultural products and waste, wood and paper, plastics, metals and phosphorous

Table 1 - adapted from *Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains (IVM et al)*

Overlap and key linkages between material flows, products and sectors										
Material ↓	Priority?	Packaging incl. bottles	Food incl. production, distribution, consumption & waste	Electronic & electrical equipment incl. phones, home appliances, electrical tools, office equipment	Transport incl. automotive	Furniture	Buildings & construction incl. materials, production & design	Apparel & fabrics	Cleaning & cosmetics incl. soaps, detergents, makeup, etc.	← Product / sector
		Food, electronic & electrical, transport, furniture, apparel, cleaning & cosmetics	Packaging, transport, apparel & fabrics, cleaning & cosmetics	Construction, packaging, transport	Packaging, food, electronic & electrical, furniture, construction, apparel	Packaging, transport, fabrics	Electronic & electrical (machinery & tools, long-term lighting & energy-use design), transport	Packaging, transport, food	Packaging, transport, food	← Cross- linkages
Agricultural products & waste	✓		Food		Biofuels			Some animal products	Some animal products	
Wood & paper	✓	Paper & cardboard			Some wood in boats etc.	Wood & paper	Wood			
Textiles						Textiles		Textiles		
Plastics	✓	Plastics		Plastics	Plastics used in automotives	Plastics	Plastics	Polyester		
Metals	✓	Metals used: aluminium, steel		Metals used: Steel, copper, aluminium, rare earths	Metals used in automotives: Steel, aluminium	Metals used: aluminium, steel	Metals used: aluminium, steel			
Phosphorus	✓		Phosphorus used as fertiliser in agriculture						Phosphorus	
Rock							Rock used: Aggregates, limestone, gypsum, cement			
Glass & ceramics		Glass		Some glass	Glass		Glass			
Fossil fuels			Energy used in supply + unrecovered energy from waste	Energy	Energy & fossil fuels					
Other chemicals & compounds		Chemicals used in production	Chemicals used in production and preparation	Chemicals used in production	Coatings, adhesives, paints	Flame retardants, dyes	Paints, etc.	Flame retardants. dyes	Chemicals	

KEY

✓

- Material has a non-negligible input to the product sector

- Material has a small, non-negligible input to the product sector

- Material input to this product sector is comparatively negligible

- Identified as a priority material

A study was launched in support of this analysis, to provide further information on a number of the priority sectors identified. The study *inter alia* analysed the market situation and policy tools in these sectors and developed recommendations for policy interventions. Furthermore, expected impacts of policy interventions in terms of economic growth, employment and environmental effects were modelled, to the extent possible at this exploratory stage. Relevant preliminary results of the study are referred to in the corresponding sections of this analysis. The full study will be made available online¹².

The views of stakeholders and the general public were sought through different activities. A roadmap¹³ was published for this initiative, to which the public could provide feedback from May 7 to June 4, 2018. 49 responses were received. Stakeholder workshops were held in October 2019 to have more in-depth consultations on specific product categories. A workshop was organised for each of seven priority product categories, totalling seven workshops. A public consultation was conducted from November 29, 2018 to January 24, 2019, to which more than 600 replies were received, most of them from citizens, and otherwise from business and industry representatives, environmental and consumer NGOs and public authorities. Annex I summarises the outcomes of the consultations. The input from stakeholders was taken into account and is reflected in the different sections of this document, where relevant.

¹² <http://ec.europa.eu/environment/enveco/studies.htm>

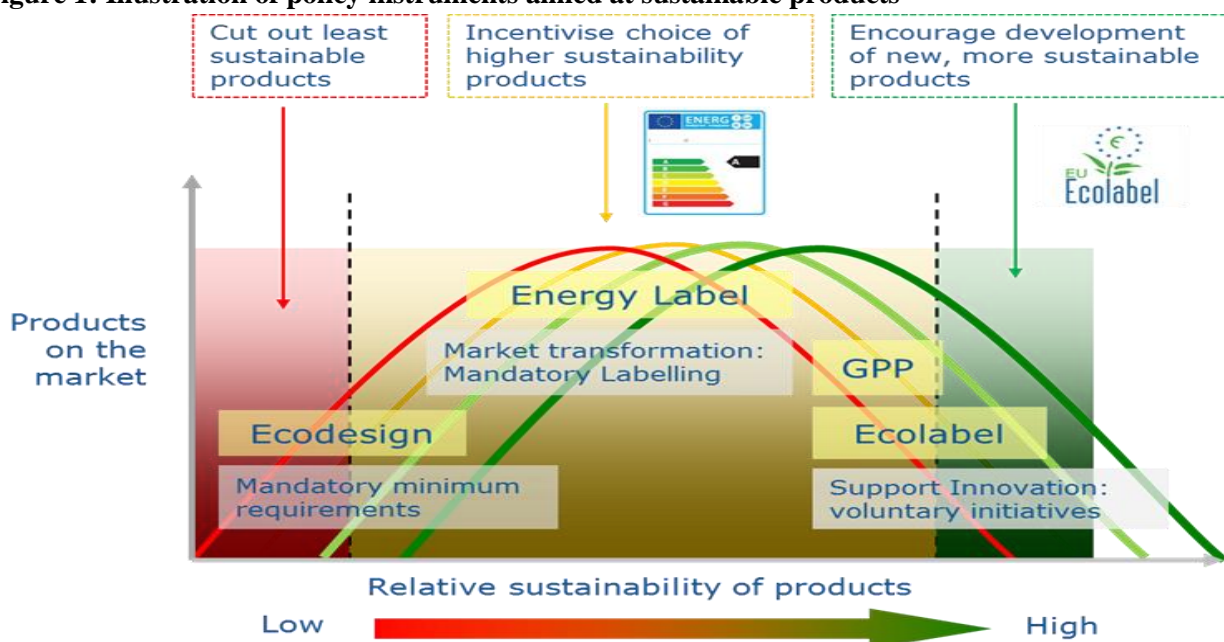
¹³ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-2409307_en

2. THE EU PRODUCT POLICY FRAMEWORK

In the EU, products move freely within the Single Market. The Single Market is one of the greatest achievements of the European project. It has made Europe one of the most attractive places in the world to live and do business in¹⁴. For the Single Market to work effectively, consumers must be able to trust the quality of products they want to buy – both goods and services, on- and offline, and provided domestically, from another Member State or from a third country. A single set of Union rules protects consumers and provides for common standards of protection in many areas, such as product and food safety, environment, passenger rights, privacy and data protection. This policy framework at EU level also ensures a level playing field for fair competition on the EU market.

Besides the EU policy tools aimed at the protection of consumers and the environment from possible negative effects of products, the policy framework also contains instruments aimed at making products more sustainable. Such policy interventions are often categorised as ‘push-and-pull’ measures. Push measures eliminate the poorest performing products through minimum requirements. For the products that meet the minimum requirements and are on the market, pull measures set incentives for producers to go beyond the minimal requirements. Figure 1 illustrates this approach while mentioning some examples of important policy tools addressing sustainability of products. In the rest of this chapter, these policy tools are briefly introduced. A recent report by the Commission’s Joint Research Centre (JRC) contains a more thorough analysis of these and other policy tools for products¹⁵.

Figure 1: Illustration of policy instruments aimed at sustainable products



¹⁴ See COM(2018) 772 – the single market in a changing world

¹⁵ http://susproc.jrc.ec.europa.eu/E4C/docs/task_6_requirements&policies_analysis_final_v2.2.pdf

2.1. Ecodesign and Energy Labelling

Ecodesign, complemented by energy labelling rules, supports the Commission's overarching priority to strengthen Europe's competitiveness and boost job creation and economic growth; it applies to energy-related products, for which it defines minimum requirements on energy efficiency and other criteria on use of resources and environmental impacts. This ensures a level playing field in the internal market, drives investment and innovation in a sustainable manner, and saves money for consumers while reducing CO₂ emissions.

The Ecodesign and Energy Labelling framework has been one of the most effective policy instruments at EU level to promote energy efficiency, estimated to contribute around half of the Energy Union target for energy savings by 2020. The Ecodesign and Energy Labelling legislative framework has the dual purpose of ensuring that more energy-efficient products come to the market (through ecodesign) while encouraging and empowering consumers to buy the most efficient products based on regulated information (through energy labelling). By doing so, it reduces the energy consumption of consumers and businesses, and thereby their energy and other utilities bills. Furthermore, it safeguards the internal market and prevents unnecessary costs for business and consumers due to diverging national requirements. By 2020 this framework is estimated to deliver¹⁶ energy savings of around 154 Mtoe per year in primary energy, more than the annual primary energy consumption of Italy. For consumers, this translates into €470 savings per household per year on energy bills. Moreover, this policy is estimated to deliver approximately €58 billion per year extra revenue for industry, wholesale and retail sectors, part of which could translate into up to 900 000 direct additional jobs in the sectors concerned. It also contributes to energy security by reducing the import of energy into the EU by the equivalent of 1.1 billion barrels of oil each year and it contributes to the mitigation of climate change by reducing CO₂ emissions by 320 million tonnes annually.

The Ecodesign Directive lays down the conditions and criteria for adopting implementing measures which set out binding requirements specific to each product group¹⁷. The Ecodesign working plan 2016 - 2019¹⁸ sets out the product groups for which new measures should be prepared or existing ones revised. It also highlights the contribution of eco-design to the circular economy agenda: when preparing or revising implementing measures, the Commission now looks more systematically at resource efficiency aspects such as durability, reparability and upgradability, recyclability and the content in recycled materials. The concept of modular components holds promise in this regard, as it facilitates reparability and upgradeability, while simultaneously encouraging simplification and standardisation of components, reducing costs.

¹⁶ Ecodesign Impact Accounting, Status report 2017 (<https://ec.europa.eu/energy/en/studies/ecodesign-impact-accounting-0>)

¹⁷ For an overview of existing implementing measures, see:
https://ec.europa.eu/energy/sites/ener/files/documents/list_of_energylabelling_measures.pdf
https://ec.europa.eu/energy/sites/ener/files/documents/list_of_ecodesign_measures.pdf

¹⁸ See 'Ecodesign Working Plan 2016-2019' (COM(2016) 773)

Both the Ecodesign Directive¹⁹ and Energy Labelling Regulation²⁰ apply to energy-related products. Recital 39 of the Ecodesign directive states that the Commission should assess the appropriateness of extending its scope beyond energy-related products. As part of a 2014 evaluation, the necessity, feasibility and added value of laying down eco-design and energy labelling requirements for non-energy-related products was considered. The final technical report²¹ recommends to postpone extending the scope until a number of methodological obstacles are overcome, and subsequently assess potential extensions on a case-by-case basis. It also states that although measures could be implemented through the Ecodesign Directive, in some cases other existing instruments are better suited to tackle the environmental impacts of non-energy related products, where the instruments target these impacts directly and have fully developed and proven methodologies.

From a range of labels presented to them, respondents to the public consultation supporting this analysis indicated to be the most familiar with the Energy Label, with more than 65% stating to be very familiar with it and more than 20% somewhat familiar. Close to 80% indicated to have a strong preference for a product with an Energy label indicating a good performance.

2.2. The EU Ecolabel

The EU Ecolabel²² was established in 1992 as a voluntary tool to encourage businesses to develop products with a reduced environmental impact throughout their whole life cycle, and to help consumers find the best environmentally performing products in their category. Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2010 on the EU Ecolabel²³ provides the basis for the European ecolabel scheme, which promotes the design, production, marketing and use of products and services that have a reduced environmental impact during their entire life cycle.

The EU Ecolabel offers a reference point of environmental excellence at European level in a wide range of product groups. It is an ISO 14024 Type I label, which means that it is multi-criteria, based on scientific evidence and life-cycle based approach, third party certified and revised regularly to follow technological evolution. EU Ecolabel criteria cover the environmental impacts of the products, as well as their technical performance. Social criteria are included for products groups for which the social aspect is particularly relevant (e.g. textiles).

Currently, EU Ecolabel criteria have been established for 25 goods and service groups²⁴, including many products discussed in Chapter 4. As of September 2018, the total number of EU Ecolabel

¹⁹ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of eco-design requirements for energy-related products

²⁰ Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU

²¹ <https://ec.europa.eu/energy/en/studies/evaluation-energy-labelling-directive-and-specific-aspects-ecodesign-directive>

²² http://ec.europa.eu/environment/ecolabel/index_en.htm

²³ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010R0066&from=EN>

²⁴ <http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html>

licences amounted to 2167, and the total number of EU Ecolabel products to 72227. The uptake under these product groups has been very uneven – including at geographical level, ranging from zero licences to hundreds of licences.

EU Ecolabel criteria for financial products are under development, as a follow-up to the Commission Action Plan: Financing Sustainable Growth²⁵, aimed at reorienting capital flows towards sustainable investments to achieve sustainable and inclusive growth, managing financial risks stemming from climate change, resource depletion, environmental degradation and social issues, and fostering transparency and long-termism in financial and economic activity. The aim is to allow retail investors²⁶ concerned with the environmental impact of their investment to rely on a trusted and credible (third party verified) label when investing in green financial products²⁷ (those leading to a reduced environmental impact), thus avoiding "greenwashing". A credible labelling scheme for financial products should (i) allow retail investors concerned with the environmental impact of their investment to make informed choices and contribute to the green transition and (ii) provide incentives to industry to develop financial products with a reduced environmental impact or a positive environmental impact.

The Regulatory Fitness Check concluded in June 2017 as part of the European Commission Regulatory Fitness and Performance Programme (REFIT)²⁸ examined the scheme in terms of its relevance, effectiveness, efficiency, coherence and EU added value. The report from the Commission to the European Parliament and the Council on the review of the implementation of the EMAS Regulation and of the EU Ecolabel Regulation adopted on 30 June 2017 confirmed the useful – even if limited – role of the scheme as a voluntary instrument for businesses that facilitates the transition to a circular economy and provides information on the environmental performance of products to consumers and in business to business transactions. The Fitness Check results also indicate that in order to fully exploit the potential of the scheme efforts need to be made to enhance its uptake.

The results of the public consultation seem to confirm the outcomes of the REFIT. Around 86% of the respondents believed that ensuring that consumers have information on the impacts of products so they can choose the best environmentally-performing products was an effective approach to reduce products' environmental impact. 86% of respondents identified the lack of knowledge and understanding of the EU Ecolabel by consumers as a main challenge to the effectiveness of the label. 80% considered that there are too many labels on the market. There was broad consensus among stakeholders that the main objective of the EU Ecolabel should be to guide EU consumers to the most environmentally friendly products on the EU market, and to encourage producers to continuously improve the environmental

²⁵ COM(2018) 97

²⁶ 'retail investor' means according to art. 4(6) of the PRIIPs Regulation: (a) a retail client as defined in point (11) of Article 4 (1) of Directive 2014/65/EU; (b) a customer within the meaning of Directive 2002/92/EC, where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of Directive 2014/65/EU;

²⁷ Products that represent investments contributing to an environmental objective, taking also into account social and ethical objectives, such as contributing to tackling inequality, fostering social cohesion, social integration and labour relations, or an investment in human capital or economically or socially disadvantaged communities.

²⁸ http://ec.europa.eu/smart-regulation/better_regulation/documents/com_2013_en.pdf

performance of their products. Fewer respondents prioritized providing manufacturers of sustainable products a competitive advantage and using the EU Ecolabel as a reference tool for GPP (38 %). As concerns the kind of products which should be covered by EU Ecolabel, respondents prioritised products with high potential for environmental performance and products of which the highest volumes are sold (such as food and drinks), which they gave the highest and second highest relative score respectively.

The Commission committed to improve the performance of the EU Ecolabel Regulation scheme by making it more focused and by ensure a bigger cumulative impact, by taking several actions, aimed at improving the strategic approach of the EU Ecolabel, developing a stronger communication strategy and streamlining EU Ecolabel operations. Given that available resources are limited, the scheme must prioritize product groups where ecolabelling can make the biggest contribution to circular economy. In this context, the Commission launched a study for the identification of elements for a strategic approach to EU Ecolabel. This will include the identification of promising product groups on which the EU Ecolabel should focus, taking into account potential synergies and avoiding duplications with other EU policies and tools, such as GPP, Ecodesign and Energy Label. The study will propose streamlined criteria for selecting products and for the discontinuation of existing criteria, based on amongst others the rate of uptake. The study should also suggest key performance indicators and adequate monitoring activities. Work on the development of a communication strategy will continue in 2019 and beyond, identifying target audiences and considering how responsibilities for promotional activities are shared between the Commission, Member States, industry participants and relevant multipliers.

Some industry players and consumer associations have recently requested the Commission to develop EU Ecolabel criteria for toys. While industry representatives in the stakeholder workshops did not indicate a particular interest in this idea, more than 70% of respondents in the public consultation claimed to take environmental aspects into consideration when purchasing toys, and of these respondents 50% considered environmental aspects to be equally important as toy safety and price. The Commission will duly consider this information in the context of the abovementioned development of a strategic approach.

2.3. Green Public Procurement (GPP)

Europe's public authorities are major customers. In the EU, the public purchase of goods and services has been estimated to be worth 14% of GDP²⁹. By using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production – this is called Green Public Procurement (GPP) or green purchasing. Although GPP is a voluntary instrument, it has a key role to play in the EU's transition to a circular economy. It stimulates demand for more sustainable goods and services which otherwise would be difficult to get onto the market.

²⁹ http://ec.europa.eu/environment/gpp/what_en.htm

The European Commission's public procurement strategy³⁰ focuses on six strategic policy priorities. It aims to improve EU public procurement practices in a collaborative manner by working with public authorities and other stakeholders. One of the six priority areas identified is ensuring a wider uptake of strategic public procurement, including green criteria.

The basic concept of GPP relies on having clear, verifiable, justifiable and ambitious environmental criteria for products and services, based on a life-cycle approach and scientific evidence base, for inclusion in the public procurement process. The European Commission and a number of European countries have developed guidance in this area, in the form of national GPP criteria. The criteria used by Member States should be similar to avoid a distortion of the single market and a reduction of EU-wide competition. Having common criteria reduces considerably the administrative burden for economic operators and for public administrations implementing GPP. Common GPP criteria are of a particular benefit to companies operating in more than one Member State as well as SMEs (whose capacity to master differing procurement procedures is limited).

Since 2008, the Commission has developed more than 20 common GPP criteria³¹. The priority sectors for implementing GPP were selected through a multi-criteria analysis including: scope for environmental improvement; public expenditure; potential impact on suppliers; potential for setting an example to private or corporate consumers; political sensitivity; existence of relevant and easy-to-use criteria; market availability and economic efficiency. The criteria are regularly updated. The GPP criteria are based on data from an evidence base, on existing ecolabel criteria and on information collected from stakeholders of industry, civil society and Member States. The evidence base uses available scientific information and data, adopts a life-cycle approach and engages stakeholders who meet to discuss issues and develop consensus.

In order to support public purchasers to contribute to the transition to a circular economy, in October 2017 the European Commission published 'Public Procurement for a Circular Economy'³². This brochure contains a range of good practice case studies as well as guidance on integrating circular economy principles into procurement.

89% of respondents to the public consultation supporting the present analysis considered GPP to be one of the most effective approaches to generally reduce the environmental impact of products on the EU market, alongside with restrictions on certain chemicals and substances (eg. RoHS, REACH) and waste legislation.

2.4. Extended producer responsibility (EPR)

Extended Producer Responsibility (EPR) is an approach to ensure that producers contribute financially to the costs of waste management; it is thus also an economic instrument to stimulate better design to reduce such costs. EPR schemes form an essential part of efficient waste

³⁰ http://ec.europa.eu/growth/single-market/public-procurement/strategy_en

³¹ http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

³² http://ec.europa.eu/environment/gpp/pdf/CP_European_Commission_Brochure_webversion_small.pdf

management required via EU directives on waste and in national legislation. EPR puts an obligation on producers to take operational or financial responsibility for the end-of-life phase of their products. For electrical and electronic equipment, end-of-life vehicles or batteries, EPR schemes are required by the relevant EU directives. All but one Member State currently have measures on EPR for packaging in place, and this will become mandatory for all Member States from 2024 onward as a result of the 2018 revision of EU waste legislation.

