OECD Environment Working Papers No. 253

Extended producer responsibility in the garments sector

Andrew Brown,

Peter Börkey

https://dx.doi.org/10.1787/8ee5adb2-en

OECD

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L22 ; L23 ; Q53 ; Q56 ; Q58

Authorised for publication by Jo Tyndall, Director, Environment Directorate.

Andrew Brown (OECD), Peter Börkey (OECD)

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Abstract

Textiles generate environmental impacts throughout the product lifecycle. The fast-fashion business model and the size of the industry means that garments generate environmental impacts, including greenhouse gas emissions, copious chemicals and water use and waste generation. Governments are considering policies to enable circular economy principles for garments. The extended producer responsibility (EPR) approach has been an integral policy approach in many other product sectors. But governments have not yet widely adopted EPR for garments. Only France and the Netherlands have national EPR schemes in operation. The aim of this report is to evaluate the potential for the EPR approach to help achieve public ambitions for the adoption of circular economy principles in the garments product sector.

The limited available experience suggests that EPR improves rates of separate collection of garments. In addition to improving collection and sorting, there is the possibility that EPR can help to reduce environmental impacts generated by the production, use, and disposal of garments. This is primarily by changing the economic incentives for producers, consumers, and waste managers. However, an EPR approach by itself will be insufficient to address all environmental impacts of garments and additional policies are likely needed to complement EPR.

Résumé

Les textiles ont un impact sur l'environnement tout au long de leur cycle de vie. Le modèle commercial de la « fast fashion » et la taille de l'industrie signifient que les textiles d'habillement sont un facteur important d'impact sur l'environnement, notamment en ce qui concerne les émissions de gaz à effet de serre, l'utilisation massive de produits chimiques et d'eau et la production de déchets. Les gouvernements envisagent des politiques visant à appliquer les principes de l'économie circulaire aux textiles d'habillement. L'approche de la responsabilité élargie du producteur (REP) a été une approche politique intégrale dans de nombreux autres secteurs de produits. Mais les gouvernements n'ont pas encore largement adopté la REP pour les textiles d'habillement. Seuls la France et les Pays-Bas ont mis en place des systèmes nationaux de REP. L'objectif de ce rapport est d'évaluer la capacité de la REP à contribuer à la réalisation des ambitions publiques en matière d'adoption des principes de l'économie circulaire dans le secteur de l'habillement.

Le peu d'expérience disponible suggère que la REP améliore les taux de collecte sélective des vêtements. Outre l'amélioration de la collecte et du tri, il est possible que la REP contribue à réduire les impacts environnementaux générés par la production, l'utilisation et l'élimination des textiles d'habillement. Cela est principalement dû à la modification des incitations économiques pour les producteurs, les consommateurs et les gestionnaires de déchets. Toutefois, une approche de REP ne suffira pas à elle seule à remédier à tous les impacts environnementaux des textiles d'habillement. D'autres politiques sont nécessaires pour compléter la REP.

Acknowledgements

This report is an output of the OECD Environment Policy Committee (EPOC) and its Working Party on Resource Productivity and Waste (WPRPW). It has been authored by Andrew Brown, with support in conceptualisation, analysis, methodology and supervision by Peter Börkey. The work benefitted from review by Frithjof Laubinger. Vilma Gertane, and Illias Mousse Iye provided editorial assistance. The work on this report was conducted under the overall supervision of Shardul Agrawala, Head of the Environment and Economy Integration Division of the OECD's Environment Directorate.

The authors are grateful to delegates of the OECD Working Party on Resource Productivity and Waste (WPRPW) for helpful comments on earlier drafts of this paper. Furthermore, the authors are indebted to experts who provided their valuable time and insights to the report through interviews, including officials from Agence de la transition écologique (ADEME), Re_Fashion, the Japanese Textile Federation (JTF), OR Foundation, Arisa, Centre for responsible business, and Reverse Resources. The authors are responsible for any remaining omissions or errors.

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Executive Summary

Humans have made, used, and disposed of textiles for thousands of years. The textiles product sector includes a diverse group of products that are composed of fibre-based materials. These can include woven fabrics in clothing and footwear, carpets, furniture, and sheets and towels. The production of textiles for garments has been a driver of manufacturing development since at least the industrial revolution. Globalisation and the advent of synthetic fibres drove down the real price of clothing over the past three decades. Businesses have largely responded by adopting a fast fashion model to sell cheaply made clothing only capable of a short use phase.

Production of fibre more than quadrupled in less than fifty years, growing from roughly 24 Mt in 1975 to 108.3 Mt in 2020. Over this period the production of natural fibres, such as cotton, silk, and wool roughly doubled. **The primary driver of the growth of production in textile fibres was the increase in synthetic fibre production which increased nearly eight-fold**.

The fast-fashion business model and the size of the industry means that garments are a significant driver of environmental impacts, including:

- Waste generation: In 2015, 92 Mt of garments became waste. Textiles commonly constitute between 3 and 6% of mixed household waste in waste composition surveys.
- Greenhouse gas (GHG) emissions A 2018 study estimated that textiles generated 4 GT of GHG, which was equivalent to 8% of human contributions.
- Water use: A 2017 study estimated 79 billion cubic meters are used annually in production.
- Chemical use: Manufacturers use a ration of nearly one to one chemical to other material on average to make textiles. A 2017 study estimated that producers use on average 0.58 kg of chemicals per production of 1 kg of material. A 2014 review of chemicals use in textiles production identified 2 450 substances and determined that 750 were hazardous to human health.

Countries are seeking to transition to circular economies that maintain material value and minimise waste and material inputs. This transition could help to reduce environmental impacts from the garments sector. The extended producer responsibility (EPR) approach is helping with this transition in packaging and several other product sectors through improvements to post-consumer collection and recovery. Governments have not yet widely adopted EPR policy for garments. This is likely to change soon as countries are looking for ways to achieve their ambitions for separate collection, reuse and recovery of garments.

Two new developments in European policy are likely to drive EPR scheme adoption in the next decade. First, a 2018 update of the Waste Framework Directive requires Member States to establish separate collection of textile waste by 2025. Second, the European Commission has proposed a targeted amendment of the Waste Framework Directive to require that EU countries establish EPR schemes for the separate collection of textiles. The proposed amendment was adopted by the European Parliament in March 2024. The Commission, Parliament, and Council negotiations on a final agreement are ongoing. If adopted, Member States would need to establish schemes. Several other OECD countries are actively exploring EPR legislation.

The limited available experience in France (begun in 2009) and a few additional European countries[1] suggests that EPR improves rates of separate collection of garments. The French EPR scheme significantly grew its collection volume (2 kg in 2009 to 3.7 kg per capita in 2019) and outperforms the EU-average collection rate (31% in France compared with 22% in the EU-27). This suggests that the EPR scheme has helped France to achieve this relative success. But there is still room for improvement because as of 2022 reporting the scheme has not yet achieved its own government-set target collection rate of 50%.

The French EPR scheme financially supports sorters, which helps to facilitate re-use of post-consumer garments. This is the single largest category of costs for the producer responsibility organisation (PRO) Re_fashion. **The scheme has achieved relatively high rates of re-use and recovery of collected and sorted material (60%)**, significantly outperforming the European average re-use rate (8%) of collected post-consumer textiles.

In addition to improving collection and sorting, there is the possibility that EPR can help to reduce environmental impacts generated by the production, use, and disposal of garments. This is primarily by changing the economic incentives for producers, consumers, and waste managers. These challenges include:

- Reuse[2] and repair: Lengthening the use phase with support for repair and social enterprises: The French scheme made several changes in 2023. The scheme is starting to support social enterprises to boost sorting and reuse, as well as providing repair credits (in the form rebates on repair costs) to households through certified repair shops.
- Recovery of exported used garments: There is a large global market for trade in used garments. This trade helps to extend the use phase, but there is concern that some importing countries are overwhelmed with management of poor-quality material that is not re-useable. Banning trade of used garments is unlikely to solve issues of waste generation and could negatively impact the people reliant on this trade for their livelihoods. Investment in improvements in sorting and recycling both domestically and abroad are needed. For example, the French EPR scheme provides funding for authorised sorters that are located outside France. Roughly 16% of the total material collected and processed by the scheme are sorted by facilities outside France (within the EU).
- Recycling: After exhausting opportunities to reuse and repair garments, recycling is a next best way to recover some material value. There are significant technical and economic barriers to recycling. New recycling technology is available but will require investment and economies of scale to become competitive with primary material. Manufacturers generate pre-consumer waste in the production phase. This material is a potentially high-value resource for recyclers. This material could be a 'low-hanging fruit' for scaling up recycling of textiles. EPR could potentially help to stimulate improvements in the handling of this material by including pre-consumer waste recovery targets for brands or offering a fee bonus for using recycled content.

[1] Several countries are at the initial stages of their implementation. The Netherlands adopted an EPR policy for textiles that includes garments. Producer registration began in 2023. Full implementation will take effect in 2025. The policy sets ambitious targets for a share (by weight) of material put on the market the previous year to be prepared for reuse or recycling, starting at 50% by 2025 and increasing to 75% by 2030. Latvia began an EPR policy in July 2024. Hungary's policy took effect in 2023. California (United States) will begin producer registration in 2026 with full implementation in 2030.

[2] In this paper the term re-use refers to the myriad waste prevention measures that prolong the use phase, include repair and remanufacture.

- Design for the environment: EPR is one approach for setting incentives for producers to change design through modulating EPR fees. Criteria could for example include chemical content or indicators of quality such as abrasion or strength. The French EPR scheme uses recycled content as a fee modulation criterion and may include recyclability criteria in the future.

An EPR approach by itself will be insufficient to address all environmental impacts of garments. Additional policies are needed to complement EPR. Regulation or complementary economic instruments can help encourage the implementation of the waste hierarchy (re-use, recycling, and then other recovery) by waste handlers. Governments can create standards by making definitions for garment waste, recycled content, and suitability for re-use. Harmonisation of these efforts where possible will ease compliance. Regulation is also needed to reduce the use of harmful chemicals during production and their treatment at end-of-life. Economic incentives can encourage demand for recycled content and stimulate investments in recycling infrastructure and technology. Complementary policies (e.g., awareness and behavioural interventions) can help households identify best practices to extend the use phase.