The revised Waste Framework Directive³³ sets new general minimum requirements for EPR schemes to improve their effectiveness and performance across the EU. These requirements specify, inter alia, the costs that should be covered by producers, including costs of separate waste collection, its transport and treatment, as well as costs of providing information to the waste holders and the costs of monitoring and reporting. In addition, the requirements set an obligation for collective schemes to modulate the financial contributions paid by producers for their individual products or groups of similar products, taking into account their durability, reparability, re-usability and recyclability and the presence of hazardous substances, thereby taking a life-cycle approach. This new obligation is still pending implementation by the Member States, although France has already introduced a system for the ‘eco-modulation’ of producers’ fees paid to EPR schemes with the view to rewarding producers designing electrical and electronic equipment which can be easily dismantled and recycled³⁴. The obligation is expected to provide further economic incentive for product design more in line with the principles of circular economy. In line with Article 8(5) of the revised Directive, the Commission will provide guidelines for the Member States on the modulation of financial contributions. The objective is to provide this support prior to the deadline of transposition of the revised Waste Framework Directive which is mid-2020.

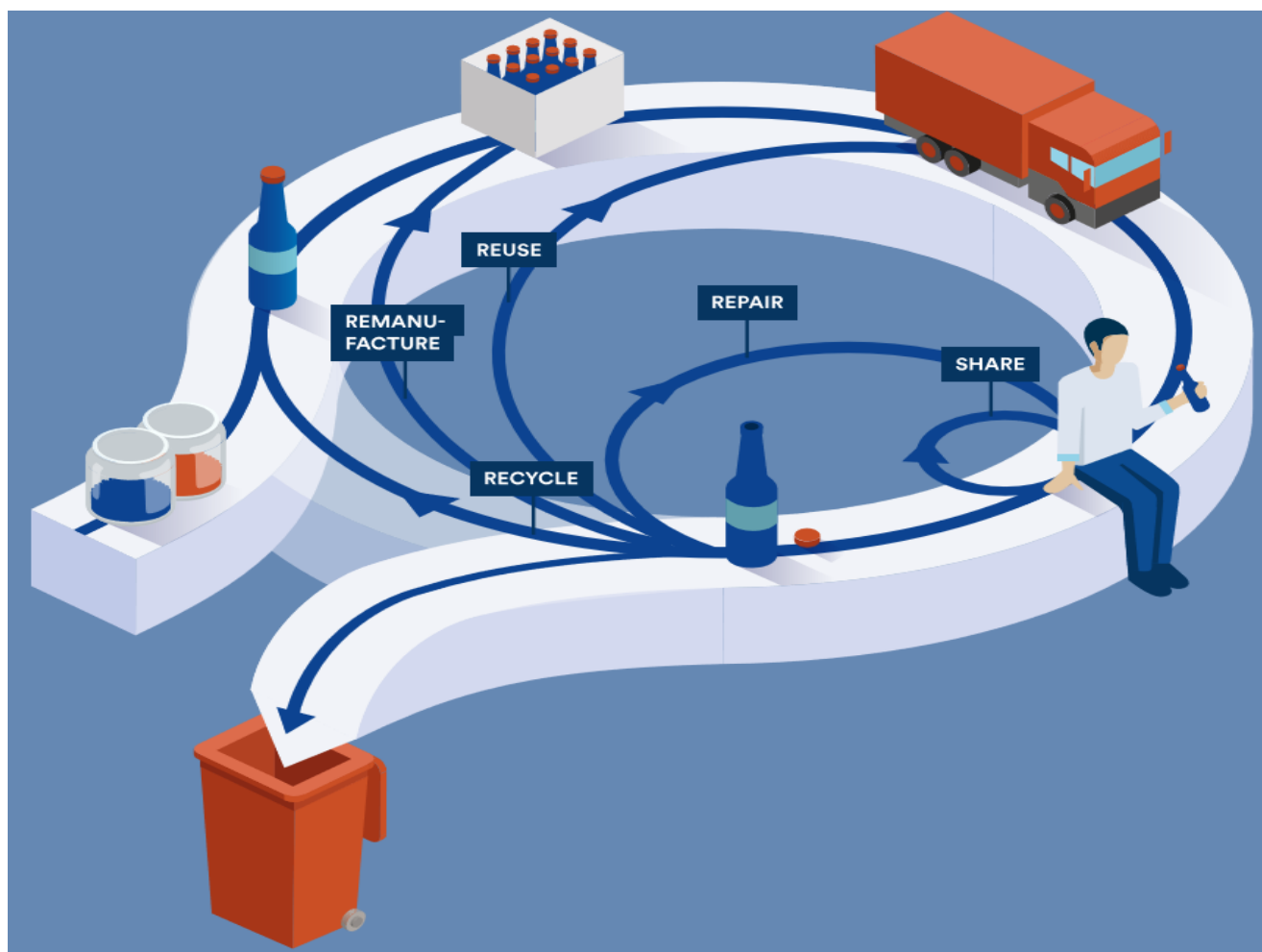
³³ Directive (EU) 2018/851 of 30 May 2018 amending Directive 2008/98/EC on waste

³⁴ More information also available in the final report of the [WEEE compliance promotion exercise](#)

3. PRODUCT LOOPS IN THE CIRCULAR ECONOMY

In a circular economy, products and their materials pass through different loops that aim to maintain the potential of products and materials to create value. Figure 2 below illustrates how this works. In 2016, these circular activities generated almost €147 billion while attracting around €17.5 billion in investments³⁵. In this chapter, the processes involved in these loops are briefly introduced.

Figure 2: Flow of products and materials in a circular economy³⁶



3.1. Share, or collaborative consumption

Many products owned by consumers are not used to full potential during their economic lifespan. Examples include cars, which on average are parked for 95% of their lifetime³⁷ and when used

³⁵ Eurostat data, available on : <https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>

³⁶ Infographic by the European Parliament Research Service, copied from:
www.europarl.europa.eu/thinktank/infographics/circulareconomy/public/index.html

³⁷ www.racfoundation.org/assets/rac_foundation/content/downloadables/spaced_out-bates_leibling-jul12.pdf

transport on average just 1,5 person³⁸; tools, which are only used occasionally by the average owner; and buildings, most of which serve either residential or commercial/industrial purposes and are therefore in actual use for a small part of the time. Collaborative practices and business models aim to harness the unused potential. Digitalisation is providing for the necessary platforms for such models (see chapter 7.1)

Business models based on collaborative consumption are typically quickly developing or well established around high-value products such as vehicles and buildings. Leasing models for cars are well established and ride-sharing applications are widely available. In the tourist sector, sharing platforms have made a serious impact, representing around 5% of all stays. In other sectors the numbers are much lower³⁹. However, some experts estimate that the collaborative economy could add EUR 160-572 billion to the EU economy⁴⁰. Therefore, there is a high potential for new businesses to seek to capture these fast growing markets, as well as a strong consumer interest⁴¹. Collaborative practices are also developing in the informal sector, for example in community networks. They are not always captured by economic statistics but can nevertheless contribute significantly to the circular economy.

In 2016 the Commission published the Communication ‘A European agenda for the collaborative economy’⁴² to help reap the benefits and to address concerns over the uncertainty about rights and obligations of those taking part in the collaborative economy. It aims for the balanced and sustainable development of the collaborative economy by providing legal guidance and policy orientation to public authorities, market operators and interested citizens.

Studies show that the environmental and socio-economic impacts of the collaborative economy are complex to evaluate and can differ strongly per business model. In general, though, by increasing the utilization of existing assets in the economy, the environmental impact of collaborative consumption is often lower than traditional alternatives⁴³. There are however growing concerns over side-effects of collaborative business models, which could have a negative environmental impact and offset the potential advantages⁴⁴. Some stakeholders express concerns over liability issues related to sharing business models⁴⁵.

In conclusion, there seems to be high economic potential for disruptive, collaborative business models. The challenge will be to ensure this potential is reaped without losing sight of the wider potential for sustainability, or even inadvertently harming the environment or consumer interests.

³⁸ www.eea.europa.eu/data-and-maps/indicators/occupancy-rates-of-passenger-vehicles/occupancy-rates-of-passenger-vehicles

³⁹ *Environmental potential of the collaborative economy*, Trinomics et al. for the European Commission, 2017.

⁴⁰ EPRS: The cost of non-Europe in the Sharing Economy. January 2016.

⁴¹ A Eurobarometer opinion poll found that 52 % of EU citizens are aware of the services offered by the collaborative economy and 17 % have used such services at least once.

⁴² COM(2016) 356

⁴³ *Environmental potential of the collaborative economy*, Trinomics et al. for the European Commission, 2017.

⁴⁴ E.g. www.weforum.org/agenda/2018/01/the-dark-side-of-the-sharing-economy/

⁴⁵ https://www.beuc.eu/publications/beuc-x-2016-030_gbe_collaborative_economy_beuc_position.pdf

3.2. Repair

Repair of products can contribute to longer product lifetimes, provide jobs in the repair sector and save expenses on replacement products. It also leads to less material use, thus reducing environmental impacts. However, products on the market are becoming more technologically complex and often contain electronic components, which in some cases complicates repair. High labour costs can also make repair relatively less attractive than replacing a broken product, which in turn is becoming easier with the increase of on-line purchasing and shorter delivery times. There are also concerns that independent repairers are at a disadvantage as compared to repairers working for the original manufacturers, in particular in the electronics sector. The manufacturers may have little incentive to provide access to information and spare parts needed for repairs on the same conditions (in terms of time and money) to repairers who in practice compete with the repairers in their own service or authorised by them. There is also at least a perception that the manufacturers encourage consumers to replace devices with new ones rather than repairing them, for instance by setting high prices for spare parts and repair services, or by designing products that are difficult or impossible to repair by using glued or welded parts or screws that require special tools⁴⁶. It could be expected that as the amount of certain products on the market increases (e.g. electronics due to digitalisation), the repair service market would also grow due to increase demand for repairs. However, this may not turn out to be the case in practice, if obstacles for higher repair rates are not addressed.

Respondents to the public consultation supporting this analysis considered that information on the specific durability of a product and how to repair it is at least as important as the components/ingredients of a product, and more important than information related to the production chain and its environmental performance. Several stakeholders involved in consultations appreciated the work undertaken by the European Commission on the access to vehicle repair and maintenance in the automotive sector⁴⁷. This is seen by many of them as an example to be followed in other areas, particularly electronics.

As explained in paragraph 2.1, reparability measures are systematically considered when preparing or reviewing Ecodesign measures. This should contribute to supporting repairers and providing consumers with more repair options. Further measures that would stimulate the sector could include providing legal clarity as to the liability for repaired products, good access to insurance for repair operators, fiscal measures or new consumer rights (“right to repair”). A comprehensive analysis of the situation in other sectors, comparable to the exercise performed in the automotive sector, could facilitate coherence between different initiatives at EU and other levels.

The repair sector is still fragmented and consists of repairers that differ significantly in type and size. The performance of the repair sector also differs depending on the product category. In order to ensure that consumers repair their products, it is important that affordable and consumer friendly repair services are further developed in the coming years. Professional training has an important role

⁴⁶ See for example <http://eeb.org/stand-up-for-peoples-right-to-repair/>

⁴⁷ https://ec.europa.eu/growth/sectors/automotive/technical-harmonisation/vehicle-repair-maintenance_en

to play to ensure the highest quality of repair services and, at the same time, to enable social benefits through wider access to skilled jobs. The certification of technical competence in this field could also facilitate their wider recognition and integration in circular economy policies.

Socio-economic analysis of the repair sector in the EU⁴⁸

This 2018 study found that reparability has high potential for bringing added value to the economy. This was considered highly relevant to achieve the ambition stated in the Circular Economy Action plan to ‘help European businesses and consumers to make the transition to a stronger and more Circular Economy, where resources are used in a more sustainable way’.

One conclusion of the study was that the high cost of repair and spare parts appears to be a barrier to higher repair rates across the EU. A more competitive independent repair sector would promote innovation and decrease repair costs. However, the study also describes a general tendency towards a higher centralisation of the sector, with large repairers gaining a higher share of the market and small independent repairers being either absorbed by larger repair services or withdrawing from the sector.

The study further concluded that repairs would benefit from more tailored and dedicated legislation, preferably harmonised at the EU level. This could be accompanied by measures taken at national level, such as reduced VAT rates on repair activities, tax deductions on income taxes, tax exemptions for repairers for payroll taxes/social security taxes to drive increased repair rates.

The design of a product, spare parts availability as well as manuals and tools were also found to have a significant role to play in the choice to repair or replace a product. The study found evidence in all ten case studies of Member States that some products are not designed to be repaired at acceptable costs, and a general tendency to substitute products or components instead of repairing them. Finally, the study stated that increased consumer awareness through labels and campaigns could increase the demand of repair activities.

The Commission’s Joint Research Centre is developing a system for scoring the reparability of products⁴⁹. The results of this study will feed into a consumer study to assess consumers’ understanding expectations and opinion on the usefulness of such information. A successful method could be applied in existing or future EU product policy tools.

In conclusion, important potential could be realised in the field of repair and upgrade of products. This would concern several different policies and legislative instruments, at EU, national or regional level. Efficient support actions would therefore require further clarification, priority-setting and cooperation between the relevant decision levels.

⁴⁸ <https://data.europa.eu/doi/10.2779/01503>

⁴⁹ <http://susproc.jrc.ec.europa.eu/ScoringSystemOnReparability/index.html>

3.3. Reuse and second-hand markets

It has been estimated that 1/3rd of goods arriving at recycling centres are re-usable and could be sold second-hand⁵⁰. Reusing these products would create jobs in the second-hand market sector in the EU, including in social enterprises, increase material efficiency and reduce waste. Supporting the development of re-use centres and networks, including through enabling technologies⁵¹, could stimulate this important contributor to circular economy. Reuse can apply to various product groups, including electrical and electronic equipment⁵² but also batteries from e-vehicles⁵³. Second-hand products can represent an affordable, high quality alternative for low quality new products.

The 2018 revision of the EU waste legislation introduced several new provisions aimed at promoting the reuse of products and packaging. In line with the waste hierarchy, the revised legislation strengthens the importance of waste prevention. In this context it requires Member States to promote sustainable production and consumption models including through resource-efficient product design; to encourage re-use of products and the setting up of systems promoting repair and re-use activities and to encourage the availability of spare parts, information and other instruments needed for repair and re-use⁵⁴. Implementation of these requirements in the Member States should significantly boost the re-use and repair sector. In addition to requirements on products, economic incentives could support re-use. For example, some Member States have set lower VAT rates for second-hand products.

In some cases, stakeholders have expressed uncertainty about the legal framework for second-hand product. Examples include requirements for the information to be provided with such products (in the absence of the original packaging) and liability for damages caused by the products. The European Commission is currently working on this issue. In particular, following the publication of the Communication on Artificial Intelligence for Europe⁵⁵, the Commission started a process to reflect on whether further developments in the EU legal framework are needed in order to ensure equitable remedies, compensation and allocation of responsibilities and to offer legal clarity. As announced in 2018, the European Commission will publish, by mid-2019, an Interpretative Guidance on the Product Liability Directive, and a Report on the broader implications for, potential gaps in and orientations for, the liability and safety frameworks for Artificial Intelligence, Internet of Things and robotics.

In conclusion, there seems to be remaining potential for supporting reuse operators, through material requirements that facilitate a longer product lifetime (and thus better reuse opportunities) and/or financial incentives, building on existing practices such as lower VAT rates for second-hand products in certain Member States.

⁵⁰ <http://www.rreuse.org/wp-content/uploads/RREUSE-response-to-CEP-FINAL-28.4.2016.pdf>

⁵¹ E.g. diagnostics and sorting technologies

⁵² <http://dx.doi.org/10.2788/51992>

⁵³ <http://dx.doi.org/10.2760/53624>

⁵⁴ See article 9 of Directive (EU) 2018/851 of 30 May 2018 amending Directive 2008/98/EC on waste

⁵⁵ COM(2018) 237; SWD(2018) 137

3.4. Remanufacturing

Remanufacturing can be considered as a process to bring discarded, out-dated or no longer functional products to a same-as-new or better condition and performance, after which they can re-enter the market⁵⁶. It involves dismantling the product, restoring and replacing components and testing the individual parts and whole product to ensure that it is within its original design specifications. As the aim is for the remanufactured product to be as good as a new product, a consumer can expect performance after remanufacture to be to the original performance specifications, and warranty provided tends in practice to be equal to that given on an equivalent new product. From an EU law perspective, the Union safety legislation considers that where products have been subject to important changes or overhaul aiming to modify its original performance, purpose or type after they have been put into circulation and having a significant impact on its functioning, the product would be subsequently deemed to be a new product and that the person who puts this new product into circulation under their name takes responsibility for compliance of that new product with the applicable Union safety legislation.

Remanufacturing represents a vital loop in the circular economy as it maintains the value incorporated in products and components as a result of their design, manufacturing and maintenance, which is lost when the product is reduced back to the materials it consists of through recycling (which in turn aims to keep the value of the materials). It typically plays an important role in industries with very high-value products, such as aviation, automotive and medical devices and as such is most relevant in a business to business context. However, it can also contribute in sectors such as furniture (in particular office furniture) and electrical and electronic equipment⁵⁷. However, even if remanufactured products should in principle perform as well as or even better than equivalent new products, in practice consumers often do not appreciate them at the same level. They can however compete with new but lower quality products, and can as such present a more sustainable alternative for these. Third-party verification of the performance of remanufactured products may also be a way to prove the quality of these products and improve their market acceptance.

The European Remanufacturing Network⁵⁸, funded through the EU Horizon 2020 program, surveyed the level of remanufacturing activity by sector across the EU and generated a number of high impact actions which could boost remanufacturing, for practitioners, policy-makers and researchers. Beyond research funding, the interaction between the different product legislations and remanufacturing could be further studied.

3.5. Recycling and uptake of recycled content

Recycling is a vital activity for avoiding environmental damage when products become waste and for providing material inputs for production. It contributes to the security of supply of (secondary) raw materials and helps to improve the sustainability of materials in the EU economy. While materials

⁵⁶ <https://www.remanufacturing.eu/about-remanufacturing.php>

⁵⁷ www.remanufacturing.eu/assets/pdfs/remanufacturing-market-study.pdf

⁵⁸ www.remanufacturing.eu

generally degrade at least to a certain extent during recovery (and some materials more so than others), recycling clearly contributes to keeping materials in the loop.

The EU has elaborated legislation on waste that in many aspects relates to recycling. Horizontal measures such as the Waste Framework Directive⁵⁹ and the Directive on Landfilling of Waste⁶⁰ set targets for reducing the amount of waste going to landfill and increasing the amount of waste being recycled. Further measures with similar aims are included in sectoral legislation such as the directives on Waste Electrical and Electronic Equipment (WEEE), End-of-life Vehicles (ELV), Packaging and Packaging Waste and Batteries. Evaluations of and reporting under these instruments shows that they have led to a strong increase in the amount of materials being recycled, even if in some cases the performance in some Member States fails to meet the targets set. Moreover, recycling rates of the critical raw materials that are contained in these waste flows are still very low⁶¹.

In many of the regulations in force, the European Commission is looking into material recyclability through instructions for the end-of-life and requirements for products to be designed in a way that facilitates recyclable material recovery. For example, measures under the Ecodesign directive have included requirements on the disassembly of components for recycling and on the identification and accessibility of hazardous materials, with a view to facilitating recycling of the products at end of life. As stated in the Ecodesign work programme 2016 - 2019, the Commission is more systematically exploring the possibility of establishing product-specific requirements contributing to Circular Economy objectives, which will further contribute to better recycling of materials from products covered by Ecodesign measures.

However, just producing more secondary raw material does not guarantee it is taken up in products. Stakeholders across the different sectors indicate challenges as to incorporating recycled materials. For some materials such as glass and metals (e.g. iron, zinc), recycling's contribution to meeting demand is relatively high, however, for most specialty metals and rare earth elements, secondary production contributes only marginally (often only around 1 % or less) to meeting materials demand⁶². A good illustration of these aspects concern waste from electrical and electronic equipment (WEEE). The successful implementation of the collection target of the WEEE Directive would mean that in 2020, about 10 million tonnes of WEEE would be separately collected. Currently however, there is a large discrepancy between WEEE generated and WEEE collected⁶³, which can partly be explained by improper disposal of WEEE by consumers (e.g. in waste bins), or by waste flows that are: (i) not properly reported as collected; (ii) treated under non-compliant conditions with

⁵⁹ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

⁶⁰ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

⁶¹ Report on Critical Raw Materials and the Circular Economy - Commission Staff Working Document SWD(2018) 36

⁶² See indicator 16 "Recycling's contribution to meeting materials demand" of the Raw Materials Scoreboard 2018.

⁶³ See for example Indicator 17 "WEEE Management" of the Raw Materials Scoreboard 2018

other metal scrap; or (iii) illegally exported⁶⁴. This implies important material losses, including for precious metals and critical raw materials.

For other materials such as plastics, demand is not at the same levels. The low price typically paid for plastic material (be it virgin or recycled) makes it hard to recuperate the investment made during the recycling process. This results in much material being exported from Europe to places where cost structures (e.g. lower labour cost) make recycling more economically attractive.

One of the aims of the EU plastics strategy⁶⁵ was to promote the use of recycled plastic material. The strategy calls for an increase in recycled materials used in all products. Furthermore, a pledging campaign was launched to invite voluntary commitments from industry to replace virgin plastics in their products with recycled plastics, aiming to multiply the amount of recycled material used by 4 (to 10 million tons annually). The Commission followed up on the campaign by launching the Circular Plastics Alliance, together with stakeholders from the plastics value chain, which aims at improving the economics and quality of plastics recycling in the EU, in particular by better matching supply and demand for recycled plastics. During negotiations on the Single-use Plastics directive⁶⁶ proposed under the umbrella of the plastics strategy, a more specific requirement was introduced to include at least 25% recycled PET material in PET beverage bottles as of 2025, and 30% recycled content in all beverage bottles by 2030.

In another effort to reduce virgin plastic use and to improve the competitive position of recycled plastic, the Commission proposed in 2018 a national contribution calculated on the amount of non-recycled plastic packaging waste in each Member State, in the context of the Multiannual Financial Framework (MFF). Discussions on the MFF are ongoing at the time of writing of this document.

Further fiscal and economic measures could improve the competitive position of recycling vis-à-vis virgin raw materials, for example reducing VAT for products containing recycled materials, or shifting the tax burden from labour to polluting activities. In the context of the European Semester, the Commission has pointed to the advantages of shifting from taxation on labour to other tax bases less detrimental to economic growth, such as consumption taxes and environmental taxes⁶⁷, which would also contribute to pricing in negative externalities and incentivise behavioural change.

Another horizontal issue relates to obstacles to cross-border recycling value chains. While the EU legislation for waste aims to establish a level playing field across the EU, differences between Member States remain when it comes to interpretation, implementation and enforcement of by-product and end-of-waste status. In spite of efforts by the European Commission to provide guidance to minimise such differences, stakeholders indicate that in practice, the same material may still be considered waste by authorities in one Member State, and not in another. This means that stakeholders in cross-border value chains need to comply with different legislative regimes, often

⁶⁴ Countering WEEE Illegal Trade (CWIT), <http://www.cwitproject.eu/>.

⁶⁵ A European Strategy for Plastics in a Circular Economy - COM (2018) 028

⁶⁶ Under negotiation at time of writing. Provisional text available at http://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/ENVI/AG/2019/01-21/1174364EN.pdf

⁶⁷ https://ec.europa.eu/info/sites/info/files/file_import/european-semester_thematic-factsheet_taxation_en_1.pdf

perceived as a deterrent for recycling. As part of the follow-up to the 2018 waste legislation revision and the discussions on the interface between chemicals, products and waste, in the course of 2019 the Commission will look into this issue to identify best practices in Member States and will consider the need to produce further guidance.,

The voluntary EU Ecolabel and GPP tools promote the recyclability of products and material: in several EU Ecolabel and GPP product groups where products are likely to contain a substantial amount of plastics, the criteria require the marking of bigger plastic parts so that at the end of its useful life, sorting of plastics is easier. A criterion on the design of plastic packaging to facilitate effective recycling by avoiding potential contaminants and incompatible materials that are known to impede separation or reprocessing or to reduce the quality of recyclate can be found in EU Ecolabel criteria for Rinse-off cosmetics and in all six criteria sets for detergents. Requirements are included in both EU Ecolabel and GPP criteria for some product groups for design for easy disassembly of different components (e.g. furniture or computers) in order to facilitate recycling. With the same aim, specific hazardous substances are restricted from plastic components in these criteria for some product groups.

4. PRIORITY PRODUCT CATEGORIES FOR THE CIRCULAR ECONOMY

4.1. Packaging

Packaging, while itself not a product, is obviously strongly associated with products. The high impacts of packaging on the environment, particularly when littered, are widely acknowledged.

There are a number of EU policy tools that addressing packaging directly or indirectly. The main one is the Packaging and Packaging Waste Directive (PPWD)⁶⁸, which inter alia contains essential requirements which packaging placed on the EU market needs to comply with. The PPWD was recently amended twice, once specifically to reduce the use of plastic bags⁶⁹ and once as part of the wider revision of the legislation applicable to waste, notably to increase the recycling targets for different packaging materials and strengthening the emphasis on prevention of packaging waste. This latest revision also resulted in a new provision calling on the Commission to examine the feasibility of reinforcing the essential requirement with a view to, inter alia, improve design for reuse and promote high quality recycling, as well as strengthening their enforcement. The Commission has started preparatory work on this which also takes into account the Plastics Strategy's action to work towards new harmonised rules to ensure that by 2030 all packaging placed on the market can be reused or recycled in a cost-effective manner. In addition, as mentioned in section 2.4, the 2018 revision of the Waste Framework Directive introduced an obligation to modulate financial contributions paid to the EPR schemes by producers for their products (including packaging) based on certain product criteria, including recyclability, which is expected to incentivise better packaging design.

With the amount of harmful plastic litter in oceans and seas growing ever greater, the European Commission proposed⁷⁰ new EU-wide rules to target the 10 single-use plastic products most often found on Europe's beaches and seas⁷¹, as well as lost and abandoned fishing gear. Together these constitute 70% of all marine litter items. A provisional agreement was reached between the co-legislators in December of 2018⁷². It covers packaging items such as plastic bottles, food containers and wrappers as well as non-packaging items. The measures are proportionate and tailored to get the best results. This means different obligations and restrictions will be applied to different products. Where alternatives are readily available and affordable, single-use plastic products will be banned from the market. For products without straight-forward alternatives, the focus is on limiting their use through national targets for reduction in consumption; design and labelling requirements and waste management/clean-up obligations for producers.

⁶⁸ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste

⁶⁹ Directive (EU) 2015/720 of the European Parliament and of the Council of 29 April 2015 amending Directive 94/62/EC as regards reducing the consumption of lightweight plastic carrier bags

⁷⁰ https://ec.europa.eu/commission/news/single-use-plastics-2018-may-28_en

⁷¹ These will be supported by new rules on Port Reception Facilities for the delivery of waste from ships; provisional agreement on these rules was reached in December 2018

⁷² http://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/ENVI/AG/2019/01-21/1174364EN.pdf

Refillable and proportionate-to-its-content packaging is promoted in EU Ecolabel criteria for Rinse-off cosmetics and in all six criteria sets for Detergents through the weight/utility ratio formula that product packaging has to comply with. The "Packaging Impact Ratio" used in Rinse-off cosmetics ensures that the products have a proportionate to their content use of plastic packaging. Furthermore, superfluous secondary packaging is not allowed if producers want to benefit from the EU Ecolabel.

In conclusion, finalization and implementation of above mentioned recent and ongoing work in the field of packaging would help address much circular economy potential in this sector.

4.2. Food

The food sector is the Union's biggest sector in terms of employment and contribution to GDP, with over 17 million businesses involved in producing, processing, transporting and selling food. The 'food system' uses many natural resources, such as land, water, nutrients and energy for food production. Subsequent processing, packaging, transportation and refrigeration use further energy, cause emissions and use materials. Food and drink production is linked to many environmental effects, including biodiversity loss, water and air pollution, and greenhouse gas emissions. The environmental impacts of the production and consumption of food in the EU are not restricted to Europe but also occur in third countries, as the EU is the largest exporter and importer of agricultural and food products on the global stage. Food production is by far the largest user of global freshwater supplies, with agriculture being responsible for 70 % of consumption. Industrial activities related to food systems require approximately 26 % of the EU's energy consumption. Food production accounts for 60 % of global terrestrial biodiversity loss. Including primary production, the food sector accounts for more than 25 % of global greenhouse gas emissions. Feeding the population of the world sustainably in coming decades is a challenge that many organisations are considering⁷³. Providing food and nutrition security in a changing world is an urgent objective due to the increasingly interconnected challenges of natural resource scarcity, climate change, and population growth, which affect European and food systems globally⁷⁴. Clearly, there is much circular economy potential in this product category in terms of economic impact, employment and environment.

The EU has comprehensive policies and legislation on agriculture, food and feed safety, nutrition, animal health and welfare, plant protection and plant health. These policies aim to reduce the environmental and climate impact on natural resources and to protect plant, animal and human health as well as the environment. In addition, policies aim to prevent contamination of the food chain and promote more efficient food production and reduction of food waste.

The 2013 reform of the Common Agriculture Policy (CAP) included new actions to adopt and maintain farming practices that help meet environment and climate goals. A major innovation introduced was direct payments to farmers for carrying out a compulsory set of greening measures. These efforts were evaluated in 2017⁷⁵. While noting that not much time had passed between the

⁷³ E.g. <http://www.weforum.org/agenda/2018/01/how-to-sustainably-feed-the-world/>

⁷⁴ European Research and Innovation for Food and Nutrition Security - SWD(2016) 319

⁷⁵ https://ec.europa.eu/agriculture/evaluation/market-and-income-reports/greening-of-direct-payments_en

introduction of new measures and the evaluation, making it hard to assess long-term effects of the new policies, it found that environmental and climate objectives had not generally been a major factor in the Member States' implementation choices. In 2018, the European Commission presented legislative proposals on the common agricultural policy (CAP) beyond 2020. These proposals aim to lead a transition towards a more sustainable agriculture and make the CAP more responsive to current and future challenges such as climate change and environmental degradation or generational renewal, while continuing to support European farmers for a sustainable and competitive agricultural sector⁷⁶.

The Council Regulation on organic production and labelling⁷⁷ sets out the principles, aims and overarching rules of organic production and defining how organic products should be labelled. This Regulation is complemented by several Commission implementing acts on the production, distribution and marketing of organic goods. These legislative acts together form the legal basis that governs whether goods, including those that have been imported from non-EU countries, can be marketed as organic within the EU and when the EU organic logo can be used. As of 2021, the regulation will be replaced by new regulation 2018/848⁷⁸, which revises and strengthens the EU's rules concerning the production and labelling of organic products in relation to the control system, the trade regime and production rules. In this way, it seeks to create a level playing field for operators, to harmonise and simplify rules and to improve consumers' confidence in organic products and in the EU's organic production logo.

The Regulation on Food Information to Consumers⁷⁹ has the objective to pursue a high level of protection of consumers' health and interests by providing food information to final consumers to enable them make informed choices and to make safe use of food, with particular regard to health, economic, environmental, social and ethical considerations. The Commission is currently preparing a report on the different front-of-pack nutrition labelling schemes currently implemented or being developed at the national level and to assess the impact on consumer understanding and consumer behaviour.

In 2011, the Commission undertook a study on the feasibility of developing EU Ecolabel criteria for food and feed products and asked the opinion of the EU Ecolabelling Board. Based on these two inputs the Commission at that time decided not to develop EU Ecolabel criteria for food and feed products, but stated it could reconsider the possible role of the EU Ecolabel within the framework of future EU food related strategies, in particular in light of developments in methodologies and other tools for measuring the environmental impact of products. The ongoing study on the identification of elements for a strategic approach to the EU Ecolabel is inter alia considering which product groups the EU Ecolabel should focus on in future and will also consider food, drinks, feed, food services etc. (see chapter 2.2). GPP criteria are already in place for food and catering services.

⁷⁶ https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap_en

⁷⁷ Council Regulation (EC) No 834/2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91

⁷⁸ Regulation (EU) 2018/848 — rules on organic production and labelling of organic products

⁷⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011R1169&from=en>

There are significant gaps in knowledge and scientific data on the environmental and social impacts of food products. This makes establishing criteria for sustainable food management, sourcing, procurement and consumption difficult. In order to overcome this difficulty the Commission has developed and road tested with food industries the product environmental footprint (PEF) method. This method allows calculating the environmental impacts of products based on a 'life-cycle' approach, thus also allowing for more accurate and comparable assessments of the full environmental impacts of specific food products. See chapter 6 for more information on the Environmental Footprint methods.

As set out in the CEAP, the Commission has worked on multiple strands relating to food. The revised Waste Framework directive introduced a definition of 'food waste', requires Member States to reduce food waste at each stage of the food supply chain and requested the Commission to adopt a delegated act on food waste measurement by March 2019. Work to meet the target, based on the outcome of the work of the dedicated platform (see below) is ongoing, focussing on establishing a common methodology to measure food waste and a format to report on food waste levels.

The "EU Platform on Food Losses and Food Waste"⁸⁰, established in 2016, aims to accelerate the EU's progress towards the Sustainable Development Goal Target 12.3 of halving global food waste by 2030⁸¹. This multi-stakeholder forum, bringing together key players from both public and private sectors, supports all actors in taking effective measures to prevent and reduce food loss and waste, facilitate inter-sector cooperation and share best practice and results achieved. A digital network was set up in 2017 to improve collaboration and exchange as well as a Community of Experts under the Horizon 2020 project REFRESH.

The Commission published EU Guidelines for the feed use of food no longer intended for human consumption⁸². The guidelines explained the legislation applicable depending on the classification of a certain product, enhanced legal clarity, and presented examples of best practices that comply with the current Union regulatory framework while preventing unnecessary administrative burden.

Facilitating food donation is crucial to reduce food waste. Therefore, EU guidelines on food donation⁸³ were adopted on 17 October 2017 in order to facilitate compliance of providers and recipients of surplus food with relevant requirements laid down in the EU regulatory framework and to promote a common interpretation by regulatory authorities in the EU Member States of EU rules applying to food redistribution. An ongoing EU pilot project will further investigate frameworks for food redistribution in the EU and support dissemination of the EU food donation guidelines and stakeholder engagement.

⁸⁰ https://ec.europa.eu/food/safety/food_waste/eu_actions/eu-platform_en

⁸¹ SDG Target 12.3: halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains.

⁸² C(2018) 133/02

⁸³ C(2017) 6872

The manner in which date marking (i.e. “use by” and “best before” dates) is utilised by food business operators and regulatory authorities in management of the food supply chain can have a significant impact on food waste. In February 2018, the European Commission published a market study on date marking practices in the EU, increasing the understanding of the possible impact of date marking on food waste generation. The study estimated that up to 10% of the 88 million tonnes of food waste generated annually in the EU are linked to date marking⁸⁴.

In conclusion, the remaining potential in this sector is very high. Many initiatives are underway that address this potential via different approaches at different levels and consistency and complementarity should be ensured. The Commission has increasingly applied circular concepts in food related policies and this will need to be continued to realise the potential for circularity.

4.3. Electrical and electronic equipment (EEE) and batteries

In today's world, semiconductors have become essential components of many aspects of our daily lives, so much so that the business of producing semiconductors is of key strategic importance to all industrialised countries. Two notable disruptions make it imperative for Europe to act to make electronics value chains fit for the future: the emergence of artificial intelligence and its impact, as well as the massive investments needed in very advanced know-how and technology to produce semiconductors and other strategically important electronic components.

Between 2014 and 2015, the amount of electrical and electronic equipment (EEE) placed on the market increased from 9.3 million tonnes to 9.8 million tonnes in the EU. However, the 2015 level (9.8 million tonnes) is still lower than in 2008⁸⁵. There are concerns that EEE products seem to have decreasing lifetimes and that it is becoming increasingly difficult to repair them. For example, even though the average first-use duration of white goods such as washing machines, dryers and refrigerators is approximately 13 years, an increasing number of appliances fail within the first five years of their service life: the number of large household appliances being replaced within the first five years of their service life due to a defect increased from 3.5 % in 2004 to 8.3 % in 2013⁸⁶. As these devices are increasingly designed for automated manufacture at lower cost, they are harder to repair at acceptable cost. Examples include the use of welded plastic tubs in washing machines that prevent the repair of bearings and sealed electronics that need replacing as a whole at a cost comparable with the original price of the machine. The recent JRC Preparatory Study⁸⁷ also notes that for washing machines, repair seems to have become more difficult in new devices.

⁸⁴ Market study on date marking and other information provided on food labels and food waste prevention. ICF in association with Anthesis, Brook Lyndhurst, and WRAP (2018)

⁸⁵ https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics_-_electrical_and_electronic_equipment; accessed on 02/09/2018

⁸⁶ Prakash, S., Dehoust, G., Gsell, M., Schleicher, T. and Stamminger, R., 2016a, Einfluss der Nutzungsdauer von Produkten auf ihre Umweltwirkung: Schaffung einer Informationsgrundlage und Entwicklung von Strategien gegen „Obsoleszenz“

⁸⁷ Follow-up of the preparatory study for Eco-design and Energy Label for household washing machines and household washer dryers, JRC 2017

The European Commission launched a process with a view to updating the current strategy on electronics⁸⁸ in Europe. A report consisting of eight proposed actions to strengthen electronics value chains was presented in June 2018. As described in section 7.1, the digitalisation of our economy and society is expected to continue and cause a large growth in the amount of electrical and electronic equipment (EEE) being marketed and used. While this is expected to bring economic, social and environmental benefits, the challenge will be to manage this development in such a way to avoid related negative impacts such as higher energy use and growth in the production of waste EEE (WEEE) and of residual waste. This requires addressing design (for repair, upgrade and recycling), the circularity potential of the materials used, energy efficiency, promoting longer product lifetimes and efforts to prevent WEEE production and promote WEEE recyclability.

Ecodesign and Energy labelling measures are in place or being developed for a number of EEE products. The Ecodesign work plan 2016 – 2019 details progress made and planned new measures and reviews⁸⁹. Priority product groups are identified by quantitative estimation of the energy saving potential resulting from improvements in the overall energy efficiency for each product group and a qualitative assessment of other environmental impacts.

While Ecodesign and Energy labelling measures have a primary focus on energy efficiency, other parameters such as water consumption and material efficiency aspects were included in the measures in force for a number of products⁹⁰. Future measures will build on this experience, where appropriate making use of the new definitions and measurement methods that are being developed. The integration of resource efficiency aspects such as durability, reparability and recyclability, is now systematically considered for new product groups or revisions, including five consumer products⁹¹ for which revised Ecodesign implementing measures and Energy Labelling measures are planned for adoption in 2019. Energy labels typically include more information than just energy use, for example water use or noise emission. Ecodesign measures can enhance the products recyclability through requirements on the easiness of dismantling and information on location and removal of components containing hazardous substances and critical raw materials, and reparability through requirements on spare parts availability, access to information on repair and maintenance and even access to the latest versions of firmware⁹². Measures addressing wider circular economy and material efficiency aspects will continue to be systematically included, whenever possible, in the upcoming ecodesign measures. The experience gained on specific products will be consolidated and constitute a 'tool box' for future product group and policies, including a review of the method of evaluation of energy-related products (MEErP) to better integrate circular economy and material efficiency aspects.

⁸⁸ <https://ec.europa.eu/digital-single-market/en/renewed-electronics-strategy-europe>

⁸⁹ See 'Ecodesign Working Plan 2016-2019' (COM(2016) 773)

⁹⁰ Durability requirements are included in the measures on lamps and vacuum cleaners, requirements on disassembly are included in the measures for vacuum cleaners and professional refrigeration products, and requirements furthering recyclability are included in a range of measures including lamps, televisions, vacuum cleaners, electric motors, industrial fans, water pumps, circulators, ventilation units, space and water heaters, and professional refrigeration products.

⁹¹ Lighting, displays, refrigerators, dishwashers, washing machines and washer-dryers.

⁹² <https://doi.org/10.1016/j.cose.2017.12.001>

The Low Voltage Directive⁹³ (LVD), which is currently being evaluated⁹⁴, aims to ensure the safety of low voltage electrical equipment placed on the EU market and enable its free movement. In addition, the proposed revision of the Machinery Directive⁹⁵ aims to further improve safety levels of professional equipment and take into account innovations that may arise from technical progress in digitisation.

The directive on the Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) aims to eliminate substances used in EEE products that could be hazardous to human health and the environment, including substances that could hamper recycling. The directive on Waste from Electrical and Electronic Equipment (WEEE) sets ambitious targets for the collection and preparation for reuse/recycling of WEEE⁹⁶. The Directive incorporates extended producer responsibility requirements so as to incentivise EEE producers to design their products in a way which reduces the amount of material ending up as waste. Its requirements on how to handle such waste reduce impacts on the environment from WEEE treatment, including recycling and other recovery operations and allow the recovery of valuable materials.