1 Introduction

Textiles generate environmental impacts throughout the product lifecycle. Production of natural fibres requires land conversion and copious use of fertiliser and water. These processes emit greenhouse gases, including methane. Synthetic fibres are derived from extracted mineral resources or energy-intensive chemical resin production. Garments shed fibres that are micropollutants throughout the lifecycle and especially in the use phase. Textiles commonly constitute between 3 and 6% of mixed household waste in waste composition surveys. Used garments are frequently exported to developing countries which can overwhelm local waste management and compete with local production. Lengthening the use phase of textiles where possible is preferable to recycling. However, as collected waste, clothing is rarely recycled.

This paper focuses primarily on clothing garments. These make up one product sector within the broader context of textiles. The textiles product sector includes a diverse group of products that are composed of fibre-based materials. These can include woven fabrics in clothing and footwear, carpets, furniture, and sheets and towels. Due to differences in product characteristics, use patterns, and disposal, comparison of existing programmes is difficult. Garments consumption and disposal patterns are different than other textiles products. Consumers accumulate numerous garments. Households also commonly dispose of garments before the end of their useable life for example due to changing fashions or body size. A key policy question is how to facilitate and incentivise the collection and distribution of these products for re-use.

A circular economy maintains material value and minimises waste and material inputs. Governments are considering policies to enable circular economy principles for garments. The extended producer responsibility (EPR) approach has been an integral policy approach in many other product sectors. But governments have not yet widely adopted EPR for garments. Only France and the Netherlands have national EPR schemes in place.

The OECD has produced a large body of work on EPR but has not yet conducted an in-depth analysis of EPR for garments. A recent paper reviewed developments in the policy debate surrounding new aspects of EPR (Brown, Laubinger and Börkey, 2023[1]). This included the application of EPR to textiles. The analysis considered how EPR in the sector helped to generate revenues for increased material collection and recovery in France, Belgium, and the United States. The OECD has hosted ten editions of the forum on responsible business conduct in the garments and footwear industry. Recent editions have included sessions focusing on due diligence in supply chains related to implementation of circular economy principles (OECD, 2021[2]; OECD, 2022[3]; OECD, 2024[4]).

Early adopters of EPR policy for garments are using innovative policies to primarily encourage re-use[3]. The EPR approach extends producers' responsibility for a product to the postconsumer stage of the product's lifecycle. By shifting the costs of end-of-life product management from the public to producers,

[3] In this paper the term re-use refers to the myriad waste prevention measures that prolong the use phase, include repair and remanufacture.

the approach aims to implement the polluter pays principle4, increase recovery rates, and incentivise design for the environment (OECD, 2016[5]). EPR policy and implementation schemes have traditionally emphasised achieving recycling targets. However, garments have characteristics that make them a promising place to trial EPR as a means for encouraging re-use.

The novelty of EPR policy for garments is an obstacle to in-depth analysis about its impact. A critical mass of existing EPR schemes can allow comparison and analysis of the differences in performance to inform policy design. In its absence, EPR can only be compared with performance in the garments sector in similar markets without a programme in place.

Several outside organisations have previously researched the lifecycle impacts of textiles, policy options for enabling circular economy principles, or recommendations for EPR. McKinsey modelled the greenhouse gas (GHG) contributions of the fashion industry, identifying 2.1 billion tonnes of emissions, roughly 4% of the global total (2020[6]). Hedrich et al followed this study with scenarios for 2030, including wide adoption (one-fifth of all garments) of circular economy business models (2022[7]). The United Nations Environment Programme (UNEP) commissioned a review of the value-chain of textiles to identify social and economic "hot-spots" (2020[8]). The Ellen MacArthur Foundation has been active in researching how to enable companies in the fashion industry to adopt circular economy principles (2017[9]). It followed this analysis with a review of the possibilities for EPR in textiles (2024[10]). Systemiq conducted a literature review of circularity of polyester textiles focused on Europe, which will soon be followed by a modelling report on mechanical and chemical recycling scenarios (2023[11]). The Swedish environmental research institute conducted a mapping exercise of Europe's recycling capacity and then combined life cycle assessment with industry modelling to identify a rate at which recycled material would need to displace new production for a net environmental benefit (0.44 kg per kg of recycled content) (2023[12]; 2023[13]). Eunomia reviewed a possible European Union directive for textiles EPR and complementary policy measures (Long and Lee-Simion, 2022[14]). Niinimäki et al. synthesised the available academic literature on the environmental impacts of 'fast fashion', including generation of textiles waste (2020[15]).

The aim of this report is to evaluate the potential for the EPR approach to help achieve public ambitions for the adoption of circular economy principles in the garments product sector. The paper is relevant to policymakers and the public because it provides a review of the environmental impacts of garments, the landscape of current policy, and the analysis of the impacts of existing schemes.

This paper answers three questions about enabling circular economy principles in the garments industry via the EPR approach:

- What are the key issues linked to materials use, resource productivity and waste throughout the lifecycle of garments? (Chapter 2)
- Which markets have an EPR scheme in place for garments? (Chapter 3)
- What has been the impact of applying this approach to the key issues of resource productivity and waste along the lifecycle? (Chapter 4)

The authors first conducted a literature review to identify the issues, debates, and existing data. Next, the authors conducted interviews with government officials, EPR compliance schemes (producer responsibility organisations [PROs]) operators, recyclers and sorters, and academia.

[4] The polluter pays principle, that the polluter should bear the expenses of carrying out measures, is a fundamental principle for cost allocation by public authorities in OECD member countries (OECD, 1974[112]).

2 Resource productivity and waste generation throughout the lifecycle

This paper divides the product lifecycle into three distinct phases: design and production, use, and end-of-life. Garments generate environmental impacts in each of these three stages. The extended producer responsibility (EPR) approach makes producers responsible for their post-consumer products. The approach emphasises improvements primarily in the environmental performance at the post-consumer (i.e., end-of-life) stage. This chapter matches this emphasis by beginning with the end-of-life stage of the lifecycle and proceeds upstream in its review of the existing literature on the impacts in each stage of the product lifecycle.

2.1. End-of-life

Textiles and garments make up a significant share of waste generation globally. In total, the Global Fashion Alliance and the Boston Consulting Group estimated that there was 92 Mt of textiles waste in 2015. This amounts to roughly 4% of their estimate of total global waste generation (2017[16]).

There are two primary forms of garments waste. **Pre-consumer** waste is made of material that is unused in the manufacture process or is produced but never sold to a customer. Households and commercial entities use textile products and then dispose of them, generating **post-consumer waste**. These two subcategories have unique drivers and barriers.

2.1.1. Pre-consumer

A significant portion of fabric is lost in the manufacture of products. Estimates range from 10% to 30%. In its impact assessment for a targeted amendment to the Waste Framework Directive the European Commission estimated that pre-consumer waste made up 13% of textiles waste generation in Europe (2023[17]). Factors include the design of the product, product type, and precision in manufacturing (Niinimäki et al., 2020[15]). Global supply chains can mean barriers to information provision and coordination between designers and manufacturers. Waste generation at manufacture is commonly mixed and disposed of by the factory.

This material is a potentially high-value resource for recyclers. With available improvements to handling **it can be kept clean**. Additionally, manufacturers have **knowledge of composition** to ease recycling.

Producers dispose of new products that they have been unable to sell, known as “deadstock”. For example, in its 2017/18 financial statement, Burberry, a United Kingdom-based luxury garment brand, reported physically destroying GBP 28.6 million in finished goods that year (Burberry, 2018[18]). Queen of raw, a technology company that serves as a pre-consumer textiles marketplace estimates that pre-consumer fabric accounts for roughly USD 120 billion in value each year (Benedetto, n.d.[19]). However, companies do not typically report on pre-consumer waste, so estimates are rough (Pinnock, 2018[20]). Governments could seek to regulate or prohibit this behaviour. For example, The EU’s Ecodesign for sustainable

products regulation will begin in 2025 to prohibit the destruction of garments and shoes (European Commission, n.d.[21]).

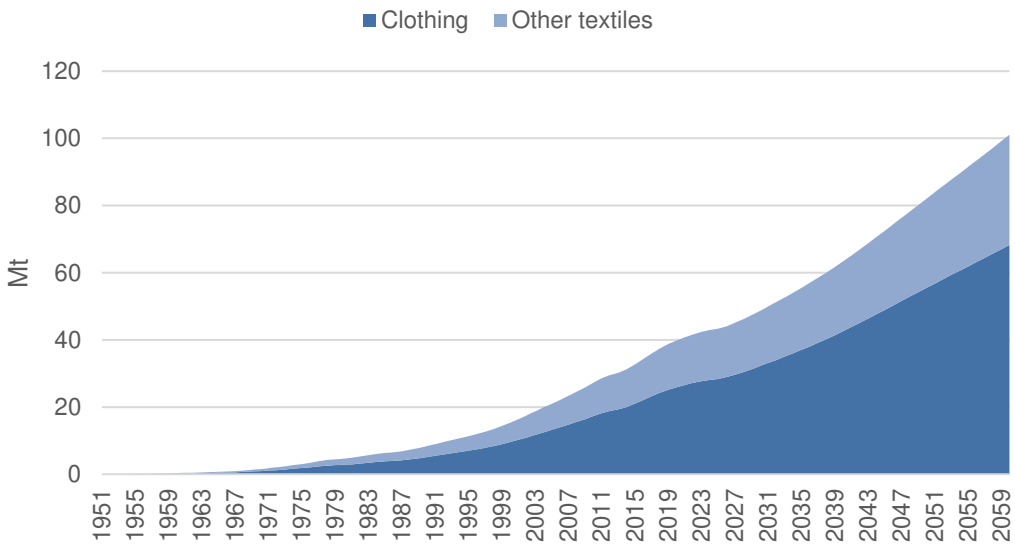
2.1.2. Post-consumer

Households dispose of their unwanted products, generating post-consumer waste. Separating garments from residual waste keeps the material relatively clean, enabling identification and processing of products for possible re-use. Separate collection can also facilitate recycling or other recovery.