As mentioned in section 2.4, the 2018 revision of the Waste Framework Directive introduced an obligation to modulate financial contributions paid to the EPR schemes by producers for their products (including electrical and electronic equipment and batteries) based on certain product criteria, including durability, reparability, re-usability, recyclability, or presence of hazardous substances. Once implemented across the EU this tool is expected to incentivise better design of EEE.

In addition, an EU platform “Information for Recyclers”⁹⁷ was launched to share information on new EEE placed on the Union market in view of their preparation for re-use and treatment at the end of life as laid out in the WEEE Directive. This information relates for example to components and materials, and to the location of dangerous substances and mixtures. Given that requirements on information exchange in the WEEE Directive are similar to those set in some Ecodesign regulations, it is important to ensure consistent implementation in cases where these requirements address the same products. Indeed, the different Ecodesign measures under preparation in line with the 2016-2019 working plan refer to the WEEE Directive requirements whenever appropriate.

The Batteries Directive is the only piece of EU legislation that is entirely dedicated to batteries. Its provisions address aspects relating to the life cycle of batteries, i.e. the design, placing on the market, end of life, collection, treatment and recycling of spent batteries. It defines objectives and sets targets, identifies corresponding actions and outputs, and establishes additional provisions enabling and complementing these key requirements. This directive is currently being evaluated to assess

⁹³ Directive 2014/35/EU on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

⁹⁴ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5291384_en

⁹⁵ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-6426989_en

⁹⁶ The WEEE Directive introduced a collection target of 45 % of EEE sold that applies from 2016 and, as a second step from 2019, a target of 65 % of EEE sold, or an equivalent of 85 % of WEEE generated.

⁹⁷ <https://i4r-platform.eu/about/>

whether it responds to its original objectives and what changes might be required to take full account of experience with its operation and a changing policy context⁹⁸.

The EU Strategic Action Plan for batteries⁹⁹ sets out the EU ambition to become a leading player in battery production. The action plan aims to use existing policy instruments to ensure that the increase in production takes due account of sustainability and circularity. Amongst others, Ecodesign measures for batteries are being considered¹⁰⁰ to complement the safety requirements with sustainability requirements based on a life-cycle approach, taking into account the results of the Product Environmental Footprint (PEF) pilot on batteries (see also chapter 6.1). With EU support, eight regions across Europe have established an interregional partnership on Advanced Materials for Batteries for Electro-mobility and Stationary Energy Storage. The partnership will develop joint projects on advanced materials (such as on robustness characteristics under extreme working conditions) with the goal to deploy them in the field of batteries. A progress report on the strategic action plan is envisaged for the first quarter of 2019.

EU Ecolabel criteria have been developed for some EEE, including televisions, imaging equipment and computers. Such criteria served to identify excellent products in terms of environmental performance. Uptake of the EU Ecolabel for such products has in practice been very limited. As a result, EU Ecolabel criteria for imaging equipment have been discontinued, and discontinuation of criteria for computers is envisaged in 2019. In the context of the development of a strategic approach for the EU Ecolabel, the Commission is analysing the reasons behind low uptake of the EU Ecolabel in these product groups and considering what role there is for the EU Ecolabel in product groups that are also covered by Energy labels. For more information, see chapter 2.2.

To better understand the possible synergies and overlaps between the different policy tools in place in this sector, the Commission has taken the example of the product group of solar photovoltaic modules, inverters and systems. A Preparatory study on the feasibility of applying EU sustainable product policy instruments (EU Ecolabel, GPP requirements, Ecodesign regulations and Energy labelling) to this product group is under development. The study will identify the best policy tool or combination of policy tools that will be more effective to increase the sustainability and circularity of this product group. Lessons learned from this experience could be applied to other product groups and/or give indications for future policy developments. Furthermore the approach also takes into account the results of the product environmental footprint pilot on photovoltaic modules (see chapter 6).

In conclusion, many EU policy tools currently address EEE. At the same time, still only 35% of WEEE is collected for recycling¹⁰¹, meaning that much material still ends up in landfill or incineration. Given the wide range of existing policy tools, the remaining potential for a better contribution to circular economy lies mostly in reinforcing the implementation of existing tools, for

⁹⁸ <http://ec.europa.eu/environment/waste/batteries/evaluation.htm>

⁹⁹ COM(2018) 293 final

¹⁰⁰ <https://ecodesignbatteries.eu/>

¹⁰¹ See <http://ewastemonitor.info/>

instance by further developing resource efficiency requirements and applying them to more products within their scope, while continuing to pursue better synergies and consistent implementation between the different policy tools and a strategic deployment of measures to achieve maximum result.

4.4. Transport and mobility

The role of mobility in a circular economy is important and complex. Developments such as alternative fuels mobility, cooperative, connected and automated mobility, car sharing, drone delivery and many others are emerging and changing our approach to transport. Several policies are in place at different levels. At the EU level, a comprehensive policy framework is in place, addressing vehicle emissions and setting requirements for safety, security and passenger rights. Covering all developments in this field is beyond the reach of this analysis, which focusses on products. Developments in electric mobility will clearly impact the use of Lithium Ion batteries, policies for which were discussed in section 4.3. Sections 3.2, 3.3 and 3.4 already touched on the particular importance of repair, reuse and remanufacturing in the automotive sector, given the high value of the products being used. When vehicles reach end-of-life, they are covered by the end-of-life vehicles (ELV directive)¹⁰², which includes mandatory EPR as set out in section 2.4. This section focusses mostly on automotive related products including tyres, oil filters and waste oils, and on some recent developments in mobility related policies relevant for circular economy.

The market value of tyres is expected to grow by 19.6% between 2018 and 2022 and to reach close to 40 billion euros. Technological developments and value growth are being driven by manufacturers continuing to pursue fuel efficiency gains through the use of different compounds and lighter materials, consumer demand for premium tyres over mid-range or budget tyres and the continuing trend for vehicles to roll on super-sized rims¹⁰³. The EU tyre labelling regulation forms part of the EU legislation on the energy efficiency of products. The new Commission proposal¹⁰⁴ aims at improving the effectiveness of labelling to ensure cleaner, safer and quieter vehicles and contributing to decarbonisation, including by requiring information to be made available on abrasion or mileage, provided suitable test methods are available.

Tyres may consist of synthetic or natural rubber or both. Natural rubber is a Critical Raw Material¹⁰⁵ in the EU. The tyre industry in EU consumes around 70% of natural rubber that is imported mainly from Asia-Pacific, but also increasingly from Ivory Coast (18%). During the last ten years the

¹⁰² Directive 2000/53/EC of 18 September 2000 on end-of life vehicles

¹⁰³ The European Tires Market, 2012 - 2022: Market size, market forecast and recommendations, PR Newswire website. Accessed 28/08/2018 <https://www.prnewswire.com/news-releases/the-european-tires-market-2012---2022-market-size-market-forecast-and-recommendations-300575332.html>

¹⁰⁴ <https://ec.europa.eu/transport/sites/transport/files/3rd-mobility-pack/com20180296-proposal.pdf>

¹⁰⁵ The list of Critical Raw Materials contains raw materials which reach or exceed thresholds for both economic importance and supply risk to the EU. The European Commission established the first list in 2011, it is updated at least every three years to reflect market, production and technological developments. In the CRM list of 2017, 27 CRMs were identified (including Natural rubber) using a revised methodology for an assessment of 78 raw materials.

demand for natural rubber has considerably increased in the world, leading to expansions in plantations in tropical countries.

Tyre retreading offers high potential for circularity, but the retreading market is in decline, down by 20% since 2010. This has come with a loss of more than 3000 jobs in the EU. Without intervention, the market is expected to further decline in the future, under pressure of inter alia competition from imported low-cost tyres. While re-treading has a very positive impact in terms of material use and employment, life-cycle analysis data suggests it is not beneficial in respect of the carbon impacts. A reduction in consumption of tyres, through direct reuse of part worn tyres and an extension in product lifetimes due to increased durability could achieve circular economy potential.

Worn tyres that are not retreaded can be recycled, although the resulting material is typically not used for making new tyres but for other purposes. One application, as rubber granulate on synthetic turf fields, has recently come under scrutiny¹⁰⁶. However, many other recycling approaches exist that can extend the time between a tyre reaching end-of-life and the incineration of its materials in energy recovery installations¹⁰⁷.

About 50% of consumed oils are lost during use (combustion, evaporation, residues left in the containers etc.). The remaining 50% is collectable as waste oil. Of this, about 75% is actually collected, leaving 675 KT (25-30%) estimated to be illegally burnt or dumped in the environment.¹⁰⁸ EU rules require the separate collection of waste oils and prioritising regeneration over end-of-life treatment of these oils, in line with the waste hierarchy. EU Ecolabel criteria exist for lubricants; 114 EU Ecolabel licences corresponding to 454 products were running as of September 2018.

Discharges of waste at sea from ships still occur, with negative effects for the marine environment. It concerns discharges of oily waste, sewage, noxious liquid substances and garbage (including plastic household waste). To reduce discharges from ships at sea, new rules were agreed on port reception facilities for the delivery of waste from ships¹⁰⁹. These should ensure that the waste is delivered on land where it should be managed in adequate port reception facilities in accordance with EU waste legislation.

In accordance with the Car Labelling Directive (Directive 1999/94/EC) and in order to help consumers choose more environmental friendly cars, EU Member States are required to ensure that relevant information is provided to consumers, including a label showing the car's fuel efficiency and CO₂ emissions. The evaluation of the Directive in 2016 identified certain shortcomings and areas where the relevance, effectiveness, efficiency and coherence of the Directive could be improved¹¹⁰. Furthermore, as part of a provisional agreement reached between the co-legislators on revised CO₂

¹⁰⁶ See for example <https://www.rivm.nl/en/rubber-granulate>

¹⁰⁷ Some examples of projects can be found here: <https://www.etra-eu.org/projects>

¹⁰⁸ Critical review of existing studies and life cycle analysis of the regeneration and incineration of waste, European Commission, DG Environment (2001)

¹⁰⁹ Provisional agreement between the co-legislators was reached in December 2018:

<https://data.consilium.europa.eu/doc/document/ST-15183-2018-REV-1/en/pdf>

¹¹⁰ <https://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/10102-2016-270-EN-F1-1.PDF>

emission standards for cars and vans, it was agreed that the Commission will review the existing European Directive on car labelling by 2020 in order to improve information to consumers, including evaluating options for introducing a fuel economy and CO₂ emission label for vans¹¹¹. The stricter CO₂ emission standards for new passenger cars and light commercial vehicles resulting from the revision will ensure that from 2030 onwards new cars will emit on average 37.5% less CO₂ and new vans will emit on average 31% less CO₂ compared to 2021 levels. Between 2025 and 2029, both cars and vans will be required to emit 15% less CO₂.

In summary, much potential for circular economy remains in this sector, including uptake of more environmentally friendly cars and improved consumer information as well as addressing waste from ships. As concerns automotive related products, potential lies in further increase in durability and resulting longer use and reuse of tyres, as well as supporting retreading, without compromising road safety. Better enforcement of the policies for waste oils could reduce the damaging illegal practices.

4.5. Furniture

More than a quarter of the world's furniture is produced in the EU, representing a market of around 84 billion euros. Furniture producers in the EU are mainly SMEs. The EU is a net exporter of furniture, but production outside the EU is increasing faster than within and with it the amount of imported furniture. Furniture produced in the EU often consists of certified wood and generally enjoys long product lifetimes, but there are indication these are decreasing and reuse options with them¹¹². In some cases, shorter product lifetime may be caused by an increase in the use of plastic, chipboard and medium-density fibreboard (MDF) to replace more durable but more expensive solid wood and metal. Where reuse does occur, it is mostly through commercial second-hand shops, social enterprise companies/ charities and furniture lease companies. Some items are also exchanged via free and paid online platforms, though the number of items traded in this way is difficult to estimate.

Furniture can maintain its value over time, indeed even becoming more valuable as antiques in some cases. Low-cost furniture can fulfil short-term needs affordably, but is more likely to be discarded in the event of moving house or office and less likely to be repaired in case of damage. Approximately 10 million tons of furniture is discarded in the EU every year. Recycling of the materials takes place, for instance in the wood-based panel industry¹¹³, however overall recycling rates for furniture are estimated at only 10%¹¹⁴.

The long product lifetimes of (high-quality) furniture mean that issues with legacy chemicals are particularly relevant in this sector. For example, some flame-retardants that have been phased out still occur in furniture, calling reuse and recycling in question.

¹¹¹ <https://www.consilium.europa.eu/en/press/press-releases/2019/01/16/co2-emission-standards-for-cars-and-vans-council-confirms-agreement-on-stricter-limits/>

¹¹² See <http://eeb.org/cutting-waste-could-boost-furniture-industry/>

¹¹³ <https://publications.europa.eu/en/publication-detail/-/publication/9b823034-ebad-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-80148793>

¹¹⁴ Forthcoming study, to be published on <http://ec.europa.eu/environment/enveco/studies.htm>

Existing EU policies affect various aspects of furniture, including safety (e.g. general product safety directive), chemical content (e.g. REACH) and recycling (e.g. Waste Framework Directive), but no specific legislation exists for furniture. France is the only Member State to date to have set up an EPR system for furniture¹¹⁵. EU Ecolabel criteria have recently been developed for furniture, but uptake has been limited to date. EU GPP criteria have also been adopted, as this sector has particular promise given the amounts of office furniture purchased by public authorities at all levels. The GPP criteria contain strong links to the EU Ecolabel criteria and this is expected to create synergy and increase uptake of both sets of criteria.

Respondents to the public consultation supporting this analysis perceive an insufficient policy coverage by the EU in this sector. 43% of them consider EU policy instruments coverage of sustainable design and production of furniture as inadequate. 54% believe that the current framework is not enough developed in providing consumers with information on sustainability and in handling waste of these products. Furniture appears to be a sector where second-hand purchases are a popular option, with 55% indicating they regularly buy furniture in the second-hand market (with 25% preferring new furniture and the rest expressing no opinion).

From the stakeholder workshops, the public consultation and policy papers from the sector itself¹¹⁶, it is clear that stakeholders are interested in developing EU policy tools in pursuit of more circular design of furniture, taking into account the whole life cycle. EPR was considered a good instrument in this context, but the stakeholders called for harmonised application across the EU, including the rules on fee modulation. Reparability could be improved by better disassembly options. Further encouragement of circular public procurement is also called for.

In conclusion, there appears to be large remaining potential in the furniture sector, specifically with material substitution, increased recycling and/or increased reuse or preparing for reuse. Enhanced uptake of EU Ecolabel and GPP criteria could realise some of this potential. Requirements on circular design of furniture and/or EPR measures could further achieve results.

4.6. Textiles (apparel and fabrics)

Textiles such as garments, textile parts of footwear and home interior textiles including carpets are sold worldwide, and are used in industrial applications including in construction, automotive and other mobility sectors. The EU is a major producer of textiles. The European textile and clothing industry employs 1.5 million people and generates a turnover of EUR 149 billion. EU exports to the rest of the world represent more than 30% of the world market. While the EU remains a net importer of textiles and clothing, with annual imports over €80 billion, exports increased faster than imports in recent years¹¹⁷. The EU is also one of the world's largest carpet producers. Overall around 65% of EU demand for carpets is fulfilled by EU-based manufacturing (high compared to other textile products), creating jobs in the EU.

¹¹⁵ see www.eco-mobilier.fr for domestic furniture, and www.valdelia.org for professional furniture

¹¹⁶ e.g. www.efic.eu/public/documents/EFIC%20policy%20paper%20Circular%20Economy.pdf

¹¹⁷ Eurostat figures from 2016: https://ec.europa.eu/growth/sectors/fashion/textiles-clothing_en

Sustainability aspects of textiles are wide. The production of bio-based materials such as cotton or wool requires much water and other agricultural inputs, while synthetic fibres and yarns used for the production of textiles are mainly fossil based and also have plastics related issues such as a microfiber or microplastic discharge. The production of textiles causes emissions of CO₂ and other compounds to air and/or water. Apparel and footwear account for 8% of global GHG emissions worldwide, and the emissions are expected to increase, in a business as usual scenario¹¹⁸. Textile production often involves the use of chemicals (e.g. for colouring) that can have negative environmental and health impacts. The fast-changing fashion in clothing means their first use is often short. Once discarded, textiles are in some cases collected for reuse or recycling, often by charities or other not-for-profit organisations. This can contribute to longer use of clothing. However, much textile material is not dealt with in a circular way: it has been estimated that a full truck of textiles is sent to incineration or landfill every second, worldwide. Recycled materials used in textiles production account for only about 1%¹¹⁹. The situation in the EU is slightly better, with infrastructure for the collection, reuse and recycling of textiles in place or being developed in a number of Member States. However, even in the EU collection rates are estimated to be as low as 25%¹²⁰, though large differences between Member States exist.

Concerns about environmental effects as well as the working conditions under which clothes that are sold in the EU are often produced outside of the EU has led to several initiatives and approaches to improve the situation. The Commission Staff Working Document "Sustainable garment value chains through EU development action"¹²¹ underlines key thematic priorities for future EU development action: women's economic empowerment, decent jobs and living wage, as well as transparency and traceability in the value chain. Environmentally friendly processing technologies aimed at *inter alia* better recycling of textiles have been developed under the EU funding schemes¹²². More advanced processing methods of woody biomass are bringing woody biomass-based textiles to the market with lower environmental and climate impacts¹²³. The Partnership for Sustainable Textiles¹²⁴, the EU funded SwitchAsia programme¹²⁵ and several initiatives by different clothing brands contribute in various ways. The Mistra future fashion program¹²⁶ aims to close loops in clothes production. While most initiatives are focused on clothing, EU producers have also invested in more sustainable approaches in the field of carpets¹²⁷. Several activities are being undertaken by national and local

¹¹⁸ <https://quantis-intl.com/measuring-fashion-report-2018/>

¹¹⁹ <https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future>

¹²⁰ See e.g. <http://www.ecap.eu.com>

¹²¹ SWD (2017) 147

¹²² One awarded example: https://ec.europa.eu/regional_policy/en/region-stars-awards/finalists_2018/cat2_fin1

¹²³ <https://publications.europa.eu/en/publication-detail/-/publication/9b823034-ebad-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-80148793>

¹²⁴ <https://www.textilbuendnis.com/en/>

¹²⁵ <https://www.switch-asia.eu/>

¹²⁶ www.mistrafuturefashion.com

¹²⁷ E.g. <https://www.dsm-niaga.com/>

authorities in the Member States. France has EPR schemes in place that cover certain textiles, and collection rates of textiles in France have doubled since their adoption¹²⁸.

A significant body of EU policy instruments is already in place. Textiles production is covered by the Registration, Evaluation, and Authorisation of Chemicals (REACH) regulation, which sets requirements for the chemicals, used during textile production, as well as the Industrial Emissions Directive (IED) and the reference document on best available techniques (BREF) on the textile industry¹²⁹ (currently under review). Textile producing facilities may also need to purchase emission allowances under the EU Emission Trading System. Once on the market, there are policy tools aimed at informing consumers. The Textile Regulation¹³⁰ sets requirements for the information about fibre composition in the labels on textiles. EU Ecolabel criteria exist for textiles, and a number of producers follow them to bear this label. EU GPP criteria guide procurers in including requirements on sustainability when purchasing textiles. However, no minimum criteria for sustainable performance of textiles exist in EU law.

Recycling of textiles takes place to a limited extent and when it takes place, it is often a matter of downcycling where the recycled material is of lower quality and functionality than the original material. There is limited knowledge of the feasibility of recycling of a number of fibres in mixtures, from an economic and environmental point of view. Challenges include the complex combinations of materials in garments and the presence of hazardous ‘legacy’ substances, such as flame-retardants in carpets that were authorised at the time of production but are (soon to be) subject of restrictions at the time of recycling.

The 2018 revision of the Waste Framework Directive introduced an obligation for separate collection of textiles by 2025. In addition, the obligation of fee modulation in case of collective fulfilment of the obligations by producers would also apply in case an EPR scheme for textiles is established. While these measures are generally welcomed by stakeholders and expected to contribute to more recycling of textiles, stakeholders, particularly from industry, call for a harmonised approach to maximise effectiveness while minimising fragmentation of the internal market¹³¹. Consistent implementation of requirements is needed to ensure material streams are useable for producers. Elements to consider include how to handle combination materials, how the value attained can be shared fairly across (cross-border) chains, etc.

In order to ensure the uptake of more sustainable business models, the value of products, materials and resources must be preserved in the economy while minimising the generation of waste and technological innovation needs to be fostered. Current rules mainly focus on health and safety aspects as well as on the recycling/waste side of textiles.

¹²⁸ http://www.ecap.eu.com/wp-content/uploads/2018/07/ECAP-Textile-collection-in-European-cities_full-report_with-summary.pdf

¹²⁹ http://eippcb.jrc.ec.europa.eu/reference/BREF/txt_bref_0703.pdf

¹³⁰ Regulation (EU) No 1007/2011 on fibre names and related labelling and marking of the fibre composition of textile products

¹³¹ See e.g. https://globalfashionagenda.com/wp-content/uploads/2017/04/GFA17_Call-to-action_Poluc-brief_FINAL_9May.pdf

62% of respondents to the public consultation stated that EU policy instruments do not adequately cover sustainable design and production in the textiles sector. 72% believe that EU instruments are not sufficient in informing consumers on the environmental performance of clothes and that the EU legal framework to cover the end-of-life / waste handling of these products is insufficiently developed. Several stakeholders call for setting up of mandatory requirements for circular design of textiles to eliminate the least sustainable textiles from the market, often mentioning the approach of the Ecodesign directive to energy related products as one that could be applied here too. A number of stakeholders also call on the EU to set up an EU EPR wide scheme, or at least provide guidance on how to set EPR for textiles at national level.

In conclusion, some EU policy instruments are in place, addressing impacts during production, use and end-of-life. However, no instrument exists setting design and durability criteria for textiles. The large amounts of textiles on the EU market in combination with relative low performance of the circular economy loops such as reuse and recycling mean that a large potential remains for circular economy in this sector. It was estimated that if an increase in duration of first use, reuse and repair of garments could lead to a reduction in production and sale of new garments by just 5%, this would deliver a sustainability benefit equivalent to 20.000 kg of CO² emissions. The accompanying economic impact due to increased reuse and repair in terms of value and jobs created was projected to be positive as well (though harder to quantify)¹³².

4.7. Buildings and Construction Products

The construction sector has large potential for circular economy given the scale of material use, value contained in buildings, labour intensiveness and long-term effect of measures. Overall the construction sector provides 18 million direct jobs and contributes to about 9% of the EU's GDP. It is one of the most resource consuming sectors in Europe - it accounts for approximately half of all extracted materials, half of total energy consumption and one third of water consumption. Construction and demolition waste (CDW) accounts for approximately 25% - 30% of all waste generated in the EU with very significant life cycle impacts, particularly associated with extraction and processing stages. The level of recycling and material recovery of CDW varies greatly (between less than 10% and over 90%) between EU Member States.

Various safety and quality rules in EU and national legislation apply to buildings. A more limited number of EU initiatives address sustainability issues in this sector. The Energy Performance of Buildings Directive and the Energy Efficiency Directive are the EU's main legislative instruments promoting the improvement of energy performance of buildings within the EU. These instruments focus on energy performance in the operational phase and as such, do not cover overall life cycle performance within the meaning of circular economy.

The overall objective for circular buildings is to reduce life cycle impact at the same time as providing healthy and comfortable spaces. This means amongst others reduced whole life carbon

¹³² Forthcoming study, to be published on <http://ec.europa.eu/environment/enveco/studies.htm>

consumption, increased reused and recycled content and sustainable handling of construction and demolition waste. Circularity and sustainability need to be assessed over the whole life cycle of the building to optimise reduction of carbon emissions and material flows. Photovoltaic panels, for example, need to be used for a certain amount of time before the sustainable energy produced offsets impacts caused during their production. Another example is the embodied carbon burden of installing triple glazing rather than double, which can be greater than the resulting operational benefit. To get a true picture of a building's energy, material and carbon emissions impact, it is necessary to understand not only operational and embodied emissions on their own, but also the interrelationship between them. This requires whole life carbon thinking¹³³.

As a first step, and as an action in the Circular Economy Action Plan, the European Commission, in collaboration with a large number of building professionals, has developed a tool to assess and report on sustainability aspects throughout the lifetime of buildings¹³⁴. The tool is called Level(s)¹³⁵. The objective is to provide a common language on sustainability and circularity for buildings, with a tool that is targeting the mainstream market. It should be an easy entry point to sustainability assessment, also for all those building projects which currently consider such assessment as being too complex. Level(s) will increase knowledge across the market and will gradually allow standard building projects to improve building performance in a cost efficient way and enable comparability, exchange of good practice and benchmarking. This common language and the knowledge it generates can in turn be used in different initiatives to incentivise circular buildings, such as Green Public Procurement, building passport concept and market initiatives.

National legislation on building codes is sometimes silent on materials, or not up to date with the development of building products which could increase the energy efficiency and performance of buildings from a sustainability perspective as well as replace energy intensive materials e.g. also in tall buildings. An example is the permitting use under these codes of wood-based products, in particular so-called engineered wood products (EWP) such as cross-laminated timber (CLT), laminated veneer lumber (LVL) and glued-laminated timber (glu-lam), which can efficiently retain a long-term carbon pool - especially in wooden buildings. It is therefore vital to raise awareness on these aspects.

Currently direct reuse of construction products such as doors, windows or frames does not take place at large scale. Increased reuse, in particular of beams and frames of steel or wood, could have a significant positive impact in terms of CO₂ emission equivalents. The accompanying reduction in

¹³³ The Evaluation report accompanying the latest version of the Energy Performance of Buildings Directive (2016) highlights the importance of the whole life cycle energy, as a highly energy efficient building may come at a high cost of embodied energy. These aspects are not part of current legislation.

¹³⁴ The tool is coherent with existing EU legislation in the field, e.g. the Energy Performance of Buildings Directive, and includes existing energy performance standards and metrics within its broader sustainability scope.

¹³⁵ <http://ec.europa.eu/environment/eussd/buildings.htm>

production and sales would have a (smaller) negative impact on employment and economic value. Better recycling of doors, flat glass and window frames containing PVC holds further promise¹³⁶.

In conclusion, further potential for circularity remains in this sector. Assessments of sustainability performance over the life cycle could be made more mainstream by enhancing their accessibility and by public authorities gradually starting to request such information. This could lead to better understanding and consistent measurement of the whole life carbon emissions and other sustainability aspects of built projects, in turn allowing for comparability of results, benchmarking and target setting to e.g. optimise overall carbon reductions. Also, long-term thinking past project completion could be promoted concerning maintenance, durability and lifespan, deconstruction, recycling and adaptability of building components or projects as a whole. This could also lead to better reuse of construction products such as windows, doors and frames. Market incentives promoting sustainability are important in this sector, as payback times for investments in circularity typically are linked to the building performance over the full lifetime, which is long for buildings.

4.8. Chemical products

95% of goods are directly linked to chemicals or chemical processes¹³⁷, including products mentioned in other sections of this document. In Europe, the chemical industry is one of the largest industrial sectors, generating ca. 1.1 per cent of EU GDP and employing around 1.14 million workers.¹³⁸

Comprehensive EU policy is in place addressing chemicals safety. The REACH Regulation is aimed at the safe use of chemicals, for instance through reducing exposure of consumers and workers to hazardous chemicals. The CLP Regulation¹³⁹ provides hazard information on labels and packaging. Specific groups of chemicals, such as biocides, pesticides, pharmaceuticals or cosmetics, are covered by their own legislation. Particular concerns under attention in the implementation of chemicals policies include the impacts of endocrine disrupting chemicals, combination effects (chemical mixtures), and chemicals that are persistent and bio-accumulative in the environment and organisms. Initiatives aimed at the substitution of chemicals of concern include the European Chemicals Agency (ECHA) strategy to promote substitution to safer chemicals¹⁴⁰ and the OECD survey¹⁴¹ of how Member Countries support alternatives assessment and substitution of chemicals of concern. An ongoing study is investigating motives for ‘front-runners’ who are replacing certain chemicals in their production processes with more sustainable ones, even if the chemicals being replaced are not subject to restrictions under Reach or otherwise.

As the policy tools addressing safe use of chemicals often include measures aimed at reducing exposure to (hazardous) chemicals, they also contribute to preventing and reducing unnecessary use

¹³⁶ Forthcoming study, to be published on <http://ec.europa.eu/environment/enveco/studies.html>

¹³⁷ www.greenchemistryvienna2018.com/fileadmin/inhalte/gcc/pdf/Conclusions_GreenChemConf2018.pdf

¹³⁸ CEFIC, 2018 <http://www.chemlandscape.cefic.org/wp-content/uploads/combined/fullDoc.pdf>

¹³⁹ Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures

¹⁴⁰ <https://echa.europa.eu/substitution-to-safer-chemicals>

¹⁴¹ ENV/JM/WRPR(2018)63 (to be published by OECD)

of chemicals and thus to resource efficiency. This supports innovations that can lead to more durable applications such as ‘self healing’ paint¹⁴². However, not many policy interventions are directed at improving reuse and recycling of chemicals. For obvious reasons, reuse of chemical products such as paints, varnishes, detergents and cosmetics is not as straightforward as for say electrical devices or furniture. Recycling holds more potential: it has been estimated that the European chemical industry could recycle 19 Mt mechanically (18% of the total chemical output) and 8 Mt chemically (9% of the total chemical output).¹⁴³

Articles 6.6 and 6.7 of the EU Ecolabel Regulation sets very strict requirements in respect to the use of hazardous substances in EU Ecolabel goods. EU Ecolabel criteria exist for indoor and outdoor paints and varnishes, rinse off cosmetics and six detergents product groups¹⁴⁴, representing some of the most successful EU Ecolabel products. Green Public Procurement criteria exist for cleaning products, paints, varnishes and road markings.

Chemical leasing is a service-oriented business model that shifts the focus from increasing sales volume of chemicals towards a value-added approach. The producer mainly sells the functions performed by the chemical and functional units are the main basis for payment (e.g. a painted wall rather than a number of buckets of paint). Within Chemical Leasing business models the responsibility of the producer and service provider is extended and may include management of the entire life cycle. Chemical Leasing strives for a win-win situation. It aims at increasing the efficient use of chemicals while reducing the risks of chemicals and protecting human health. It improves the economic and environmental performance of participating companies and enhances their access to new markets¹⁴⁵.

Lack of information about chemical content of material streams jeopardizes mechanical recycling processes, use of recycled content and trust of consumers in materials and products. This issue is discussed in section 7.3.

In conclusion, EU policies are in place addressing safe use of chemicals and reducing environmental impacts. Few policies address material efficiency (in the sense of using less material for the same result). Some emerging business models could contribute to material efficiency.

¹⁴² <https://www.feynlab.com/technology/self-healing-technology/>

¹⁴³ Accenture (2017) Taking the European Chemical Industry into the circular economy

¹⁴⁴ Detergents for dishwashers, Industrial and institutional automatic dishwasher detergents, Laundry detergents, Industrial and institutional laundry detergents, All purpose cleaners and sanitary cleaners and Hand dishwashing detergents

¹⁴⁵ See www.chemicalleasing.org

5. CONSUMERS RIGHTS AND CONSUMER PROTECTION IN A CIRCULAR ECONOMY

EU households spend more than 8 trillion euro's per year, of which roughly 40% is spent on products such as those discussed in this document¹⁴⁶. Clearly consumers have a vital role in driving markets and their choices can heavily influence (positively or negatively) the transition to a circular economy.

Faster obsolescence of products is a growing concern for consumers and consumer protection authorities¹⁴⁷. The 2016 Commission guidance on the Unfair Commercial Practices Directive (UCPD)¹⁴⁸ specifies that "*planned obsolescence, or built-in obsolescence in industrial design, is a commercial policy involving deliberately planning or designing a product with a limited useful life so that it will become obsolete or non-functional after a certain period of time*". Therefore, planned obsolescence, in its strict sense, consists of designing a product to have a shorter life, if necessary by designing it to run only for a limited number of operations. However, different types of obsolescence¹⁴⁹ may also need particular attention:

- Premature obsolescence, which implies that the product lasts less than its normal "lifespan". While considering this obsolescence the normal "lifespan" needs to be defined by taking into account consumers' expectations.
- Indirect obsolescence generally occurs because the components required to repair the product are unobtainable or because it cannot be repaired or substituted (e.g. batteries welded into an electronic device).
- Incompatibility obsolescence occurs when a device no longer works properly once an operating system is updated, or when the software update has resulted in poor functioning of the device.
- Style obsolescence occurs because marketing campaigns or other factors lead consumers to perceive existing products as out-of-date.

The 2016 Commission guidance on the Unfair Commercial Practices Directive¹⁵⁰ specifies that from the UCPD point of view, planned obsolescence is not unfair per se. However, under Article 7 of this directive, a trader who fails to inform the consumer that a product has been designed with a limited lifetime, according to the specific circumstances of the individual case, can be considered to have omitted to provide material information.

¹⁴⁶ Deduced from: <https://ec.europa.eu/eurostat/news/themes-in-the-spotlight/household-expenditure>

¹⁴⁷ For example: https://www.beuc.eu/publications/beuc-x-2018-057_premature_obsolescence.pdf
http://www.europarl.europa.eu/doceo/document/E-8-2018-005062-ASW_EN.html

¹⁴⁸ Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market, OJ L 149, 11.6.2005, p. 22–39

¹⁴⁹ See also <https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/towards-more-sustainable-consumption-industrial-product-lifetimes-and-restoring-trust-through-consumer-information>

¹⁵⁰ SWD/2016/0163 : <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016SC0163>

Consumer Protection Authorities in the framework of the Consumer Protection Cooperation Regulation¹⁵¹ are looking into the consumer detriment and possible enforcement options regarding unfair obsolescence following recent national developments¹⁵².

Building on the input from a multi-stakeholder group¹⁵³, the 2016 Commission guidance on the Unfair Commercial Practices Directive (UCPD) also includes specific guidance on misleading and unfounded environmental claims, with the goal of making environmental claims clearer, more credible and transparent and to support enforcement by the Member States competent bodies¹⁵⁴. The guidance addresses false, unclear, unintelligible, or ambiguous information, which includes claims related to the circular economy, in order to protect consumers from misleading commercial information.

The “New Deal for Consumers” proposal¹⁵⁵ adopted on 11 April 2018 aims at amending four EU directives that protect the economic interests of consumers. Most of the amendments concern the Unfair Commercial Practices Directive 2005/29/EC and the Consumer Rights Directive 2011/83/EU. This proposal was presented together with a proposal on representative actions for the protection of the collective interests of consumers, repealing Directive 2009/22/EC on injunctions. The proposal introduces more effective, proportionate and dissuasive penalties for widespread cross-border infringements. The available penalties for infringements of consumer law are very different across the EU, and are often set at a low level. Under the proposal, national authorities will have the power to impose a fine of at least up to 4 % of a trader's turnover for such widespread infringements. Furthermore, the proposal envisages that consumers will have the right to individual remedies, such as right to contact termination and compensation, when they are harmed by unfair commercial practices. Finally, the Commission proposed a modernised system of representative actions, building on the existing Injunctions Directive¹⁵⁶. This system allows non-profit making qualified entities, such as consumer organisations or independent public bodies, to defend collective consumer interests in cases of mass harm. This will help individual consumers to secure their rights.

EU Consumer Legislation also offers consumer protection in the case of faulty products. The Consumer Sales and Guarantees Directive (CSGD)¹⁵⁷ makes sellers liable for “lack of conformity” of goods which exists at the time of delivery of the goods for a minimum period of two years after

¹⁵¹ Regulation (EC) No 2006/2004 of the European Parliament and of the Council of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws
OJ L 364, 9.12.2004, p. 1–11

¹⁵² Recent enforcement decision (October 2018) from the Italian consumer protection authorities on premature obsolescence against Samsung and Apple <http://en.agcm.it/en/media/detail?id=385e274c-8dc3-4911-9b8c-9771c854193a&parent=Press%20Releases&parentUrl=/en/media/press-releases> and decision of the French government include provisions rendering “planned obsolescence” a misdemeanour (French Energy Transition Law)

¹⁵³ https://ec.europa.eu/info/live-work-travel-eu/consumers/unfair-treatment/unfair-treatment-policy-information_en#environmental-claims

¹⁵⁴ http://ec.europa.eu/info/law/law-topic/consumers/unfair-commercial-practices-law/unfair-commercial-practices-directive_en#updatedguidance

¹⁵⁵ https://ec.europa.eu/newsroom/just/item-detail.cfm?item_id=620435

¹⁵⁶ Directive 2009/22/EC https://ec.europa.eu/info/law/law-topic/consumers/injunctions-directive_en

¹⁵⁷ Directive 1999/44/EC : <https://eur-lex.europa.eu/eli/dir/1999/44/oj>

delivery. This requirement is known as the two-year legal guarantee for goods. During that time, consumers have the right to a free repair or replacement or, subject to specific conditions, to price reduction or rescission of contract if their goods are not in conformity, i.e. defective. The CSGD also includes a reversal of the burden of the proof in the sense that within the first six months after delivery, the seller has to prove that no lack of conformity existed at the time of delivery. The Consumers Rights Directive¹⁵⁸ obliges them to inform consumers on the existence of the legal guarantee. The proposal for a Directive on the online sales of goods, presented in December 2015 as a deliverable of the Circular Economy Action Plan, was amended in 2017 to extend its scope to also cover sales of goods offline. The proposal, which includes provisions on the extension of the reversal of the burden of proof period and will help consumers to apply their legal guarantee rights, is currently undergoing final steps in the legislative process¹⁵⁹.

*EU behavioural Study on "Consumers' engagement in the Circular Economy"*¹⁶⁰

An EU wide behavioural study on Consumer Engagement in a Circular Economy found that consumers were generally willing to engage in Circular Economy practices. In brief, all strands of research found that consumers were generally willing to engage in CE practices. But actual engagement was rather low. While a majority of consumers repair products (64%), a substantial share have not repaired products in the past (36%), and/or have no experience renting/leasing or buying second hand products (~90%). A reason for this low engagement in CE practices could be that consumers lack information regarding product durability and reparability as well as the lack of sufficiently developed markets (e.g. for second hand products, renting, leasing or sharing services etc.). In the behavioural experiment, the provision of such information was found to be highly effective at shifting purchasing decisions towards products with greater durability and reparability. The survey and experiment also found that repair decisions are easily disrupted if arranging repair requires effort. These findings indicate that there is a large potential to close the gap between consumers' willingness to engage and their actual engagement. The study contains several policy recommendations, which will be further examined. Based on the results of this research and other fact analysis, the Commission may consider follow-up initiatives¹⁶¹.

¹⁵⁸ Directive 2011/83/EC

¹⁵⁹ A provisional agreement was reached by the co-legislators on 29 January 2019

¹⁶⁰ https://ec.europa.eu/info/live-work-travel-eu/consumers/sustainable-consumption_en

¹⁶¹ See also: http://www.europarl.europa.eu/doceo/document/E-8-2018-005062-ASW_EN.html

6. THE ENVIRONMENTAL FOOTPRINT METHODS

There are more than 465 environmental labels worldwide, up from 430 in 2013. In the EU, more than 100 environmental labels are active¹⁶². There are more than 80 leading initiatives on greenhouse gas reporting only¹⁶³. These labels and initiatives are based on different methods, with a varied level of reliability and environmental issues covered. This proliferation of initiatives and labels is creating confusion and mistrust in environmental information – and results in a sub-optimal level of using more environmentally friendly products and solutions. More than 60% of respondents in the public consultation considered that there are too many different and confusing labels bearing environmental information.

Consumers are interested – 80% of EU citizens are buying environmentally friendly products at least occasionally. Businesses are interested in this growing market – in 2014, products bearing information on sustainability grew by 7% in comparison with 1% growth for those that did not have a commitment in this area¹⁶⁴. Investors are increasingly drawn to sustainable investments – assets in green funds in Europe have grown by 47% between 2014 and 2016¹⁶⁵.

To address this situation, the Commission published in 2013 a Recommendation on the use of the Product and Organisation Environmental Footprint (PEF and OEF) methods¹⁶⁶. This recommendation also responded to invitations of the Council to develop a harmonised method for the calculation of the life cycle environmental performance of products. The methods aim to provide reliable, reproducible, comparable and verifiable information and were developed under the scientific and technical lead of the Commission's Joint Research Centre (JRC). Based on this Recommendation, the Commission also set out to test together with industry new features for the methods, such as the development of product- and sector-specific rules, and approaches to verification and communication.