Garments constitute a significant and growing share of household waste. This growth is due to increases in production and fewer uses per item. Amongst the OECD member countries, estimates of waste generation range from 12 kg per capita across the EU-27 countries in 2019 (European Commission, 2023[17]) to 36 kg per capita[5] in the United States in 2018. If not collected separately, the management of this waste stream is costly to the public sector responsible for residual waste.

Clothing and the textiles sector are a significant driver of plastic waste generation. Synthetic fibres are composed of polymers. In 2019, clothing was responsible for an estimated roughly 20 Mt of plastic waste generation. Textiles make up roughly 10% of all plastic waste globally. Macro-economic modelling by OECD suggests that this contribution to waste generation will more than double to over 60 Mt by 2060 (Figure 2.1).

Figure 2.1. Waste generation of synthetic fibres is projected to more than double by 2060



Source: Adapted from data available from (OECD, 2022[22]).

The first post-consumer step in maintaining material value is separate collection. A portion of post-consumer products are still re-usable, either domestically or abroad. After re-use the recycling of textile fibres can maintain some material value and be used in the manufacture of new products. The remainder of post-consumer textile waste is disposed of. The sub-chapter follows this order of material flow in the following sections.

[5] Based on the generation of 12 970 US tons of waste generation reported in 2018 and a population of 326.8 million people (U.S. EPA, n.d.[36]).

Collection

There are several types of actors involved in the separate collection of garments.

- Charities play a significant role in accepting donations.
- In some countries the public sector provides separate collection. For example, the EU will require separate collection of textile waste by its member countries from 2025.[6]
- Retail companies offer drop off points in stores. There is a concern that offering these services may impart a 'feel-good effect' or a financial compensation to participating customers that instigates further purchases and consumption of new garments made from primary materials. Additional consumption of new products will further the environmental impacts of production.

Re-use

The environmental benefits of re-use and recycling are primarily driven by their hypothetical displacement of primary resource use. Lifecycle assessments typically include a subsequent drop in primary resource use. Replacement of primary production helps to significantly reduce the environmental footprint of industry. However, there is a possibility that re-use instead creates a re-bound effect, enabling further consumption rather than displacing primary production. Re-use does generate environmental impacts from transportation and repairing products. **There remains general uncertainty about how much re-use displaces demand for primary material, and thus the results of LCAs**.

After separate collection, some garments are in good condition and may be re-used or repaired. Typically, only the high-value portion will be re-used domestically. A share of worn garments is exported to other markets, enabling re-use, but also shifting issues of waste management at the end-of-life phase of the product (see Export of used garments). For example, Changing Markets, an environmental non-governmental organisation, submitted good quality garments with tracking devices to 10 common retailers in Europe and the United Kingdom. Five of the twenty-one were re-sold within Europe (of which one was sold domestically), and a further four were ultimately shipped to Africa (2023[23]).

Charity shops commonly operate retail space to sell the items they collect as donations. They also provide employment opportunities and have a social benefit component. For example, Goodwill in the United States provides jobs and skills training for people with disabilities.

Circular business models can help to maintain textiles at a high value. For example, Rent the Runway, a clothing rental business, reported its record number of subscribers and revenue in fiscal year 2022 (Rent the Runway, 2023[24]). Thredup, a re-use retailer, estimated that the global re-use market was worth approximately USD 197 billion in 2023. Recent growth has been due largely to internet sales, households' perception of good value, and greater engagement by younger generations (2024[25]).

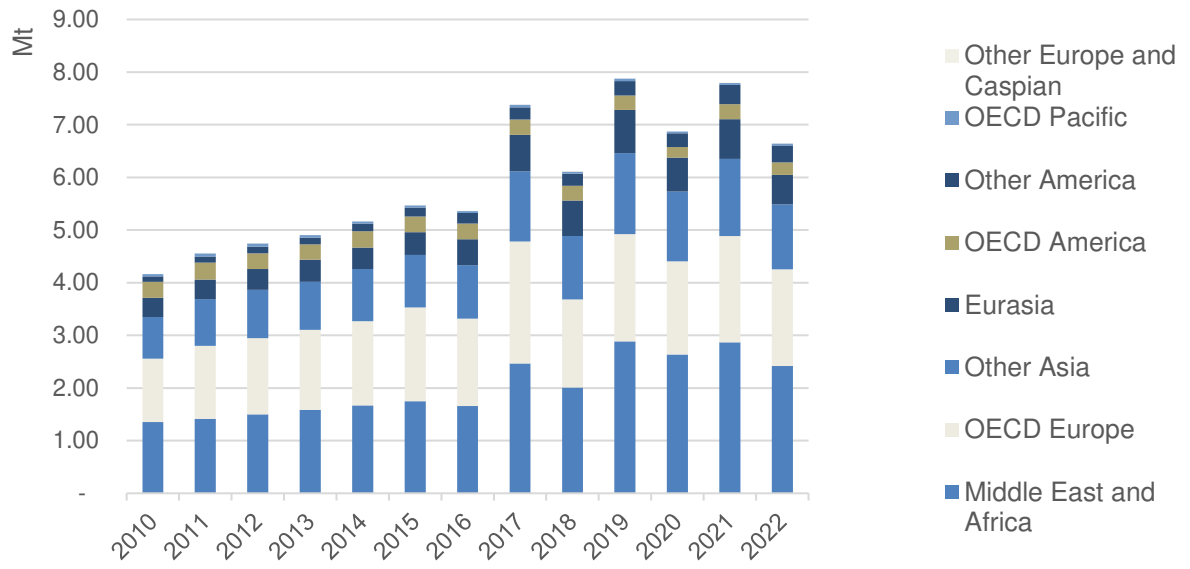
Some retail brands offer a platform for sale of post-consumer (i.e., 'second-hand') clothing. By one survey, 67% of fashion executives reported that they believe re-sale will be a significant revenue stream for their company within five years (Thredup, 2024[25]).

[6] Finland was an early adopter of policy to require separate collection of textiles, from 2023. Pilot projects in Helsinki from 2019 identified issues with contamination at waste storing stations, challenges in sorting, and limited marketability for recycled material. However, the pilot project was able to achieve relatively high rates of material recovery and facilitate sale for re-use by charitable organisations and vintage stores (Morsen, 2022[113]).

Export of used garments

A portion of collected end-of-life garments is exported for reuse by OECD countries. The export weight of 'worn garments' by OECD member countries has reportedly increased by 59% from 2010 to 2022 (Figure 2.2). The largest share of exports by OECD member countries is to the Middle East and Africa region. This finding is consistent with a recent study by the European Environment Agency into the exports by the EU countries from 2000 to 2019 (2023[26]). There is substantial intra-OECD trade within Europe, and to a lesser extent within the Americas. In total, OECD member countries reported exporting 5 Mt of worn garments to non-OECD countries in 2021. The value per weight is typically higher for trade between OECD member countries.

Figure 2.2. OECD exports of worn garments



Note: Based on HS code 6309 of worn garments. Data obtained on 6 September 2023.
Source: (UN Comtrade, n.d.[27])

Worn garments are typically shipped as bales, roughly distinguished by their quality and type. Importers and dealers sell the bales to market sellers. The quality is typically mixed, occasionally including high-value deadstock, but a portion of this material is also unusable and is immediately discarded (Franklin-Walis, 2023[28]). Based on surveys, interviews, and observation, the OR Foundation estimated that 40% of clothing traded at Kantamanto market in Accra, Ghana became landfill waste upon arrival in bales (n.d.[29]).

The net environmental benefit of exporting garments for re-use remains an open question. Export of used garments arguably could play a positive role in creating a circular economy. Positively, trade could facilitate re-use, lengthening the use phase. This can help maintain material value and potentially displace demand for primary materials. Additionally, the import of used garments generates revenues from tariffs, provides employment, and generates tax revenue for importing countries. A study by the Nordic council of ministers[7] that reviewed the exports of used garments from countries in the region concluded that this trade gives strong net environmental benefits, but a mixed economic and social effect (Watson et al., 2016[30]).

[7] This includes OECD countries Denmark, Finland, Iceland, Norway, and Sweden.

The export of used garments is also subject to criticism. Importing countries become responsible for the waste when the products reach end-of-life. This waste can overwhelm their management facilities. For example, Ghana created the Kpone landfill site in part to handle the influx of waste from the Kantamanto garment market. Landfilled textile waste traps methane and causes leachate, creating hazardous environmental and health impacts (Franklin-Walis, 2023[28]). Exporting countries can do more to help address this situation. For example, the European Union's waste transport regulation will provide further guidance for its member countries on criteria to apply when determining whether used garments constitute waste.

Imports of worn garments compete with domestic production. In response, some African countries have introduced high import taxes on second-hand textiles or implemented import bans, such as Uganda and Rwanda (Biryabarema and Holland, 2023[31]).

Recycling

There are significant technical barriers to recycling. Garments are often made of multi-material fibres, requiring difficult or costly separation. Products like jackets and braziers can include non-fibre material for buttons or hooks. Identifying and sorting materials in used garments is difficult, especially for cellulose-polyester mixtures. The Ellen MacArthur Foundation estimated that globally 12% of End-of-life garments are downcycled to a less valuable use (e.g., upholstery, rags, or composite material), and **less than 1% is recycled to make new fibres** for a textile of similar value (2017[9]).

There is limited marketability for recycled fibres. Mechanical recycling of textiles shortens the constituent fibres, which reduces their applicability. The limited scale of secondary production also makes it difficult to achieve price parity with primary materials. For these reasons there are still few economically viable mechanical recycling options for garments.

New recycling technology is available but will require investment and economies of scale to become competitive with primary material. Chemical and biological recycling technologies may overcome recycling barriers but remain niche or in pilot stages (Damayanti et al., 2021[32]). McKinsey have estimated that the scaling of current fibre-to-fibre chemical recycling could process as much as 26% of textile waste in Europe by 2030. Barriers to achieving this scaling include limited feed stock, composition and purity, indicating a need for advances in sorting, public private collaboration, and investments in the range of EUR 7 billion (Hedrich et al., 2022[7]). These technologies can also be energy-intensive, generating environmental impacts.