PEF and OEF are Life Cycle Assessment methods, taking into consideration 16 potential environmental impacts¹⁶⁷ occurring throughout the value chain, from the extraction/ growing of resources to the end of life of the product or the product portfolio of an organisation. The methods were built on existing standards and methodologies¹⁶⁸ and can be used for any product or organisation to calculate their environmental profile. In case the aim is to compare products

¹⁶² Ecolabel Index, extracted August 2017. <http://www.ecolabelindex.com/>

¹⁶³ [Company GHG Emissions Reporting – a Study on Methods and Initiatives](#). ERM for DG Environment, 2010

¹⁶⁴ [The Sustainability Imperative – New insights on consumer expectations](#). Nielsen, 2015

¹⁶⁵ [The European Green Funds Market](#), Novethic, 2017

¹⁶⁶ Commission Recommendation of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations, [2013/179/EU](#)

¹⁶⁷ climate change, ozone depletion, human toxicity – cancer, human toxicity – non-cancers, particulate matter, ionizing radiation – human health, photochemical ozone formation – human health, acidification, eutrophication – terrestrial, eutrophication – freshwater, eutrophication – marine, ecotoxicity – freshwater, land use, water use, resource use – minerals and metals, resource use - fossils

¹⁶⁸ [Analysis of existing Environmental Footprint methodologies for Products and Organizations: Recommendations, Rationale, and Alignment](#), Joint Research Centre, Institute for Environment and Sustainability, 2011

providing the same main function, the development of specific category rules (called Product Environmental Footprint Category Rules, PEFCRs) is necessary. The development of Organisation Environmental Footprint Sectoral Rules (OEFSRs) is also very beneficial to harmonise calculation rules at sectoral level, but it does not enable an automatic way of comparing companies belonging to the same sector¹⁶⁹.

This approach was tested during the Environmental Footprint pilot phase (2013-2018). Other developments further contributed to the use of the methods in the pilot phase. These included the improved availability of good quality life cycle data via the Life Cycle Data Network hosted by the Commission's Joint Research Centre (JRC); setting-up a verification system which is cost-effective; testing different ways of communicating environmental footprint related information, both in business-to-business and business-to consumer settings. See annex II for more details on the Environmental Footprint pilot phase.

The pilot phase resulted in the availability of a series of finalised calculation rules for different product groups and sectors (PEFCRs and OEFSRs) and of important methodological advances.

6.1. Current uses in EU policy

The European Commission's Joint Research Centre is currently performing a preparatory study for solar photovoltaic modules, inverters and systems to assess the feasibility of applying Ecodesign, Energy Label, Ecolabel and Green Public Procurement instruments¹⁷⁰. This study is considering the PEFCR on photovoltaic modules used in photovoltaic power systems for electricity generation as one of the sources to develop the study.

In the Communication Europe on the Move, more specifically its annex on the Strategic Action Plan on Batteries¹⁷¹, the Commission puts forward the objective to support the growth of high performing, safe and sustainable battery cells and battery packs/modules production with the lowest environmental footprint possible. For this purpose, it committed to identify the possibility of developing a standardised EU life cycle assessment scheme for batteries and on this basis, to put forward sustainability 'design and use' requirements for all batteries to comply with when placed on the EU market. The Commission is currently performing a preparatory study for rechargeable electrochemical batteries, in which the PEFCR for batteries is used as one of the main sources of information.

In 2012 CEN adopted the standard EN 15804, related to the calculation of the environmental impacts of construction products. This standard has been used as basis to publish Environmental Product

¹⁶⁹ This option is only possible when the companies have exactly the same product portfolio. Alternative approaches like calculating the environmental profile per Euro of turnover or other financial indicators have been proposed but not sufficiently tested yet.

¹⁷⁰ http://susproc.jrc.ec.europa.eu/solar_photovoltaics/index.html

¹⁷¹ [Europe on the Move – Sustainable Mobility for Europe: safe, connected and clean](#) COM(2018)293 final, Annex 2 Strategic Action Plan on Batteries

Declarations (EPDs) by many businesses in the construction sector. It has also been referenced in several national legislations (e.g. in France, Germany, the Netherlands) and in private schemes certifying the environmental performance of buildings. However, the EN 15804 standard has never been used as reference in any European legislation related to construction products or buildings, due to methodological issues. As an outcome of discussions between CEN and the Commission, and based on the results of the different pilots related to construction products, the Commission issued a new mandate to CEN to amend the EN 15804 making it more consistent with PEF and resolve some of the methodological issues. Depending on the outcome of the CEN ballot (expected in spring 2019) an amended EN 15804 might become available by the end of 2019, allowing for the consideration of their use in existing or new policy initiatives related to construction products and buildings (e.g. in the context of the Level(s) initiative¹⁷²).

The Commission adopted an Action Plan on Sustainable Finance¹⁷³ in 2018, in which it commits, among others, to ensure the progressive development of an EU taxonomy for climate change, environmentally and socially sustainable activities and to base low carbon indices on transparent and sounder methodologies. In these two actions, the Commission is exploring the possibility of using also the Environmental Footprint methods, when relevant and appropriate. For example, the proposal for a regulation on low carbon benchmarks and positive carbon impact benchmarks¹⁷⁴ clearly refers to leveraging the PEF and OEF methods regarding the calculation of the carbon footprint and carbon savings. Similarly, Level(s), the assessment tool for sustainable buildings, feeds information to the taxonomy work for buildings in the Sustainable Finance initiative.

6.2. Related Initiatives in Member States

Italy is the first European Member State who has presented legislation fully based on the Environmental Footprint methods. In December 2015 Italy passed a law¹⁷⁵ introducing a new initiative called “Made Green in Italy”, a voluntary scheme for the evaluation and communication of the Environmental Footprint of products, which is based on the PEF method, as defined in the Commission Recommendation 2013/2017/EU. The scheme is managed by the Ministry for the Environment and the Protection of the Territory and the Sea (MATTM) and is applicable to products, understood as goods and services, including intermediate and semi-finished products. Through this new voluntary label, Italy intends to offer companies the opportunity to promote the environmental excellence of their products promoting the specificities of Italian products (like quality) together with their environmental performance. The Italian Law to Promote a Green Economy also established links and incentives to promote Green Public Procurement. In particular, it foresees that ecolabels including the “Made green in Italy” ecolabel can be used by the contracting

¹⁷² <http://ec.europa.eu/environment/eussd/buildings.htm>

¹⁷³ Commission Communication *Action Plan: Financing Sustainable Growth*, COM(2018) 97 final

¹⁷⁴ *Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2016/1011 on low carbon benchmarks and positive carbon impact benchmarks*, COM(2018) 355 final

¹⁷⁵ Law n. 221/2015 (Collegato ambientale alla legge di stabilità del 2014) on “Disposizioni in materia ambientale per promuovere misure di green economy e per il contenimento dell'uso eccessivo di risorse naturali”.

authorities as a means of verifying compliance with the technical specifications, where relevant and concerning the life cycle of the product.

France is a frontrunner in the area of disclosing product life cycle environmental information. They developed the first programme for developing reference documents for consumer products based on Life Cycle Assessment and performed the first experiment communicating results to consumers. They are currently running a voluntary scheme on displaying environmental performance for the clothing, furniture and touristic accommodation sectors. Furthermore, two companies are rolling out labelling for food and electronic products¹⁷⁶. The basis for these initiatives is a French standard, which has a similar approach as the PEF method.

The working group for Sustainable Consumption and Production under the Nordic Council of Ministers established the Nordic Environmental Footprint group (NEF)¹⁷⁷ in 2015. Countries participating are Denmark, Sweden, Norway and Finland. The Group is disseminating knowledge on the EU Environmental Footprint methods and related activities to Nordic stakeholders, organises conferences and produces discussion papers.

6.3. The Environmental Footprint transition phase

In the period between the end of the Environmental Footprint pilot phase and the potential future use in EU policies of the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) methods, a transition phase is established. The main aims of the transition phase are to provide a framework for monitoring the implementation of existing PEFCRs and OEFSRs and developing new ones, and for further methodological developments.

The Commission received several requests on the possibility to develop further PEFCRs and OEFSRs. To cater for this need, the Commission will publish a call for volunteers in the first quarter of 2019.

6.4. Stakeholder opinions about potential future uses of the Environmental Footprint methods

Based on the results of the Environmental Footprint pilot phase, the European Commission consulted stakeholders on the potential future uses for the Environmental Footprint methods. The views of stakeholders have been gathered through several activities, as explained below.

The final conference of the Environmental Footprint pilot phase was held between 23-25 April 2018. During the conference, several stakeholders expressed strong support for the work done, and several industry sectors expressed their intention to start implementing the PEFCRs and OEFSRs as soon as possible. Several stakeholders asked the Commission for clarity on the policy options considered for the implementation of the Environmental Footprint methods. Many participants voiced their support

¹⁷⁶ <https://www.ecologique-solidaire.gouv.fr/laffichage-environnemental-des-produits-et-des-services>

¹⁷⁷ <http://www.nordic-pef.org/index.html>

for the Commission using the methods in the context of the Sustainable Finance Action Plan, and in the short term in existing tools such as the EU Ecolabel, EMAS, and Green Public Procurement as well as the application of the Unfair Commercial Practices Directive in the area of misleading and unfounded environmental claims¹⁷⁸.

In terms of future actions, an overwhelming majority of stakeholders following the conference expressed support for requiring the use of PEF for substantiating green claims – under such a scenario, there would be no obligation to make environmental claims on products, but if a company wishes to do so, they would need to use the PEF method to substantiate their claim.

A stakeholder meeting was held on the 26 April 2018 to further explore the views of stakeholders on the future use of the methods. Whilst some participants argued that after the efforts invested by businesses and other stakeholders in the pilot phase, a business as usual scenario would not be acceptable, other participants thought that further development of the method would be needed for the more ambitious policy applications. Stakeholders saw added value in using the methods in existing instruments, especially the EU Ecolabel, and most participants were favourable to using the PEF for substantiating environmental claims made on a voluntary basis. Stakeholders raised that it would be necessary to combine the integration of the methods in existing tools with an instrument for using PEF for supporting environmental claims.

291 respondents to the public consultation replied to the section dedicated to the Environmental Footprint. Out of these respondents, 78 were involved either as a stakeholder or as members of one of the pilots in the Environmental Footprint pilot phase, whilst 80 were aware of the Environmental Footprint. Thus, 46% of respondents were not familiar with the methods or the pilot phase. The most promising policy applications for the PEF and OEF methods were to

- use the PEF/OEF methods and product/sector specific rules as common knowledge basis in existing or new policies (e.g. to support the development of EU Ecolabel criteria, Green Public Procurement criteria, Sustainable Finance, Eco-management and Audit scheme, etc) (75% thinks this would be very effective or effective);
- provide requirements on how to communicate to consumers, businesses and other stakeholders (e.g. NGOs) on the Environmental Footprint (73% thinks this would be very effective or effective);
- develop new policies related to the environmental performance of products and/or organisations compliant with the PEF/OEF methods (e.g. on misleading green claims and proliferation of environmental labels) (68% thinks it would be very effective or effective);
- review existing policies related to the environmental performance of products and/or organisations making them compliant with the PEF/OEF methods (66% thinks this would be very effective or effective);

¹⁷⁸ https://ec.europa.eu/info/law/law-topic/consumers/unfair-commercial-practices-law/unfair-commercial-practices-directive_en

- create an EU repository of PEF results for products (62% thinks this would be very effective or effective);
- create an EU rating scheme based on OEF results for companies and organisations (52% thinks this would be very effective or effective).

Targeted online consultations were organised focussing specifically on the potential future uses for the Environmental Footprint methods. These were developed for businesses and business associations, investors and financial institutions, public administrations, NGOs and method/ initiative owners. Targeted consultations were open between 13 November and 18 December 2018. A total of 223 stakeholders replied to the questionnaire. Businesses and sectoral or business organisations were the most represented (81%), followed by method and initiative owners (9%), public administrations and international organisations (5%), NGOs (4%) and investors or financial institutions (2%). Most of the respondents to the targeted questionnaires was at least aware of the Environmental Footprint (91%). More than half of them was involved as a stakeholder or as a member of one of the pilots (61%). A total of 39 respondents replied both to the public consultation and the targeted consultation. This concerns 14 businesses / business associations, 3 NGOs, 3 public administrations and 19 citizens. Respondents considered that the most promising policy applications for the PEF method were to:

- provide requirements on how to communicate on the Environmental Footprint (it is not mandatory to communicate environmental information, but if communicated, these have to comply with specific requirements)(65% thinks it would be very effective or effective);
- prescribe the use of the PEF in case communicating environmental information (it is not mandatory to communicate environmental information, but if communicated, the information has to rely on the PEF method) (57% thinks it would be very effective or effective);
- the European Commission encourages the use of the Environmental Footprint methods for measuring and communicating environmental information on a voluntary basis (56% thinks it would be very effective or effective);
- prescribe the use of the PEF for measuring and communicating life cycle environmental performance (52% thinks it would be very effective or effective);
- use the PEF in the development of EU Ecolabel criteria (50% thinks it would be very effective or effective);
- use PEF for defining Green Public Procurement criteria (49% thinks it would be very effective or effective).

Differences between the opinions of the different stakeholder groups, are explained in Annex II.

Respondents considered that the most promising policy applications for the OEF method were:

- for the European Commission to encourage the use of the Environmental Footprint methods for measuring and communicating environmental information on a voluntary basis (36% thinks it would be very effective or effective);
- to promote more harmonised reporting based on (but not limited to) the OEF for the environmental pillar of non-financial reporting (29% thinks it would be very effective or effective);
- to provide an EU registry of OEF results for companies (participation voluntary or mandatory depending on the policy) (28% thinks it would be very effective or effective);
- to use OEF indicators in the EU Eco-Management and Audit scheme (EMAS) reporting (27% thinks it would be very effective or effective).

Other policy options polled were to create an EU rating scheme for environmental performance of companies, based on (but not limited to) the OEF (22%) and to delegate the management of a voluntary Environmental Footprint scheme to a 3rd party (13%).

Considering the input from all the consultations, stakeholders expressed most support for using PEF for the substantiation of environmental claims (making claims is voluntary, substantiating with PEF is mandatory), provide requirements on how to communicate on the Environmental Footprint (it is not mandatory to communicate environmental information, but if communicated, these have to comply with specific requirements), using the Environmental Footprint methods in support of existing instruments, as a common knowledge basis (EU Ecolabel, Green Public Procurement, Unfair Commercial Practices Directive and EMAS). For the OEF, stakeholders expressed most support for encouraging the use of the method on a voluntary basis, to promote harmonised reporting in the framework of non-financial reporting and to create an EU registry of OEF results. It is important to note that all five investors who replied (investors being the main users of the results of the method), thought that a registry, reporting and an EU rating scheme were very important.

7. HORIZONTAL DEVELOPMENTS

7.1. Digitalisation

The increasing digitalisation of our society presents new opportunities as well as challenges for the transition to a circular economy. The growing consumer awareness and resulting change in consumption patterns will influence how the markets will develop in the future taking also into account the growing role of consumers and new business models spurred through the digitalisation of the economy¹⁷⁹. To take full advantage of the opportunities offered by digitalisation, the necessary knowledge and skills need to be strengthened amongst young and older workers. Where materials are replaced by digital solutions, dematerialisation leads to reduced resource use. New circular business models such as Mobility as a Service (MaaS) applications often rely on collaborative digital platforms and can lead to more efficient use of products and materials. At the same time, if not properly managed the increase in electrical and electronic equipment that results from digitalisation can lead to more energy use, an increase of consumption of precious and critical raw materials¹⁸⁰ and an increase in waste of such equipment. This is why the total life-cycle approach of ICT components as well as the circular computing approach will play a key future role. The policy tools mentioned in paragraph 4.1 address this to a certain extent, but may not be able to offset an exponential increase in devices.

Digitalisation is rapidly changing the industrial environment, simultaneously allowing and requiring continuous innovation.

Digital solutions may come with an increase in energy consumption. A study commissioned by the Commission¹⁸¹ showed that the energy consumption of data centers and telecommunication networks would grow at an alarming rate of 35% to 150% over 9 years. According to data from the Pan-European Data Centre Academy (PEDCA) project¹⁸², European data centres consumed more than 104TWh in 2015 representing 3% of total electricity and the data centre Eureka project¹⁸³ estimated that this had grown even faster than foreseen to 130TWh by 2017.

In this context, the European Commission is working on the European Processor Initiative (EPI)¹⁸⁴, which brings together 23 partners from 10 European countries, with the aim to bring to the market a low power microprocessor. It gathers experts from the High Performance Computing (HPC)¹⁸⁵ research community, the major supercomputing centres, and the computing and silicon industry as

¹⁷⁹ In-depth analysis in support of the Commission communication COM(2018) 773 A Clean Planet for all - A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy

¹⁸⁰ <https://publications.europa.eu/s/ko6O>

¹⁸¹ <https://ec.europa.eu/digital-single-market/en/news/experts-and-stakeholders-advise-cross-border-eu-level-intervention-green-ict>

¹⁸² <https://www.data-central.org/mpage/MicrositeHome>

¹⁸³ <https://www.dceureca.eu/>

¹⁸⁴ <https://ec.europa.eu/digital-single-market/en/news/european-processor-initiative-consortium-develop-europes-microprocessors-future-supercomputers>

¹⁸⁵ <https://ec.europa.eu/digital-single-market/en/high-performance-computing>

well as the potential scientific and industrial users. This initiative will be buoyed through a Framework Partnership Agreement. It is therefore important to keep a total life-cycle perspective in finding solutions for both energy efficiency, the digital single market¹⁸⁶ and the circular economy agendas.

Data and digital tools are emerging that provide new possibilities for tracing materials throughout the value chain. This could help address some of the issues on the interface between products, chemicals and waste legislation as discussed in paragraph 6.3.

Digital technologies empower consumers in a circular economy. Digital systems help integrate information across multiple lifecycles and various stakeholder in the value chain. More than 40% of Europeans use their smartphone to look for product information when shopping. Also in business-to-business transactions, transferring environmental information digitally is becoming more and more important, and it is increasingly facilitated by technology. The potential for channelling environmental information to help decisions in a digital world is huge – however, more data needs to become available to consumers and business in order to inform their choices, and policies need to be in place to avoid that decisions are based on misleading information. The European Commission is already acting on this, an excellent example being the recent launch of the European Product Database for Energy Labelling (EPREL)¹⁸⁷. Consumers will be able to search the database, starting from quarter II 2019, for energy labels and product information sheets which will help them to make informed purchasing decisions for a wide range of appliances.

To ensure policies achieve their objectives efficiently, it is important to look not just at equipment used, but to consider digital services as a whole. The dynamic operation of digital services is to a large extent determined by software, which can make a significance difference in the energy use, as well as to the integrated end-to-end infrastructure on which it will be executed (combining network and cloud/data centres). So it is important that sustainability criteria are met not just by the intermediate products (digital equipment), but also by the system in which they are integrated. In this context, it is useful to raise awareness among consumers of different energy service equivalents. In this respect, the Commission is currently conducting a study¹⁸⁸ on the energy efficiency of providing end-to-end digital services using cloud computing. The aim is to better understand the underlying energy consumption patterns, to develop a strategic roadmap for research, technology development and innovation to optimise energy-efficiency, and to develop measures to drive the market in providing more energy-efficient digital services.

¹⁸⁶ https://ec.europa.eu/commission/priorities/digital-single-market_en

¹⁸⁷ https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/european-product-database-energy-labelling_en

¹⁸⁸ <https://etendering.ted.europa.eu/cft/cft-display.html?cftId=3494>

Digital developments such as artificial intelligence and the internet of things may present new challenges for the policy framework, for instance in the field of security. The Commission is preparing initiatives in this regard, including on privacy and software related to radio equipment¹⁸⁹.

7.2. Innovation

7.2.1. Eco-innovation

Innovation is essential to facilitate the transition to a circular economy. Innovations aimed at more sustainable practices, processes and products are referred to as eco-innovations. The Commission supports many such innovations through research programs such as Horizon 2020. Two initiatives funded by The European Institute of Innovation and Technology (EIT) are of particular relevance in this context. The EIT raw materials is the largest consortium in the raw materials sector worldwide. Its vision is to develop raw materials into a major strength for Europe. Its mission is to enable sustainable competitiveness of the European minerals, metals and materials sector along the value chain by driving innovation, education and entrepreneurship. The EIT Climate-KIC is a European knowledge and innovation community, working to accelerate the transition to a zero-carbon economy.

Progress in the field of Eco-innovation has been further supported through the EU Eco-innovation action plan and followed through the Eco-innovation observatory¹⁹⁰, including the eco-innovation index. The bi-annual report published by this observatory in 2019 specifically looks at product policy in eco-innovation context, including case studies from 10 Member States and policy recommendations¹⁹¹.

The work on the eco-innovation index has, together with other work such as the resource efficiency scoreboard, contributed to the development of the Circular Economy monitoring framework¹⁹².

As regards the development of sustainable bio-based products, circularity is at the heart of the recently updated Bioeconomy Strategy.¹⁹³ Its action plan includes, inter alia, the mobilisation of public and private stakeholders to foster research and innovation investments for the development of substitutes to fossil based materials that are bio-based, recyclable and marine biodegradable. At the same time, in a circular economy resources are kept in the value chain for as long as possible. In the Plastics Strategy, the Commission committed to identify conditions under which the use of biodegradable or compostable plastics is beneficial in this respect and has recently launched a study on the relevance of biodegradable and compostable consumer plastic products and packaging.

¹⁸⁹ E.g. https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-6426936_en;
https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-6621038_en

¹⁹⁰ www.eco-innovation.eu

¹⁹¹ Report will be available at www.eco-innovation.eu/index.php/reports/annual-reports

¹⁹² <http://ec.europa.eu/environment/circular-economy/pdf/monitoring-framework.pdf>

¹⁹³ COM(2018) 673 final

7.2.2. *Environmental technology verification*

Currently, a technology that performs well above normal standards or that presents an innovative approach to solve an environmental problem can face difficulties in penetrating the market due to lack of independent and credible evidence of its advantages. On the other hand, technology purchasers or investors committed to finding the best solution for their situation are often faced with non-comparable, incomplete or non-trustworthy performance information when assessing the available choices on the market. This risks that such developments are not rewarded and that incentives for businesses to take part in the transition to a circular economy remain low. This may be particularly the case for SMEs.

To address this situation, the Commission launched the Environmental Technology Verification (ETV) pilot programme¹⁹⁴ to offer a verification procedure to cutting-edge environmental technologies that may otherwise find it difficult to establish their environmental added value. The verification procedure allows for an independent assessment and validation of the manufacturer's claims on the performance and environmental benefits of their technology. The information produced by the verification is public and can be used to compare performance parameters and therefore becomes an extremely useful tool to convince third-parties of the merits of a technology, potentially enhancing its market value and acceptance. The ETV Pilot Programme ran from 2013 to 2017 and was subsequently evaluated. The evaluation is expected to be published in the first half of 2019.

7.3. **Traceability of substances of concern**

Traceability of substances of concern¹⁹⁵ in supply chains was identified as a priority horizontal issue in several product groups. Lack of information about chemical content of material streams jeopardizes mechanical recycling processes, use of recycled content and trust of consumers in materials and products. The Commission is involved in several initiatives addressing this issue. In the framework of the Interface between chemicals, products and waste¹⁹⁶, one of the main objectives is to make sure that information on substances of concern in products is available to all actors in the supply chain and to waste operators. A summary report of the open public consultation, which outlined several different options to address the challenges at the interface, is expected to be published in March 2019. In addition, the Commission launched a feasibility study on the use of different information systems, innovative tracing technologies and strategies which could enable relevant information to flow along article supply chains and reach recyclers. The study is expected to conclude in the first half of 2020.

¹⁹⁴ http://ec.europa.eu/environment/ecoap/etv_en

¹⁹⁵ A definition for the term "substances of concern" has not yet been agreed but a number of possible definitions are proposed in the Staff Working Document (SWD(2018) 20 final) which accompanied the Commission's Communication on the interface between chemical, product and waste legislation (COM (2018) 32 final).

¹⁹⁶ COM (2018) 32 final

In the framework of the REACH Review¹⁹⁷, the Commission is assessing whether and how a tracking system could contribute to improve the workability of information requirements for substances of very high concern (SVHC) in articles. In addition, under the revised Waste Framework Directive, the Commission has tasked the European Chemicals Agency (ECHA) to set up a database on the presence of substances of concern in products by 2020. This information would be available to consumers as well as waste handlers. In addition, for electrical and electronic equipment (EEE), the EU platform “Information for Recyclers”¹⁹⁸ was launched to collect and share information (e.g. components and materials, and location of dangerous substances and mixtures) about preparation for re-use and treatment of new EEE placed for the first time on the Union market. Furthermore the Commission has launched a study (CleaR, 2018-2019) with the purpose of developing an evidence-based approach as support to regulators when assessing how to manage the presence of substances of concern in recycled materials.

Substances of concern particularly cause problems in plastics, many of which contain SVHCs and other legacy substances of concern, which can stay in material streams for a long time when recycled mechanically. Much is expected in this regard from chemical plastic recycling, in which polymers are broken down into their chemical constituents, which can be converted into new basic chemicals and polymers for the production of new clean plastics. This could allow elimination of substances of concern in the recycling process. However, the technology is currently insufficiently developed for the main polymers classes on the market, and there are concerns about environmental impact and the risk of infrastructure lock-in. Further innovation, a clear legal framework and the right economic incentives are required to make chemical recycling of plastics into plastics a reality.

¹⁹⁷ COM(2018) 116 final

¹⁹⁸ <https://i4r-platform.eu/about/>

8. CONCLUSIONS

8.1. The EU Policy Framework for products

The analysis conducted and summarised in this document has given an overview that is perhaps not exhaustive, but illustrative of the framework of EU policies applicable to products and their contribution to circular economy. It is clear that no overarching, integrated EU policy instrument exists that covers the sustainable production and consumption of all products and/or the availability and reliability of information on these products to consumers. Instead, the EU product policy framework consists of a wide range of EU legislative instruments and other policy tools. The policy tools contribute, through varying approaches, to ensuring safety of products and/or promoting sustainable production, consumption, reuse, repair, remanufacturing and/or recycling of products, in different phases of the product life cycle. Together they form a patchwork providing a substantial contribution to circular economy. However, the overall remaining potential for circular economy remains high, as is amongst others clear from the fact that in terms of overall average progress of EU Member States toward the SDGs, SDG12 is the second lowest ranking SDG. Further evidence of this includes the large volumes of textiles, furniture and WEEE that are still being landfilled or incinerated.

The deployment of different policy tools allows for tailoring them to the specificities of the products they cover and the way they do this. However, to optimize their efficiency and contribution to circular economy, it requires regular consideration of overall consistency of the policy interventions. This begins with considering which products to cover, and how. When multiple policy tools apply to the same products, there should be consideration of possible synergies and avoidance of overlap or inconsistencies.

8.1.1. Coverage

The coverage of products by different legislative instruments and other policy tools varies across the product groups analysed, as visualised in table 2.

In general, policies aimed at safety of the different products seem to be adequately developed with many policy instruments in place. Naturally, these need continued updating and implementation to keep up with developments and innovations in the different fields, which requires continuous efforts from the Commission, Parliament and Member States.

Policy tools setting minimum requirements for sustainable performance of products are less widely in place. The Ecodesign directive addresses a range of energy-related products and is widely recognised as an effective instrument for the products it covers. For packaging, the Packaging and Packaging Waste Directive (PPWD) contains essential requirements that restrict non-sustainable packaging from the market, at least to a certain extent. The Single use Plastics Directive will ban a number of plastic items considered not sustainable. For other sectors, such an approach is not yet in place, despite high potential and interest from some stakeholders.

Table 2: impression of EU policy tools addressing different aspects of circular economy

	EU policy tools on safety, including sectoral legislation (non-exhaustive)	EU policy setting minimum requirements for circular design	EU policy tools promoting Sustainable production and/or consumption	EU policy tools on waste handling/recycling
Packaging	PPWD	PPWD SuP Directive ¹⁹⁹	EPR under WFD EU Ecolabel	PPWD
Food	Food safety policy (incl. information to consumers)		Organic Label WFD (measures to prevent food waste)	WFD
EEE (including batteries)	RoHS Directive Low Voltage Directive GPSD Batteries Directive	Ecodesign Directive RoHS Regulation	Energy Labelling EU Ecolabel GPP EPR (under WEEE and Batteries Directives)	WEEE Directive Batteries Directive
Transport ²⁰⁰	Type approval requirements ²⁰¹		Tyre Labelling Regulation EPR (under ELV Directive and waste from ships)	WFD (for waste oils) ELV Directive PRF Directive ²⁰²
Furniture	REACH Regulation GPSD		EU Ecolabel GPP EU Timber Regulation	
Buildings and Construction ²⁰³	CPR	Level(s)	EPBD EED Level(s)	WFD (Recovery target and selective demolition obligation)
Textiles	REACH Regulation GPSD		Textiles Regulation EU Ecolabel GPP	WFD (separate collection by 1/1/2025)
Chemical products ²⁰⁴	REACH Regulation CLP Regulation		EU Ecolabel	WFD

PPWD: Packaging and Packaging Waste Directive

CLP: Classification, Labelling and Packaging

WEEE: Waste Electrical and Electronic Equipment

EPR: Extended Producer Responsibility

REACH: Registration, Evaluation and Authorisation of Chemicals

WFD: Waste Framework Directive

GPP: Green Public Procurement

ELV: End-of-Life Vehicles

RoHS: Restriction of Hazardous Substances

GPSD: General Products Safety Directive

CPR: Construction Products Regulation

EED: Energy Efficiency Directive

¹⁹⁹ Single Use Plastics Directive – Commission Proposal under negotiation by co-legislators at time of writing

²⁰⁰ This analysis focussed on automotive products such as oils, oil filters and tyres

²⁰¹ See, http://ec.europa.eu/growth/sectors/automotive/technical-harmonisation/eu_en

²⁰² Port Reception Facilities directive - Commission Proposal under negotiation by co-legislators at time of writing

²⁰³ Besides whole buildings, this analysis focused on construction products such as doors, windows, steel frames

²⁰⁴ E.g. detergents, paints and cosmetics

A range of policy tools exists that aims to promote sustainable consumption or production, typically by trying to give a market advantage to more sustainable products, thus nudging consumers to prefer these over other products. Most of these are voluntary, with the notable exception of the Energy Labelling Regulation, which is mandatory for the products it covers. This was the most widely recognised label and considered the most effective of the labels shown to respondents in the public consultation. EPR systems are an economical instrument providing incentives for sustainable production and waste prevention. EPR is mandatory for electrical and electronic equipment, end-of-life vehicles and batteries, and will soon become mandatory for packaging. In other sectors it has not been applied widely, and there is potential and interest from stakeholders for use of the instrument in some of these sectors. Some form of guidance or coordination from the EU level would help prevent fragmentation of the internal market.

The Waste Framework Directive, augmented with legislation for specific waste streams (such as EEE, ELV, batteries and packaging) provides for the necessary tools to address waste from products. The recent revision of a number of these legislative instruments will be implemented in the coming years and should increase their contribution to circular economy substantially.

8.1.2. Consistent implementation

Just having policy tools in place achieves little without implementation. Strong coordination is in place for the implementation of the Ecodesign directive and Energy labelling regulation and work will continue to address the energy-related products holding the highest potential for improvement. Coordination with legislative instruments such as RoHS and REACH restrictions is key, for example on issues such as restrictions or information on substances of concern, for which both instruments can potentially regulate and reinforce each other if adequately coordinated. Synergies with consumer policy instruments could also be further explored. In other areas, there is room for improvement of consistency of implementation. Some coordination is taking place in the development of EU Ecolabel and Green Public Procurement (GPP) criteria, including by reflecting on how or where these instruments could address products also covered by other tools (such as the Energy Labelling Regulation).

8.2. Remaining potential in specific product categories

In chapter 4, remaining potential was identified in a number of high-impact sectors for the circular economy. General conclusions are:

- For electrical and electronic equipment, further implementation of existing policy tools holds potential for improvements, continuing to safeguard consistency amongst policy tools and in combination with better enforcement. New developments, for instance in e-mobility and digitalisation, will require diligence and high efforts in this sector.
- In other sectors such as packaging, food and construction, many relatively recent or ongoing efforts can address a significant share of the remaining potential if they are properly implemented and circular approaches become more mainstream. In these sectors the implementation of recent

initiatives should therefore be kept under scrutiny in coming years while complementary measures would help achieve the full potential for circularity in these sectors.

- In sectors such as textiles and furniture, there would be much added value in considering to further develop policy instruments to support circular economy, in particular to address product design. There is also high interest from stakeholders in these sectors for EU policy development to support circular approaches.

8.3. Economic aspects

8.3.1. Supply and demand in recycled materials

An economic issue encountered in this analysis is the difficulty of matching supply and demand for secondary raw materials. In practice, secondary raw materials compete with virgin materials, which can in many cases meet all defined product specifications at a low price. This can make it hard to earn back investments in recycling, including labour costs. For producers, secondary raw materials can be difficult to secure in the quantities and qualities required and are often perceived to be of lower quality than virgin materials. This can lead to them being used in products with lower specifications or in low value processes.

Economic incentives could help address this situation. There is some experience with applying EPR or reduced VAT rates. Shifting from taxation on labour to other tax bases less detrimental to economic growth, such as consumption taxes and environmental taxes²⁰⁵, would contribute to pricing in negative externalities, incentivise behavioural change and support the transition to a Circular Economy.

8.3.2. The repair sector

The repair sector offers particular potential for circular economy, addressing material efficiency (prolonged product lifetime), employment (jobs in repair in the EU, often including social employment) and economic added value. As explained in this analysis, initiatives are ongoing to support this sector and in particular the independent professional repair sector. This sector would profit from support in obtaining fair access to repair information and spare parts, better recognition of technical competence and training, as well as legal certainty as regards liability issues relating to damage caused by repaired products.

8.4. Consumer information and rights

Work is ongoing to further empower consumers to participate in the circular economy, including through providing them better and more reliable information on products e.g. via tagging. Availability of information in digital, machine-readable format is therefore of great importance. Continuation and stepping up of this work holds large potential for further progress. This could include further measures addressing premature obsolescence of products and strengthening the rights of consumers or supporting consumer friendly repair services. Building on the PEF pilots, green

²⁰⁵ https://ec.europa.eu/info/sites/info/files/file_import/european-semester_thematic-factsheet_taxation_en_1.pdf

claims accompanying products should be made more verifiable and reliable, to build consumer trust in green products. The role of the EU Ecolabel in guiding consumers to products with excellent environmental performance remains relevant and should become more effective as a result of the strategic approach under development.

8.5. Overall remaining potential

The assessment made in this document, including the consultations held and information received through various studies, shows that:

- policies systematically targeting circularity for specific sectors, such as set out for plastics in the Plastics Strategy, are not in place in other relevant sectors such as textiles, furniture and food;
- eco-design policies have successfully been used to stimulate circularity for energy-related products. Such policies are not yet applied in other relevant sectors;
- there is not yet a systematic assessment of synergies between policies and legislation that interact with product policies, in particular consumer protection policies; this includes issues related to premature obsolescence of products, rights of consumers or effective and affordable repair services; this also applies to synergies with policies on climate change and air pollution;
- measurement and assessment tools such as Product Environmental Footprint methods for the verification and substantiation of green claims on the environmental performance of products have been developed, but are not yet applied to their full potential.

Annex I Summary of consultations in support of the analysis

1. ROADMAP

A roadmap²⁰⁶ was published for this initiative, to which the public could provide feedback from May 7 to June 4, 2018. 49 responses were received, including 30 uploaded position papers, all of which are available on the roadmap website. 28 responses came from company/business organisations or business associations, 14 from NGO's or environmental organisations and 3 from public authorities, the rest identified themselves as 'other' organisations.

In general, responses were positive towards the initiative. Many respondents emphasised the importance of product policies for circular economy and sustainability and expressed (strong) support for action in this field. Some respondents asked for a holistic, coherent or integrated approach, pointing to the need for life-cycle approaches to take into account potential trade-offs between policy interventions across the production cycle. Several respondents emphasized the importance of a level playing field for operators on the EU market and vis-à-vis producers in third countries.

Many issues to be tackled were suggested by the different respondents, including

- Avoidance of hazardous substances, in particular to keep recycling options open;
- durability and reparability of products, countering premature obsolescence;
- dependence of the EU on imports of (critical) raw materials;
- the export of waste from the EU to third countries;
- informing consumers and/or educating citizens as regards circular concepts;
- Circular design of food packaging, taking into account its importance for food safety;
- Taxation of virgin materials to support recycled materials;
- Sourcing and managing virgin and secondary materials sustainably;

Policy concepts and instruments mentioned by respondents as being relevant in this context included

- Mandatory product design requirements (e.g. Ecodesign);
- Product labelling;
- Substitution of possession of products with access to services;
- legislation for chemicals (such as REACH);
- Economic incentives such as EPR (with modulation of EPR fees) and VAT rates;
- Application of the waste hierarchy and the polluter pays principle;
- Relevant standards and conformity assessments;
- Consumer rights, in particular longer product guarantees;

²⁰⁶ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-2409307_en

Respondents pointed to the importance of several specific sectors for this initiative, including food and beverages, tyres, agriculture, automotive industry and imaging equipment (in particular cartridges).

Some respondents commented that the roadmap overstated concerns in the field of sustainability, at least in the sectors in which the respondents were active. A number of respondents indicated they had been involved in the PEF/OEF pilots and elaborated their different experiences in their contribution.

2. STAKEHOLDER WORKSHOPS

To obtain views and ideas from stakeholders in a number of fields considered relevant under this initiative, workshops were held with these stakeholders in October 2018. The workshops were organised with 15 – 30 representatives of companies, business associations, consultants and environmental and/or consumer NGO's. The meetings were held under 'Chatham house' rules, allowing for an open exchange of views and ideas. In total, seven half-day workshops were held, focussing around the sectors:

- Energy related products
- Textiles (garments, footwear, carpets)
- Chemical products (cosmetics, paints and varnishes, detergents)
- Furniture
- Construction products
- Transport products (tyres, oils, oil filters)
- Toys

In general, the stakeholders were supportive of the Commissions initiative. There were questions as to the sectors selected for the workshops, to which the Commission explained that the purpose was to get a picture of the state of play in different sectors. No scoping effect for any potential future work was intended by the selection.

Discussions focussed on finding remaining potential for circular economy. In some sectors such as toys and chemical products, it was questioned whether much potential was present. Participants pointed to existing requirements in the different sectors which already realise much potential, or make further improvements difficult due to conflicting policy goals. In the sectors textiles and furniture, many suggestions for further policy developments were made and there was generally wide support for EU action in these fields, taking into account the level playing field and better regulation principles.

The views expressed by stakeholders in the workshops were taken into account in this document in relevant sectors, as indicated in the text.

3. OPEN PUBLIC CONSULTATION

An open public consultation was undertaken via the EU Survey platform, running from 29 November 2018 to 24 January 2019. The aim of the public consultation was to gather input from all interested stakeholders, including consumers, on how the EU product policy framework supports the circular economy. Consultation results on specific issues were incorporated in the different sections of this document where relevant. This annex summarizes some more general findings of the consultation. The full results will be published on the EU survey website²⁰⁷.

The questionnaire focused on whether and how EU policies and regulations should promote the circularity of products, including questions on specific product categories. The questionnaire also sought stakeholder views on more specific topics: how environmental information on products should be communicated to consumers; environmental labelling; and environmental footprint methods.

3.1. Responses

A total of 642 responses were received, with the majority of responses coming from citizens. The responses included:

- 429 (67%) responses from citizens
- 141 (22%) from industry
- 34 (5.3%) from civil society, including environmental NGOs and consumer organisations
- 14 (2.2%) from public authorities
- 14 (2.2%) from academic or research institutes
- 7 (1%) responding as ‘other’ types of organisations, including trade unions.

Responses were received from inhabitants of all Member States except Cyprus. 25 replies were received from outside the European Union Member States.

Of the industry responses, 74 identified as business associations and 67 as companies. Of the companies, more than half (57%) identified as large companies with more than 250 employees.