Disposal

Textiles remain a significant portion of residual waste in OECD member countries. Waste characterisation studies indicate that textiles commonly constitute between 3 and 6% by weight of residual waste. Example survey results include:

- Switzerland—2001, textiles constituted 3% by weight of waste in rubbish bags across 33 municipalities surveyed (SAEFL, 2022[33]).
- California (United States)—the 2021, disposal facility waste characterisation study estimated the following textiles in residual waste for disposal: garments (2.5%, 0.9 Mt), and textile accessories[8] (0.5%, 0.2 Mt) (Calrecycle, 2022[34]).
- New York City (United States)—2017 estimated that textiles constituted 6% of household aggregate discards (NYC Sanitation, 2017[35]).

[8] Shoes, purses, and belts

- The United States—2018 estimate that clothing and footwear made up 4.4% of municipal solid waste (U.S. EPA, n.d.[36]).

Incineration and landfilling of End-of-life textiles remain prevalent. The Ellen MacArthur Foundation estimated that globally roughly 73% of End-of-life garment waste is landfilled or incinerated (2017[9]). In Europe, an estimated 16 to 33% of collected textiles is ultimately disposed with mixed municipal waste (European Environment Agency, 2021[37]). [9] In 2022, Japan recycled 17.4%, re-used 18.1%, and discarded 64.3% of collected textiles. Commercial waste exhibited a higher recycling rate, but household waste exhibited a higher re-use rate (MOE Japan, 2023[38]).

2.2. Use

Individuals decide when and how to dispose of their garments. The proximate cause of any product disposal can be either **absolute**, meaning that the product is no longer functional, or **relative**, when the product is still useable (Cooper, 2004[39]). This distinction helps to identify how to prolong the use phase, because **the producer has agency to reduce the frequency of absolute garment disposal and the household has agency in the case of relative obsoletion and maintaining the product**.

There have been relatively few technological innovations in garments. This distinguishes the product sector from other durable products with EPR schemes like electronics or electrical equipment (EEE) or vehicles. Absolute obsolescence is a less frequent cause compared with changing preferences. Laitala's meta-study of consumer disposal behaviour surveys identifies that **'wear and tear' was typically not the main reason for disposal**, compared to fit, fashion, and other reasons (2014[40]). A qualitative study of consumer behaviour in Scotland identified body changes (e.g. child growth), a temporary need for a garment, and low quality as drivers of relative obsolescence (Wilson, Shaw and Duffy, 2023[41]).

Lower prices led to more frequent purchases and the emergence of "fast fashion" as the predominant business model in the past three decades, which has meant a shortening of the use phase. In the EU-27 and the United Kingdom, the real price of clothing dropped by 36% between 1996 and 2012. Whilst overall spending on clothing increased by 40% over this period, the share of household expenditures on clothing slightly declined, due to the decline in the relative price of clothing compared with other household expenses (Reichel et al., 2014[42]).

Households have embraced this business model by emphasising price before other criteria like durability. A household survey commissioned by the producer responsibility organisation in France estimated that 70% of the volume of purchases in 2021 were 'entry-level' synonymous with fast-fashion brands (Kantar, 2022[43]). Sun et al conducted a choice experiment with university students to determine whether they would prefer to purchase one high quality item or several mid-quality items over time. Most respondents indicated they would prefer to purchase several mid-quality items (shoes and jackets). The authors argued that this could be due to 'product-durability neglect' (Sun, Bellezza and Paharia, 2021[44]).

The fashion industry has changed to include more seasons, and therefore additional products, with greater frequency. Households acquire new products, but increasing their use is limited by time and space constraints. This implies that the current business model is helping to drive relative obsoletion. The results of a recent survey of teenagers in Finland suggests that internet usage and businesses online presence may also help to drive further consumption (Nyrhinen et al., 2023[45]).

Income and proximity to retail space may in part drive consumption behaviour. DeVoy et al. found that the average income level and number of clothing stores of municipalities in Florida (United States) was

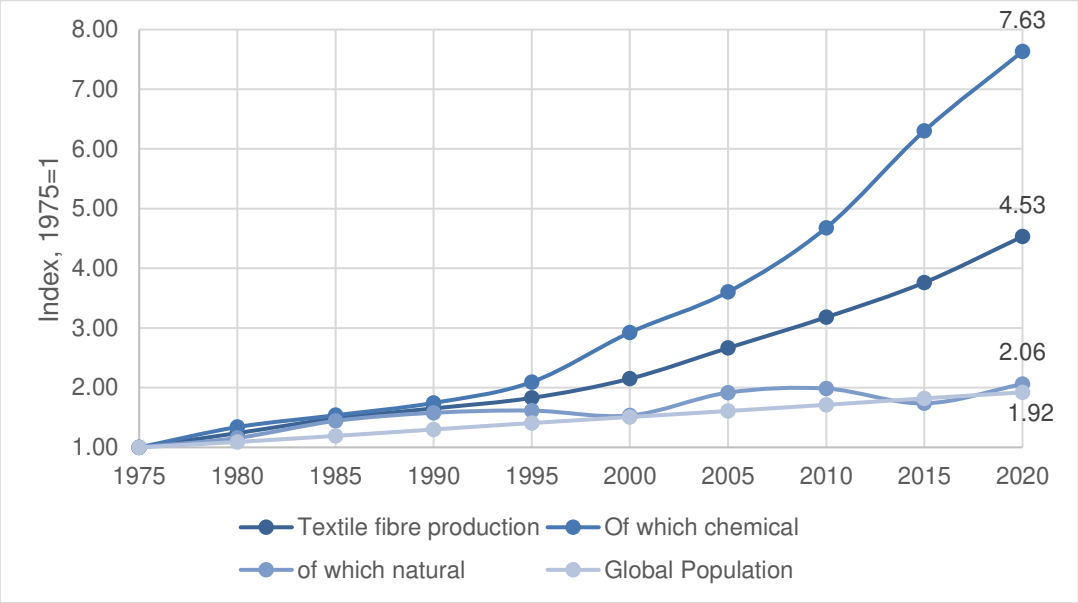
[9] There is no EU-level requirement to report volumes of separately collected textiles, and no standard definition for whether used textiles are considered waste.

positively correlated with textile waste generation per capita (2021[46]). The Kantar survey found that French households identified price as their top choice criterion. This finding was valid across income brackets with higher income correlated with more frequent purchases (2022[43]).

2.3. Design and production

There has been extensive growth in fibre production from 1975 to 2020 (Figure 2.3). Production of fibre grew from roughly 24 Mt in 1975 to 108.3 Mt, more than quadrupling in less than fifty years. Over this period the production of natural fibres, such as cotton, silk, and wool roughly doubled. **The primary driver of the growth in textile fibres was the increase in synthetic fibre production which experienced nearly an eight-fold increase**. For comparison, global population only doubled over the same period, meaning that there was a significant increase in fibre-production per capita. Clothing and other textiles are projected to more than double in use and constitute 9% (~112 Mt) of plastic material use in 2060 (OECD, 2022[22]).

Figure 2.3. Growth of global annual fibre production and population



Source: Fibre production (Industrievereinigung Chemiefaser e.V., 2022[47]); Population (The World Bank, n.d.[48])

The production stage creates myriad environmental impacts, including:

- **Water usage.** By one estimate, 79 billion cubic meters are used annually to produce garments (Global Fashion Alliance and The Boston Consulting Group, 2017[16]). This involves roughly 200 tonnes of water to produce one tonne of material (Anguelov, 2015[49]). Water requirements vary by fabric type. For example, cotton can require 1 559 litres per kg of fibre, whilst polyamide only requires 4 litres (Niinimäki et al., 2020[15]).
- **Harmful chemicals**. The production of textiles is reliant on the use of chemicals that can impact the environment and human health when released via wastewater. A sampling of wastewater effluent at textile wastewater treatment plants identified that while treatment facilities can be effective (~95%) at capture, the production stage can still generate microfibres that are released into the water at a substantial rate (Xu et al., 2018[50]).

i. Natural fibres production is reliant on fertilisers and pesticides. For example, roughly 6% of global pesticides use can be tied to cotton production (Pesticide Action Network, 2018[51]). Synthetic fibre production involves chemical processes to create materials from hydrocarbons.

ii. The 'wet processing' during spinning and weaving involved in yarn production and dyeing is another hotspot of chemicals use. One case study identified that 466g of chemicals were used per kg of textile produced (Niinimäki et al., 2020[15]). EMF has estimated that on average 0.58 kg of chemicals are used per 1 kg of material (2017[9]). KEMI conducted a review of 2 450 substances used in production and determined that 750 were hazardous to human health (Swedish Chemicals Agency, 2014[52]).

- **Greenhouse gas emissions**. There is not a universally accepted estimate for the contribution to GHG emissions. In 2018, UNEP and Quantis estimated that garments were responsible for 4Gt of CO2 equivalent, roughly 8.1% of global emissions (2018[53]). Niinimaki et al estimate that garments contribute 2.9 Gt, of which two-thirds were driven by the production of synthetic fibres (2020[15]). McKinsey modelled the greenhouse gas (GHG) contributions of the fashion industry, identifying 2.1 Gt of emissions, roughly 4% of the global total (2020[6]). Estimates are contingent on fibre share composition and geographic assumptions of production, which impact the energy composition mix.

The production phase typically involves a global value chain in which material flows from one stage via trade to another. For example, a cotton t-shirt could be made with cotton grown in North America, fabric production in Bangladesh, followed by assembly in Viet Nam, with design and consumption occurring in Europe. OECD countries are primarily users and designers of products. Domestic brands commonly contract with manufacturers in the global south. This can be a barrier to changing producer behaviour.

Location of production is driven by input costs, which can include labour and compliance with environmental regulations. Therefore, production tends to occur in countries with relatively inexpensive labour or loose environmental regulation, which can mean a disproportionate impact burden on developing countries. OECD countries do retain some portion of the supply chain. For example, Türkiye and Europe are responsible for roughly one-fourth of global dyeing and finishing (United Nations Environment Programme, 2020[8]).

3 EPR policies for garments

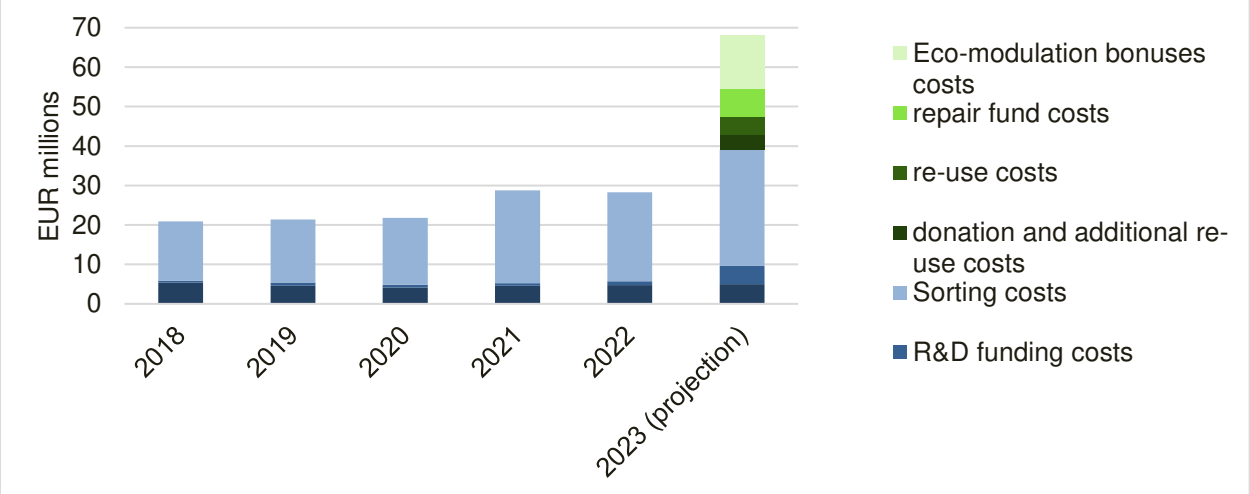
France is the only OECD country with extensive experience with a fully implemented national EPR policy covering garments. The scheme has covered garments, shoes, and household linens from 2007 and expanded to include curtains in 2020 (Transition, 2020[54]), One Producer Responsibility Organisation (PRO) implements a compliance scheme for obligated producers, called Re_fashion.

The French scheme made several changes in 2023. These comply with requirements laid out in an order issued by the government in 2022 (République Francaise, 2022[55]). Historically, the policy required producers to pay the net costs for separate collection and sorting, research and development projects, and costs for local authorities' awareness campaigns. Beginning in 2023, the scheme will cover the costs of several new features, including:

- Re-use: the scheme will now cover the net-costs of social enterprises facilitating re-use of garments.
- Repair: the scheme will provide households with a credit for the repair of their products. The credit is applied directly to households as a discount on the invoice of the repair by approved businesses.
- Eco-modulation: the scheme will introduce a new fee modulation schedule which will not necessarily be tied to the size of the fee contribution (Figure 3.1).

Further, the order requires Re_fashion to develop reports on textiles recyclability and durability with a proposal for eco-modulation that includes recyclability as a criterion. France is also establishing new targets for its EPR. These include collecting 60% by weight of production by 2028; and recycling or re-use targets of 70% of collected material by 2024 and 80% by 2027.

Figure 3.1. The French EPR scheme expense categories



Note: 2023 is a cost projection.
Source: based on data from (Re_fashion, 2023[56]; Re_fashion, 2022[57]; Re_fashion, 2021[58]; Re_fashion, 2020[59])

Several OECD countries are at the initial stages of implementing an EPR policy for textiles that includes garments. These include:

- California (United States) will begin producer registration in 2026 with full implementation in 2030. Its law requires that producers work with a producer responsibility organisation registered and approved by the government to meet obligations for collection, repair and recycling of 'apparel' (Megan Quinn and Cole Rosengren, 2024[60]).
- The Netherlands began producer registration in 2023. Full implementation will take effect in 2025. The policy sets ambitious targets for a share (by weight) of material put on the market the previous year to be prepared for reuse or recycling, starting at 50% by 2025 and increasing to 75% by 2030 (Staatscourant, 2022[61]). At least one PRO is beginning a compliance scheme for producers, called *Stichting UPV Textiel*. Producers can also comply with the EPR policy individually.
- Latvia began an EPR policy in July 2024. The policy requires a EUR 0.5/kg 'natural resource tax' on textiles placed on its market. Companies can avoid the tax by entering the collective EPR scheme *Latvijas Zaļais punkts*. The fee to participate in the collective EPR scheme was estimated to be EUR 0.13/kg (Latvijas Zalais Púnkts, 2024[62]).
- Hungary began an EPR policy in 2023. Producers are subject to an envrinmnetal product charge of HUF 145/kg and must register with the national waste manegement authority. (forvis mazars, n.d.[63]).

There are several voluntary EPR schemes that cover garments in additional OECD countries (Table 3.1). This includes an industry wide programme in Australia. The scheme has released a plan to 2030 (Seamless, 2023[64]). It will begin with reporting and identifying needs to inform scheme design. The United Kingdom likewise has a voluntary programme with ambitions for 2030 to reduce carbon emissions and water usage by its textiles industry. This scheme's signatories cover 62% of the national market (WRAP, 2024[65]).

The export of used goods for repair, refurbishment or re-use raises policy questions on how to address the environmental impacts of these products when they become waste. Academia and governments are considering how to incorporate exports of used goods into EPR schemes. Usually, EPR policies only target the recycling of products that become waste in the domestic market and producer responsibility ends at the point of export. To date, there is a policy gap in how to address this issue in the textiles sector. Japan's plan for a sound material society expresses a vision for re-patriating material that is difficult for developing nations to properly dispose of, but the application to textiles is not yet clear. In the absence of a mandatory policy, Shein has established its own ESG programme to provide financial resources to those communities working in the used garment sector in developing countries, starting in Ghana.

Table 3.1. Examples of voluntary EPR for textiles

Country	Description	Status
Australia	The Australian Fashion Council is establishing a clothing textile waste stewardship scheme (Seamless). The government of Australia is providing a 1 million AUSD grant to the project (DAWE, 2021[66]).	Implementing
Ghana	Shein (a garment producer) has established a USD 50 million fund to address impacts of global textile waste. Its first grant recipient of USD 5 million is the OR Foundation (a U.S. and Ghana-based non-governmental organisation) which will help to support local groups upcycling and re-use efforts (Shein, 2022[67]).	Established
Japan	The 2018 fundamental plan for establishing a sound material-cycle society states that Japan will form an international resource circulation network for its recycling industry to accept waste with resource potential that is difficult for developing nations to properly dispose (Ministry of the Environment Government of Japan, 2018[68]).	n/a
United Kingdom	Textiles 2030 is a voluntary agreement between WRAP, the UK government, and signatories to create a circular industry by 2030 (WRAP, 2024[65]).	Established

Several markets are considering whether to adopt EPR measures for textiles. At EU level, the European Commission is treating the textiles sector as a key value chain in its new Circular Economy Action Plan (European Commission, 2020[69]). The EU strategy for sustainable and circular textiles suggests that EPR has the potential to incentivise producers to reduce textile waste and increase rates of reuse and recycling. Article 11(1) of the EU's Waste Framework Directive requires Member States to establish separate collection of textile waste by 2025 (European Parliament and Council of the European Union, 2018[70]).

The European Commission has proposed a targeted amendment of the Waste Framework Directive to ensure that EU countries set up EPR schemes for textiles. This proposal would also establish producer registration and eco-modulation of fees. Further it would require sorting remains within the EU and would only allow the export of worn garments 'suitable for re-use' (European Parliamentary Research Service, 2023[71]).

Several OECD countries are actively exploring EPR legislation. Italy has a draft proposal that will make producers responsible for a nationwide textile waste collection system, digital labelling, and support for eco-design and research (Signorini and Tardiolo, 2023[72]) Outside the EU, England is considering an EPR for garments waste.

Garments are one product category within the greater textiles product sector. Several other products have EPR schemes in place, including for mattresses and carpets (see Table 3.2).

Box 3.1. EPR schemes for textiles other than garments

Several OECD countries have EPR schemes that specifically target mattresses or carpets. France's scheme covers textiles more generally, including garments (Table 3.2).

Table 3.2. Examples of mandatory EPR policy for other textiles

Country	Description
Belgium	An EPR scheme for **mattresses** in which mattress retailers accept End-of-life mattresses from customers upon purchase of a new replacement mattress. Producers provide an environmental contribution fee (Valumat, n.d.[73])..
France	An EPR scheme for **clothing, shoes, and household linens** began in 2007. The scheme expanded in 2020 to include curtains (Transition, 2020[54]).
The Netherlands	The five largest mattress producers established a voluntary EPR 'stichting matras recycling Nederland' (MRN). Participation in the **mattress** EPR scheme became mandatory after a decision of general applicability (Rijkswaterstaat, n.d.[74]). The PRO sets its own targets for recycling.
United States (California, Connecticut, Rhode Island, Oregon)	California, Connecticut, Rhode Island, and Oregon have EPR recycling programmes for **mattresses**. Retailers collect an ADF at point of purchase that fund mattress collection and recycling programme (Bye Bye Mattress, n.d.[75])
United States (California)	An EPR for residential and commercial **carpets** began in 2011, with a recycling rate goal of 24% by 2020. PROs or individual producers develop stewardship plans for submission to CalRecycle. An advisory committee appointed by CalRecycle works with PROs and individual producers on plans and annual reports. PROs are left to determine their own funding mechanism but must include modulated fees that consider design elements such as recycled content (CalRecycle, 2021[76]). The California scheme will undergo changes in its governance structure after a new law was passed in September 2024 (Megan Quinn and Cole Rosengren, 2024[60])

These schemes show evidence of improving separate collection rates and displacing these products from the residual waste stream. Carpets constituted 0.6% (71 837 tonnes) of California's 2022 waste characterisation study, a reduction from 3.5% (697 461 tonnes) in its 2008 study. (Calrecycle, 2022[34]; California Integrated Waste Management Board, 2009[77]). Mattress schemes have helped with collection of millions of mattresses for example in the United States and Belgium. The introduction of a mattress EPR in Connecticut coincided with a significant boost in separate collection (PSI, n.d.[78]). The California programme has collected 9.6 million mattresses since 2016 (1.4 million in 2022), providing access to collection within 15 miles (24.1 km) to 99% of the state's residents (Mattress Recycling Council, n.d.[79]). In 2021, Valumat (Belgium) collected 8 911 tonnes of mattresses, roughly 60% the total weight of mattresses placed in the market, well outperforming its target of 30%.