3.2. Main themes

3.2.1. EU product policy framework

Respondents generally preferred regulation on the circularity of products to be made at the EU-level. The majority of respondents stated they prefer EU product rules and policies, with 94.5% agreeing or strongly agreeing with the statement, ‘the EU should set rules for products on the EU market to limit their impact on the environment’. A similar proportion (89.2%) of respondents agreed or strongly agreed that ‘the EU should promote products with reduced environmental impact, for example through labels’. Similarly, 87% of respondents agreed or strongly agreed with the statement ‘the EU

²⁰⁷ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-2409307/public-consultation_en

should set rules and rights to help consumers to engage in the circular economy, for example through additional consumer rights to repair' and with the statement 'the EU should set rules to make sure products have a long lifetime' (83.4%). A significant proportion (73.5%) either disagreed or strongly disagreed with Member States setting rules on product policies.

In terms of whether certain types of products should be given priority in policy-making, respondents tended to prefer a prioritisation of products with the greatest impact on the environment or climate. Just under half (46.7%) of respondents believed 'the EU should prioritise products with the highest impact on climate, the environment or use of resources'. This was followed by 27% of respondents who stated 'the EU should aim to reduce effects on the environment of all products' and 14.9% who stated 'the EU should prioritise those products where significant improvements can be made at lowest cost to producers and consumers'. Only 1.7% agreed with the statement that 'the EU should not be setting such rules and policies for products'. When asked to clarify if other factors should be considered to determine whether certain products should be prioritised, some respondents mentioned that regulatory attention should be paid to products produced outside the EU where environmental standards are lower or to products that are the most hazardous for citizens' health.

In terms of the effectiveness of specific EU policy approaches, in general, a majority of respondents agreed that key policy approaches were at least somewhat effective. These approaches were: restricting setting performance standards (e.g. through the Ecodesign Directive); restricting hazardous substances in products (e.g. REACH or the RoHS Directive); setting safety standards and product certifications (e.g. through CEN/CENELEC standards); making producers responsible for the waste caused by products (e.g. Extended Producer Responsibility schemes).

Respondents were asked for their views on whether the EU product policy framework adequately covers certain product categories: Electrical and electronic equipment; Furniture; Textiles; and Toys. While significant numbers of respondents expressed concerns for all four product categories, respondents considered that textile products were least adequately covered. More than half of respondents stated that the EU policy framework for textile products was inadequate in all three of the areas covered by the questionnaire (Sustainable design and production; Information on product sustainability; End-of-life and waste).

In terms of consumer preferences for products, 90% of respondents reported a preference for products that can be easily repaired. A large majority of respondents stated that they prefer products with environmental labels, with 86.5% agreeing or strongly agreeing with the statement, 'I prefer buying products with labels stating that they perform well in terms of their impact on the environment'. Nonetheless 60% consider that there are too many different and confusing environmental labels. A similar proportion (83.4%) of respondents agreed that they are willing to pay more for a product if they could be sure it is more sustainable. There was also strong support for an EU role in verifying information on product labels, with 80% agreeing that the EU should play such a role. Only 7.6% stated that price is the only aspect that influences their purchasing.

Only a small minority of respondents (13%) stated that they do not trust information on labels. However, a large majority (88%) of respondents expressed concern about premature obsolescence of products.

3.2.2. Information on products

When asked which information they wished to see on products, a large majority (93%) of respondents showed support for including information on products relating to ingredients and components of products. There was also strong support (i.e. above 80% of all respondents) for information on: life expectancy of products; recyclability; repairability; place of manufacture; production type; and the life-cycle environmental impacts of products.

Consumers were asked for their views on specific product labels: the EU Ecolabel; national or regional ecolabels, such as the German Blue Angel or the Nordic Swan; the EU Energy Label; labels for specific natural resource-based materials (e.g. FSC, RSPO, MSC); the EU Organic Farming Label; and the EU Tyre Label. Respondents reported strongest familiarity, understanding and preference for the EU Energy label, and least familiarity with the EU Tyre label.

Broadly speaking, consumers are not satisfied with the environmental information on products: 85% of respondents reported being unsatisfied or only partially satisfied with the information available to them. In respondents' explanations of why they are not satisfied with environmental information, some key themes emerged:

- Environmental information on products is generally not sufficient to support consumer decision-making. Often respondents considered that more products should be labelled.
- Respondents want more information about specific themes, including the product's entire life-cycle, information on post-consumer (i.e. waste) impacts, and information on the durability of products.
- The information that is provided is too difficult to understand. In particular, respondents felt that it was too difficult to compare similar products.
- There are too many labels, which also does not support the comparison of products.
- For some consumers, environmental information about products is not to be trusted.

3.2.3. EU Ecolabel

When focusing on the EU Ecolabel specifically, stakeholders agreed that the main objectives of the EU Ecolabel should be guiding EU consumers to the most environmentally friendly products on the EU market and encouraging producers to continuously improve the environmental performance of their products. 86% of respondents considered that the lack of consumer knowledge and understanding of the EU Ecolabel by consumers is a main challenge to the effectiveness of the label.

3.2.4. Product Environmental Footprint Pilot

291 respondents to the public consultation replied to the section dedicated to the Environmental Footprint. Out of these respondents, 78 were involved either as a stakeholder or as members of one of the pilots in the Environmental Footprint pilot phase, whilst 80 were aware of the Environmental

Footprint. Thus, 46% of respondents were not familiar with the methods or the pilot phase. The most promising policy applications for the PEF and OEF methods were to

- use the PEF/OEF methods and product/sector specific rules as common knowledge basis in existing or new policies (e.g. to support the development of EU Ecolabel criteria, Green Public Procurement criteria, Sustainable Finance, Eco-management and Audit scheme, etc) (75% thinks this would be very effective or effective);
- provide requirements on how to communicate to consumers, businesses and other stakeholders (e.g. NGOs) on the Environmental Footprint (73% thinks this would be very effective or effective);
- develop new policies related to the environmental performance of products and/or organisations compliant with the PEF/OEF methods (e.g. on misleading green claims and proliferation of environmental labels) (68% thinks it would be very effective or effective);
- review existing policies related to the environmental performance of products and/or organisations making them compliant with the PEF/OEF methods (66% thinks this would be very effective or effective);
- create an EU repository of PEF results for products (62% thinks this would be very effective or effective);
- create an EU rating scheme based on OEF results for companies and organisations (52% thinks this would be very effective or effective).

Annex II Background information on The Environmental Footprint

Between 2013 and 2018, the Commission has been running a comprehensive road-test exercise, the so-called Environmental Footprint pilot phase. The pilot phase had the following main objectives:

1. To test the implementation of the PEF/OEF methods adopted in 2013 into Product Category Rules and Organisation Sectoral Rules (respectively called PEFCRs, and OEFSRs). Having a single set of rules for a product category or a sector could stop of the current proliferation of "similar-but-different" rules in the EU.
2. To develop a "benchmark" for each product category, where the benchmark is the quantified environmental performance of the average product sold in EU. The benchmark is available per impact category (the methods address 16 different impact categories) and as total environmental impact (single score).
3. To test alternative verification approaches, knowing that the reliability and traceability of the information provided is a key element to increase the lacking trust from stakeholders when it comes to green claims and labels.
4. To test alternative communication vehicles (websites, leaflets, Environmental Product Declarations, labels, bar codes, QR codes, etc).

The Commission decided that this exercise should be industry-driven. Therefore, the Commission launched a call for volunteers open to stakeholders from within and outside of the EU.

27 pilots were selected out of the 120 proposals received. 11 were related to food, feed and drink sector²⁰⁸ and 16 related to other sectors²⁰⁹. The pilots were finalised in 2018, with the exception of 5 that decided to stop during the process (seafood, coffee, stationery, red meat and footwear)²¹⁰ and one (olive oil), the finalisation of which has been postponed to spring 2019. The great majority of the pilots cover at least 51% of the European market in terms of turnover of product sold in EU, with a total average for all pilots of more than 65%.

More than 300 companies and business associations from the EU and beyond were directly involved in the technical work, investing their own time and resources. More than 2000 stakeholders followed the work done during the pilot phase. Several public administrations were closely monitoring the work and some of them (France, Germany, Italy, and Switzerland) were also contributing to the technical work.

²⁰⁸ meat, seafood, olive oil, coffee, pasta, packed water, wine, beer, dairy, pet food, feed

²⁰⁹ batteries - high specific energy rechargeable batteries for mobile applications; decorative paints, footwear, hot and cold water pipe systems, detergents, intermediate paper products, IT equipment (storage), leather, metal sheets, photovoltaic panels, stationery products, thermal insulation, t-shirts, Uninterruptible Power Supply, copper production, retail

²¹⁰ The final deliverables of the pilot phase are available on http://ec.europa.eu/environment/eussd/smgp/PEFCR_OEFSR_en.htm

The work performed during the pilot phase provided input for improving the process of developing PEFCRs and OEFSRs and on the applicability of the methods for different policy uses.

1. THE RESULTS OF THE PILOT PHASE

The pilot phase delivered many results and methodological advancements, positioning the PEF/OEF methods and the Commission as best practice reference worldwide. The pilot phase was assessed through several reports, focussing on different strands of work: an independent review of the pilot phase, focussing on the process; a technical evaluation; conclusions regarding the testing of different approaches to verification; a report on the testing of different communication vehicles for providing Environmental Footprint information. These outcomes have been confirmed by the independent reviews and reports on the pilot phase.

One of these developments is the materiality principle, which states that the effort needs to focus on the most relevant environmental impacts, life cycle stages and processes. Even for complex products with thousands of processes in their supply chain, the list of most relevant processes tends to be in the order of 20-30. As the analysis focuses on these most important processes, the effort and cost is greatly reduced.

In addition to focussing the collection of company-specific data to the most relevant processes, the Commission made available the average secondary data needed for the other processes for free to users applying the PEFCRs and OEFSRs.

Another important development is the definition of a benchmark, which corresponds to the Environmental Footprint profile of the average product on the market, also called representative product. This allows to determine whether a product has a better, average or worse performance respectively to the benchmark.

The pilot phase also brought agreements on how to approach different horizontal issues, such as modelling climate change indicators, electricity, transport, agriculture, packaging, and end of life (i.e. re-use, recycling, and disposal treatments).

Moreover, building on developments and expertise from the European Commission's Joint Research Centre and on the outcome of the work done at international level by the Life Cycle Initiative²¹¹ and on a fruitful collaboration between the Commission and European Chemicals Agency, on data to be used in toxicity assessments, several impact assessment methods have been improved (e.g. water use, land use, freshwater ecotoxicity and human toxicity²¹²).

The pilot phase identified needs for further improvement of the approach in certain issues such as the scope definition (determining the right coverage and granularity for product groups and

²¹¹ <https://www.lifecycleinitiative.org/>

²¹² http://eplca.jrc.ec.europa.eu/permalink/JRC114227__FINAL_online.pdf

sectors in PEFCRs and OEFSRs), the development of an approach for defining classes of performance (e.g. performance levels from A to E, similarly to the EU Energy Label) and the improvement of modelling agriculture and husbandry (allocation of impacts to parts of the animal).

The pilot phase has built on the PEF/OEF Guides that were adopted by the Commission in 2013. Experience was gained during the pilot phase (2013-2018), in the work done in collaboration with industries and stakeholders from all over the world and through the inputs received in these years by many EC services. The Commission is considering options for integrating the method into the policy framework. In the meantime, stakeholders can take the experience gained during the pilot phase into account during the Environmental Footprint transition phase.

2. THE INDEPENDENT REVIEW OF THE PILOT PHASE

The independent review²¹³ was performed by experts from international organisations (UN Environment), the private sector and NGOs (performed by an environmental NGO expert). The reviewers gathered views through questionnaires and had the opportunity to observe the process in person.

The reviewers concluded that PEF and OEF are a good basis for harmonisation at EU and international level, but that more effort was needed to foster harmonisation at international level. The methods were also judged to be good tools for simplifying the assessment and information gathering for industry and for companies in supply chains. They confirmed that the pilot phase created consolidated approaches to some long-debated methodological issues (e.g. on the end of life of products).

Regarding the process, they appreciated the multi-stakeholder approach and the rule that pre-existing work had to be considered before developing a new PEFCR or OEFSR, and they recommended to continue these in the future.

The peer reviewers conducted surveys among the constituencies they represented, i.e. international organisations, academia, businesses and NGOs. There were a number of opinions on the Environmental Footprint methods, ranging from trust in its robustness to doubts on specific elements in the methods (e.g. toxicity impact categories); from appreciation of simplifications through the PEFCRs/ OEFSRs to worries about over-simplification.

The reviewers drew the attention to the need to have clear and reliable rules for verification. They recommended to continue the multi-stakeholder approach and the rule to consider existing initiatives. Regarding communication, the messages from the stakeholders are not clear-cut,

²¹³

[Final report of the Environmental Footprint pilot peer reviewers](#), August 2017

with opinions both pushing for the use of PEF and OEF in business-to-business and business-to-consumer communication, or for limiting their use, especially in consumer communication.

They considered the integration of the Environmental Footprint methods into existing policies such as the EU Ecolabel, Green Public Procurement and the Eco-Management and Audit scheme as the next logical step.

3. TECHNICAL EVALUATION OF THE ENVIRONMENTAL FOOTPRINT PILOT PHASE

The technical evaluation²¹⁴ was performed by the Environmental Footprint helpdesk, which was providing assistance on methodological issues to the pilots. The report identified points of improvement needed for fair product comparisons (e.g. clearer rules on scope, improving the impact assessment of toxicity, etc.).

The report concluded that a significant reduction of cost of calculations will result from the PEFCRs/OEFSRs compared to conventional Life Cycle Assessment. Main drivers of this are the rules, the materiality principle (focus on what drives environmental impacts), freely available background data and models and having a single method as a basis.

4. ASSESSMENT OF DIFFERENT APPROACHES TO VERIFICATION

During the pilot phase, a contractor performed different approaches to verification on the results of studies performed on real products. The verification of embedded impacts and traceability of information were of key importance in this experiment.

The report²¹⁵ stated that the good balance between cost and reliability of verification might be to verify models and data owned by the company (typically covering about 80% of the data) through on-site audits. This would require about 2 days of verification. It identifies different scenarios of verification activities needed and related costs based on wider types of policy.

5. ASSESSMENT OF COMMUNICATION VEHICLES FOR PROVIDING ENVIRONMENTAL FOOTPRINT INFORMATION

The report²¹⁶ summarises the experiences of the pilots in testing different communication vehicles and the complementary tests performed by the Commission's contractor.

Pilots carried out a total of 51 communication tests – 27 focussing on business-to-business communication, and 24 focussing on business-to-consumer communication. Approaches included labels, environmental product declarations, reports, websites, videos, banners,

²¹⁴ [Technical evaluation of the EU Environmental Footprint pilot phase](#), Ecofys, Pré Consultants and RDC, April

2017

²¹⁵ [Final report on the verification stage](#), Ernst & Young, April 2017

²¹⁶ [Final report on the assessment of different communication vehicles for providing Environmental Footprint information](#) London School of Economics and partners, 2018

infographics, ads and newsletters. To understand the impact of these approaches, surveys, interviews, workshops and focus groups were carried out.

Both citizens and businesses find Environmental Footprint information of interest. Citizens are concerned about environmental sustainability even if environmental performance is not the main driver of their purchasing decisions; for many businesses, Life Cycle Assessment is already embedded in their thinking and they anticipate benefits for both business-to-business and business-to-consumer activities through the use of the Environmental Footprint.

Both for citizens and businesses the clarity and simplicity of the information is key. Citizens find numerical information and scientific terms too complex and prefer graphics, bars and colour scales. QR codes, barcodes and links can lead to more detailed information for the interested citizen. Translating the complexity of EF information into simple, easily understandable messages is a challenge. Consumers highlighted the need for certification of information from named and independent sources.

6. SUMMARY OF MAIN RESULTS OF THE TARGETED STAKEHOLDER CONSULTATIONS

The main conclusions from the different consultations held with stakeholders on the potential future policy applications of the PEF and OEF method are described in section 6.4, including a description of overall results of the targeted consultations.

This section presents the differences in opinion between the stakeholder groups consulted during the targeted consultation. The stakeholder groups included businesses and business organisations, public administrations and international organisations, investors and financial institutions, NGOs and method/ initiative owners.

The consultation focussed on the following policy options in implementing the PEF method:

- The European Commission encourages the use of the Environmental Footprint methods for measuring and communicating environmental information on a voluntary basis
- Delegate the management of a voluntary Environmental Footprint scheme to a 3rd party
- Prescribe the use of the PEF in case communicating environmental information (it is not mandatory to communicate environmental information, but if communicated, the information has to rely on the PEF method)
- Prescribe the use of the PEF for measuring and communicating life cycle environmental performance
- Use the PEF in the development of EU Ecolabel criteria
- Use PEF benchmarks (performance of the average product) as thresholds to access the EU Ecolabel scheme
- Use PEF information to demonstrate compliance with the EU Taxonomy of Sustainable Investments.
- Use PEF for defining Green Public Procurement criteria

- Use PEF benchmarks as thresholds for accessing Green Public Procurement
- Use PEF information to check the accuracy of environmental claims when applying the Unfair Commercial Practices Directive
- Provide requirements on how to communicate on the Environmental Footprint (it is not mandatory to communicate environmental information, but if communicated, these have to comply with specific requirements)
- Create an EU repository of PEF results for products (participation voluntary or mandatory depending on the policy)

The most promising option with businesses and business organisations was to provide requirements on how to communicate environmental information (62%)., The second most preferred option would be that the Commission encourage the use of the methods (59%), followed by the prescription of the use of PEF in case communicating environmental information (54%).

For investors and financial institutions, the most promising options are that of providing requirements on how to communicate on the Environmental Footprint (100%), encouraging the use of the methods (100%) and using PEF information to demonstrate compliance with the EU taxonomy of sustainable investments (100%).

For public administrations, the most promising options remains that of providing requirements on how to communicate on the Environmental Footprint (100%), followed by the prescription of the use of PEF in case communicating environmental information (92%) and by the prescription of the use of PEF for measuring and communicating life cycle environmental performance (83%).

For NGOs, the most promising options are that of prescribing the use of PEF for measuring and communicating life cycle environmental performance (50%), the creation of an EU repository of PEF products for products (50%) and the use of PEF information for checking the accuracy of environmental claims when applying the Unfair Commercial Practices Directive (50%).

For method and initiative owners, the most promising option remains that of providing requirements on how to communicate on the Environmental Footprint (79%), followed by the creation of an EU repository of PEF products for products (74%) and by the prescription of the use of PEF in case communicating environmental information (68%).

The options considered for OEF included

- The European Commission encourages the use of the Environmental Footprint methods for measuring and communicating environmental information on a voluntary basis
- Delegate the management of a voluntary Environmental Footprint scheme to a 3rd party
- Use OEF indicators in the EU Eco-Management and Audit scheme (EMAS) reporting
- Promote more harmonised reporting based on (but not limited to) the OEF for the environmental pillar of non-financial reporting
- Provide an EU registry of OEF results for companies (participation voluntary or mandatory depending on the policy)

- Create an EU rating scheme for environmental performance of companies, based on (but not limited to) the OEF.

The most promising policy option with businesses and business organisations was that of encouraging the use of the OEF for communicating environmental information on a voluntary basis (36%), followed by the EU registry of OEF results for companies (23%) and the use of OEF indicators in the EMAS (22%).

For investors and financial institutions, the most promising options are that of providing an EU registry of OEF results for companies (100%), to promote more harmonised reporting based on (but not limited to) OEF for the environmental pillar of non-financial reporting (100%) and to create an EU rating scheme for the environmental performance of companies based (but not limited to) the OEF (100%).

For public administrations, the most promising options are to promote more harmonised reporting based on (but not limited to) OEF for the environmental pillar of non-financial reporting (67%), to use OEF indicators in the EMAS (67%), followed by the provision of an EU registry of OEF results for companies (50%).

For NGOs, the most promising option is to promote more harmonised reporting based on (but not limited to) OEF for the environmental pillar of non-financial reporting (50%), followed by the use of OEF indicators in EMAS reporting (13%) and the provision of an EU registry of OEF results for companies (13%).

For method and initiative owners, the most promising policy options were to promote more harmonised reporting based on (but not limited to) OEF for the environmental pillar of non-financial reporting (58%) and to create an EU rating scheme for the environmental performance of companies based (but not limited to) the OEF (58%), followed by using OEF indicators in EMAS reporting (47%).

A detailed analysis of the consultations related to the Environmental Footprint will be available in a separate report.