These schemes have helped to increase collection and recovery rates (see Figure 3.2). California's carpet stewardship programme achieved an annual recycling rate of 34% in 2021. This is above its target of 26% and the recycling rate has continuously improved over the life of the scheme. The United Kingdom's voluntary carpet scheme has impressive collection, but most (73%) of this recovery is waste-to-energy, 1% is for reuse, and only 4% for fibre-to-fibre recycling (Eunomia, 2020[80]).

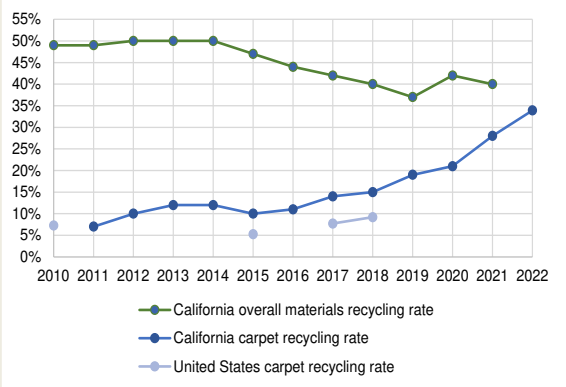
Mattress EPR schemes achieve impressive recovery rates of collected material, improving over time. This rate far outmatches the United States' national estimate: 99.6% of furniture and furnishing (the category containing mattresses) were combusted or landfilled in 2018 (US EPA, n.d.[81]). In 2021, Valumat placed 124 716 collected mattresses for re-use, recycled 1 997 tonnes of material, sent 6 337

tonnes for energy valorisation and did not report landfilling any material in line with Belgian waste policy. The Dutch mattress PRO MRN has set itself a recycling target of 75% by 2028, though no benchmark data is available yet (MRN, n.d.[82]).

Legacy substances can limit the recyclability of End-of-life textiles. Old carpets and mattresses may contain persistent organic pollutants (PoPs), which should not re-enter the market in secondary content. Recycling efforts and EPR programs should emphasise safety and work to ensure material with such PoPs are properly treated at end-of-life (Onyshko and Hewlett, 2018[83]). This remains an obstacle to recycling that could potentially be overcome with technological advances.

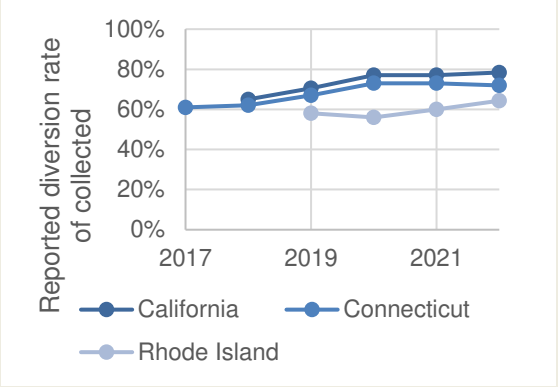
Figure 3.2. Material recovery rates of other textile schemes in the United States

Comparison of California's overall materials recycling rate (%) and the carpet recycling rate (%)



Source: California carpet data (CARE, 2021[84]) and (CARE, 2023[85]); California overall 2020 and 2021 overall rates (CalRecycle, 2022[86]); United States data (US EPA, n.d.[87])

Material recovery rates of Mattress EPR programmes in the United States



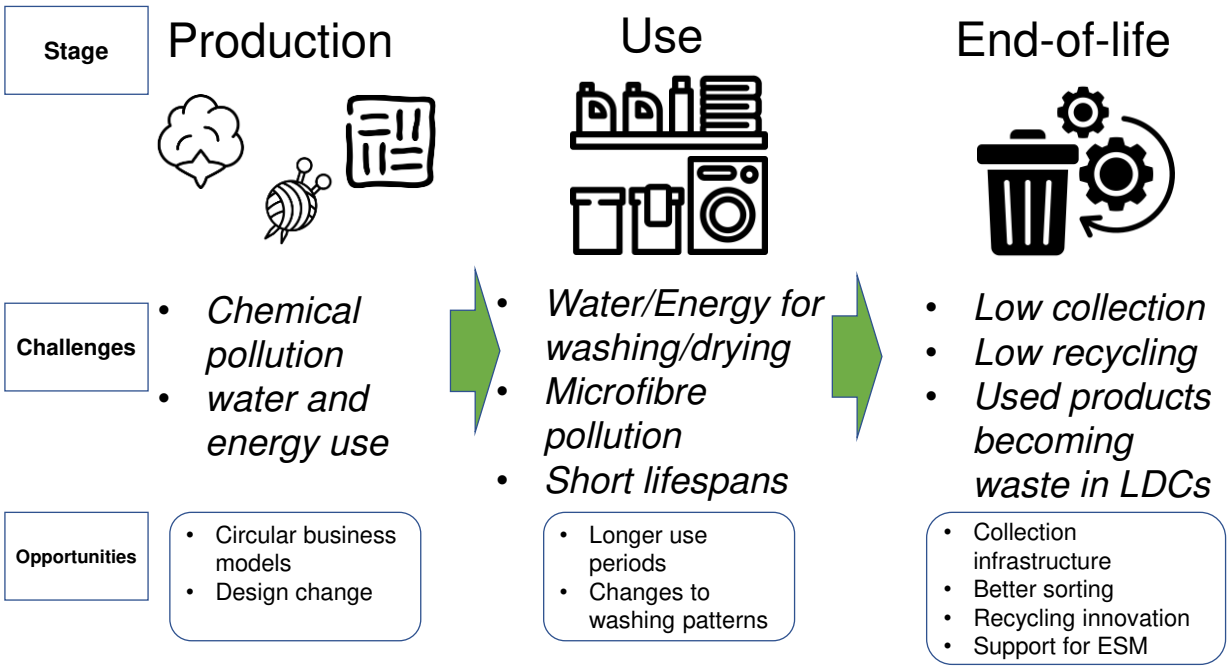
Note: Rhode Island and Connecticut report based on performance year, not calendar year.
Source: based on data made available in annual reports accessible at California (Mattress recycling council, n.d.[88]).; Connecticut (Mattress recycling council, n.d.[89]); and Rhode Island (Mattress recycling council, n.d.[90]).

4 Evaluation of existing EPR experience and potential

EPR's emphasis has traditionally been on the end-of-life phase of the lifecycle. But there are environmental impact hotspots throughout the textile product lifecycle (see Chapter 2). There are opportunities throughout the lifecycle for producers to reduce these impacts (Figure 4.1). At end-of-life, improvements to collection, sorting, and recycling are opportunities to increase recovery rates domestically and improve end-of-life outcomes of used products exported.

This chapter evaluates the experience with existing EPR schemes and suggests potential for how governments could design EPR policy to stimulate producer behaviour change. This chapter matches EPR's initial emphasis on post-consumer products by beginning with the end-of-life stage of the lifecycle. and proceeds in its review 'upstream'.

Figure 4.1. Challenges and opportunities for circularity occur throughout the garment lifecycle



4.1. End-of-life

Three primary aims of EPR relate to the end-of-life phase of the lifecycle. These are to achieve public ambition for:

- separate collection of targeted waste streams
- material recovery (including re-use and recycling), and

- recovery of the costs of waste management previously covered by governments (OECD, 2016[91]).

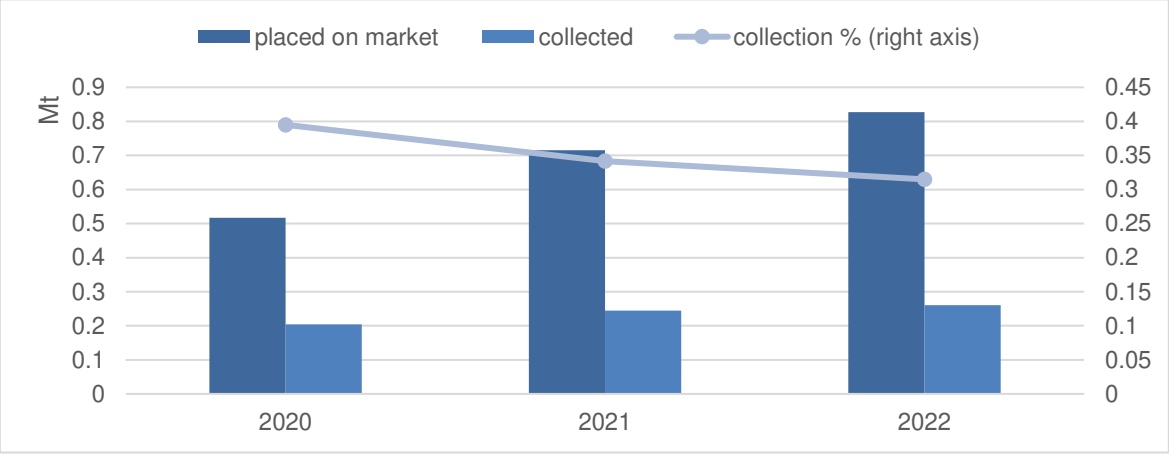
This sub-chapter reviews available data on these aims from early adopters and considers the role of used garment exports in the End-of-life stage of textiles.

4.1.1. Separate collection

Proponents of EPR argue that schemes can help to improve collection for reuse if possible, and other recovery of garments. They argue that mandatory take back requirements and collection targets can lead to development of a more comprehensive collection system, which would allow for new opportunities for reuse and targeted recycling. For example, The Nordic co-operation (Norden) compared likely outcomes of a mandatory EPR scheme with a tax on hazardous substances, a voluntary scheme with a raw materials fee, and a mix of policies to support new business models (e.g., leasing, repair, second-hand sales). The report suggests that a mandatory EPR scheme would have a significant impact on collection and recycling of textiles and could lead to the creation of green jobs in collection, re-use, and recycling (Ekvall et al., 2015[92]).

The experience in France shows some evidence that the presence of an EPR coincided with increasing collection rates. **The French EPR scheme is growing its collection volume, but it is not achieving its target collection rate (50%)**. The weight of separately collected textiles per capita grew from 2 kg in 2009 to 3.7 kg in 2019 (Refashion, 2021[93]). The total volume collected has increased each year from 2020 to 2022 (Figure 4.2). However, collection as a share of products placed on the market (weight/weight) is not achieving the programme's 50% target. The collection rate has decreased from 39% in 2020 to 31% in 2022. The decline in performance is largely due to a 66% increase in products placed on the market over this period from 0.5 Mt in 2020 to .83 Mt in 2022. The experience in France brings to question the relevance of this kind of target, and the need for complementary policies to help with curbing the growth in garment production.

Figure 4.2. Garments placed on the market and EPR scheme collection in France



Source: based on data from (Re_fashion, 2023[56]; Re_fashion, 2022[57]; Re_fashion, 2021[58]; Re_fashion, 2020[59]).

The French EPR scheme supports the provision of a system of publicly available 'self-deposit' drop-off points for separate collection of post-consumer textiles. Operators register with the PRO Re_fashion and benefit from receiving signage and educational/informational material and publicity. Operators are obliged to provide the PRO with quarterly collection data (Re_fashion, n.d.[94]). There were 47 000 self-deposit

points in 2022 (Re_fashion, 2023[56]). Container collection is done by social enterprises, for-profit, and semi-public organisations. Additionally social enterprises (13% of total collection), municipal recycling centres (7%), shops (2%), and occasional drop off points (3%) contribute to total collection (Re_fashion, 2023[95]).

The French scheme outperforms the European average collection rate. In its impact assessment for a preferred option of a targeted amendment to the Waste Framework Directive the European Commission estimated that the EU-27 average collection rate was 22% in 2019 (2023[17]). France's collection rate, at 31% is about 50% higher than the EU-27 average. However, Germany for example, has achieved a high collection rate in the absence of a mandatory EPR scheme.

For a voluntary EPR scheme, Textiles 2030 in the United Kingdom coincided with a slight improvement in volume collected. The scheme was established in 2021, building upon the earlier sustainable clothing action plan (SCAP) that ran from 2012 to 2020. There was an 8% increase in volume collected from 2019 to 2022, reaching 0.2 Mt of textiles. However, there was also a 13% increase in textiles volume placed on the market over this period (WRAP, 2024[65]). Data reporting and accuracy are concerns because the scheme is voluntary.

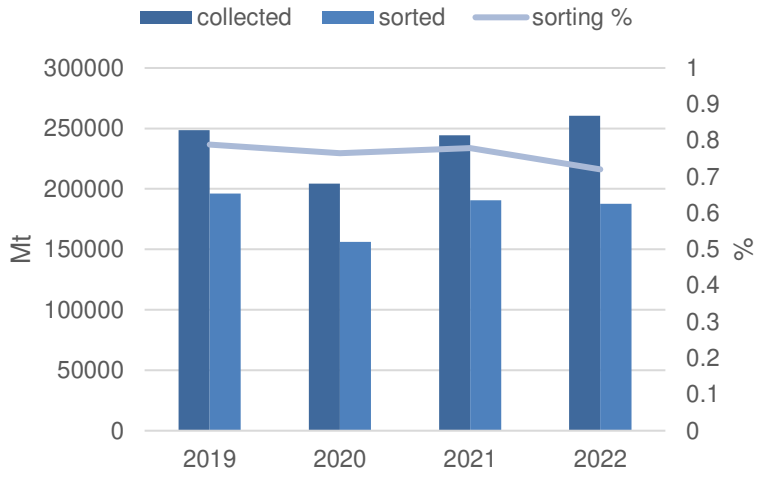
4.1.2. Increases to re-use and recycling rates

Sorting collected garments is the next important step in identifying re-useable garments or post-consumer material for recycling. Sorting may occur in several steps. First, unclean material is separated and becomes waste. A share of high value collected garments are sent directly to charity shops/outlets for re-use sale. Additional sorting helps to group garments by colour, quality, and size. Next, they may be baled for resale and re-use or as material for recycling.

The French EPR scheme financially supports sorters. This is the single largest category of costs for the PRO. For example, in 2022 Re_fashion paid EUR 22.5 million to 67 authorised sorters. The scheme-supported sorting system processed 0.18 Mt of textile in 2022, which was 72% of the weight reportedly collected (

Figure 4.3). The remaining 28% is due to a fire in a sorting facility and material removed in preliminary sorting that identified high- and low-quality garments (Re_fashion, 2023[56]).

Figure 4.3. Garment collection and sorting in France

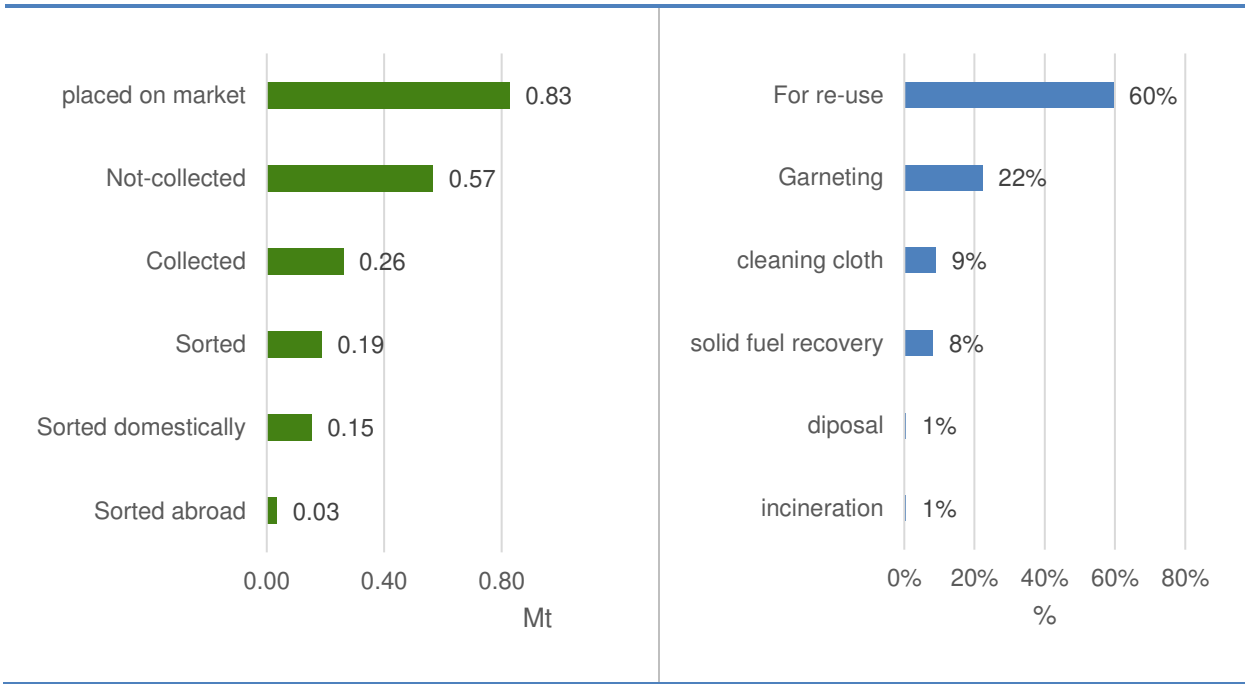


Source: based on data from (Re_fashion, 2023[56]; Re_fashion, 2022[57]; Re_fashion, 2021[58]; Re_fashion, 2020[59]).

Data on outcomes of post-consumer garments in France is limited to the material sorted by the PRO-authorised sorters. **The scheme has achieved relatively high rates of re-use and recovery for this stream of collected and sorted material** (Figure 4.4). The re-use rate of collected textiles is roughly 59.5%. From its introduction in 2009 to 2022, the share of collected garments used as material for garnetting (recycling) grew from 14% to 31.3%, however energy recovery also grew from nothing to 8.2% (Refashion, 2021[93]; Re_fashion, 2023[56]).

Figure 4.4. Post-consumer outcomes of collected and sorted textiles in France

Placed on market, collected and sorted in 2022 (left); Outcomes of collected and sorted items (right)



Source: based on data from (Re_fashion, 2023[56]).

The French scheme significantly outperforms the European average re-use rate of collected post-consumer textiles. In its impact assessment for a preferred option of a targeted amendment to the Waste Framework Directive the European Commission estimated that the EU-27 average re-use rate of separately collected material was only 8% in 2019 (2023[17]), compared with 60% in France.

4.1.3. Exports to low-income countries

There is a large global market for trade in used garments. In advance of its EPR scheme, the Netherlands commissioned research into its export destinations and outcomes of its used textiles. The study focused on outcomes in Ghana, India, Kenya, Poland, and Pakistan. The study found used textiles are commonly exported first to intermediary countries and then to low-income countries. The trade does enable circular outcomes, but its informality and lack of transparency can enable unsafe work conditions and environmental impacts (Ministerie van Infrastructuur en Waterstaat, 2023[96]).

The UN Economic Commission for Europe (ECE) and the Economic Commission for Latin America and the Caribbean (ECLAC) conducted a study on outcomes of used clothing exported from Europe to Chile. The study included fieldwork at a sorting facility at the Free Trade Zone of Iquique. About 75% of the

incoming used clothing had no market value and was sent to nearby landfills (UNECE, 202[97]). This study recommended that European countries introduce EPR to improve quality of repair and recycling.

EPR obligations typically apply to producers placing a product on the domestic market. Academia and non-governmental organisations have noted that PROs do not typically fund post-consumer management for products that are exported for re-use. Proponents of extending this responsibility in academia have argued that producers should provide financial and technical assistance or other support to the countries that ultimately manage the product at end-of-life (Thapa et al., 2022[98]; Thapa et al., 2022[99]).

The French EPR scheme provides funding for authorised sorters that are located outside France. In 2022, the scheme supported 15 foreign[10] sorting operators that processed roughly 30 000 tonnes, or 16% of the total material collected and processed by the scheme (Re_fashion, 2023[56]). The scheme collects data at the first point of exit from France but does not track the ultimate destination of the material.

There is also a corporate-level voluntary initiative. Shein is partnering with an Africa-based non-governmental organisation (NGO) to start a voluntary EPR scheme for clothing products. The OR foundation is an NGO that supports workers at the Kantamanto used clothing market in Accra, Ghana. The OR foundation's 'campaign to stop waste colonialism' suggests the need for 'globally accountable' EPR that would require exporting countries to help with the development of circular economy solutions in export destinations like Ghana. OR argues that improved sorting in the global North alone will be insufficient to ensure the marketability of clothing in receiving countries (The OR Foundation, n.d.[100]).

The voluntary EPR scheme is using its resources to fund several diverse projects to help individuals that relate to the handling of used garments in Ghana. The scheme's projects include:

- Beach cleanups in surrounding areas.
- An apprenticeship programme for women.
- Studying microfibre pollution in local waterways.
- A debt-relief programme for local used garment vendors; and
- infrastructure upgrades in Kantamanto market (Rachel Cernansky, 2023[101]).

Shein's voluntary scheme has been subject to a mixed response. Positively, its partners state that the funding will help local communities to reduce the health impacts of circular economy, especially for young women at risk when transporting bales. Detractors point out that the commitment thus far is only USD 15 million, which is less than 0.02% of Shein's reported annual revenues (USD 80 billion) (Chan, 2022[102]). The size of the initiative suggests that it is unlikely to achieve the scale needed to fully address issues for importing countries. Additionally, the grant projects are not necessarily tied to collection and treatment, which can bring into **question the extent to which corporate social responsibility may be called EPR**.

There is also a question about the replicability of the Shein-OR foundation model. Not all used garment markets will have comparable organisational capacity to manage incoming funding effectively.

Local communities will need avenues for participation in decision-making regarding funding. There is a possibility that exporting countries could tailor EPR mechanisms without considering local needs.

4.1.4. Cost recovery

A principle aim for EPR is to implement the polluter-pays-principle and recover the costs of achieving the policy targets for collection and recovery. EPR is not a tax, but its obligations placed on producers may trigger a fee for service. In France, producers pay a fee per weight of their products placed on the market

[10] There is at least one contracted sorting facility in the Netherlands, Belgium, Spain, Germany, Portugal, and Slovakia. All contracted facilities operate within the EU.

to the PRO. In 2022, 6 500 producers placed 3.3 billion products on the market, totalling 0.8 Mt. The per-weight fee in 2021 was EUR 0.0168 per item. In 2021, the PRO took in EUR 52.7 million (Re_fashion, 2023[56]). In its impact assessment for a preferred option of a targeted amendment to the Waste Framework Directive the European Commission estimated that EPR for textiles could recoup EUR 3.5 to 4.5 billion in annual funding for collection and recovery. This would be equivalent to EUR 0.12 per common product or 0.6% of retail price (2023[17]).

The Australian voluntary scheme will be launched with support of AUD 100 000 in contributions from six founding brands and the New South Wales Environment Protection Authority. Once fully implemented these brands will add a 4% fee per garment (WRAP, 2023[103]). As a voluntary scheme, free riding by non-committed brands may limit the reach and impact of the scheme.

If separate collection is less than perfect (100%), there are post-consumer garments present in residual waste. This mixed waste is commonly managed by local governments in OECD countries. Cost recovery is dependent on which activities producers must fund. For example, in France the scheme funds collection and sorting, but does not reimburse local governments for managing garments in the residual waste stream. This design raises the question of whether the scheme only partially funds the management of the waste of covered products.

4.2. Use

Households can help to reduce environmental impacts of textiles during the use phase by extending the use phase. Garment repair helps to address absolute obsoletion in which a garment is no longer functional. The repair and refurbishing industries were largely abandoned due to competition from the availability of low-cost replacements. Barriers to repair include customer expectations, cost of labour, especially the intensity of labour for care and repair when compared with manufacture of new products (Rachel Cernansky, 2022[104]). France has adjusted its EPR scheme to strengthen circular business models that lengthen the use phase by financing repair (to reduce demand for new products) and domestic sorting (to increase supply of re-use products).

Repair and maintenance of products lengthens the use phase and helps to reduce demand for new products. Economic instruments may help to change the relative price of repair. EPR is one possible mechanism for these instruments. For example, France is now using its scheme to give households a credit to pay for repair of clothes and shoes (EUR 7 for a shoe heel, and EUR 10-25 for clothing repairs). The credits will come from a EUR 154 million fund for 2023 to 2028 and paid for by producers through their EPR fees (Le Monde and AFP, 2023[105])The PRO conducted a survey to determine a credit level that could appeal to households.

Domestic sorting can help to identify high-value garments that increase the supply of products for re-use, extending the use phase of these products. From 2023, the French scheme dedicates 5% of collected EPR fees to support social enterprises that facilitate re-use and preparation of textiles for re-use (*Fonds pour le Réemploi Solidaire*) (RReuse, 2020[106]).

In addition to social enterprises, there is opportunity for businesses to identify high-value post-consumer garments for re-use and offering access to products as a service. EPR mechanisms such as product take back requirements for producers could motivate them to invest in reverse-logistics infrastructure that would facilitate these circular business models. This would help improve the supply of re-use garments.

There is a question as to whether producers have a specialised expertise to help prolong the use phase of products or whether they are simply generating revenue. For example, the French scheme will credit households and social enterprises directly, so there is little additional incentive for producers to offer repair of their own products. There is potentially opportunity for policy to further encourage brands to engage in collecting and selling their own high-quality garments for re-use.

4.3. Design and production

A theoretical benefit of EPR is that it can create incentives for producers to change the design of their products to reduce their environmental impacts. Most environmental impacts of garments occur in the production stage of the lifecycle. Producers have agency to reduce these impacts by making more durable products, using recycled content, and using designs that ease recycling.

EPR schemes are beginning to tailor the fee schedule for products based on characteristics of product design. Collective implementation of EPR by Producer Responsibility Organisations (PROs) have historically used basic methods for assigning fees for products (e.g., by weight or per item). Many governments are beginning to require that EPR schemes modulate fees based on product characteristics. The aim of fee modulation is to incentivise design change through an EPR scheme.

EPR fee modulation for high value products like garments is difficult because the size of the fee is small compared to the product price. This means that producers and consumers are unlikely to be motivated to change behaviour to lower liability of paying a small fee. For example, the contribution of producers in France is between EUR 0.01 and 0.02 per item (Re_fashion, 2023[56]).

France is changing its fee modulation system to create further incentives for design change. The EPR scheme previously included a 50% fee reduction for products with 15% recycled fibres/materials (Re_fashion, n.d.[107]). It also included a 75% bonus for products that met durability requirements (ECO-TLC, 2019[108]). The system will soon change and may include recyclability as modulation criteria. There was consensus that the previous fee scheme was not providing enough incentive for design change.

A second consideration for changing design is the geographic spread of supply chains. OECD member countries host designers and brands, but most production occurs outside of the OECD. Some industrial stakeholders have cited the global nature of supply chains as a concern for implementing EPR. Schemes typically oblige domestic producers, but in many cases such as in Chile and Japan, most garments are made elsewhere and imported. For example, Japan imported roughly 98% of its textiles placed on its market in 2022 (MOE Japan, 2023[38]).

There is some evidence that EPR can help to identify and promote best practices in international supply chains. The United Kingdom's textiles 2030 voluntary scheme includes targets to reduce GHG emissions and water usage. These are environmental impacts occurring primarily in the production phase of the lifecycle. The scheme is attempting to reduce environmental impacts in supply chains in part by improving information exchange with producers. It has developed a footprint tool, targets, and a roadmap for improvements. Signatories have reported a reduction of 8 % in GHG emissions but a 2% increase in water usage compared against its 2019 baseline (WRAP, 2024[65]).

Reduction in the use of primary materials is the most effective means to reduce the environmental impacts of the garments industry. However, there is little evidence from existing schemes that EPR is likely to cause a drop in production of primary materials used to make garments. Textiles production in France grew 66% from 2020 to 2022, despite its EPR scheme. Household expenditure on clothing and footwear in France has remained relatively constant from 2008 to 2021 (OECD, n.d.[109]).

5 EPR within a policy mix for the textiles sector

An EPR approach by itself is insufficient to address all environmental impacts of garments. This chapter will briefly review opportunities and examples for other policy approaches to complement EPR for garments within a broader policy mix.

Several researchers at University of London created a policy map to identify interventions along the product lifecycle to achieve a sustainable fashion industry (see Figure 5.1). The researchers identified EPR as an established means for encouraging recycling. They identified other established complementary policies, including regulation of harmful chemicals, green public procurement, eco-labelling, right to repair and economic instruments to encourage re-use and repair.

Several complementary policies are available to amplify EPR's effect at the post-consumer stage of the lifecycle. Opportunities include:

- Regulation could help to require households to separate garments waste. For example, Massachusetts (United States) has banned disposal of textiles by households into mixed waste collection (Massachusetts Department of Environmental Protection, n.d.[110]).
- Regulation or complementary economic instruments can encourage the waste hierarchy (re-use, recycling, and other recovery) by waste handlers. One option is a ban on disposal or incineration of separately collected material. A tax could also raise the cost of this treatment for collected garments.
- Investments in sorting and recycling. Governments can help to galvanize and encourage the direction of private investment in emerging technologies.

Complementary policies can help change household behaviour in the use phase. Awareness and behavioural interventions help households identify best practices to extend the use phase. For example, Scotland commissioned surveys to identify common reasons for absolute obsoletion and is tailoring awareness efforts to the results (Wilson, Shaw and Duffy, 2023[41]). Economic incentives can also impact the relative price of garments. For example, some OECD countries do not charge value added taxes (VAT) on re-use products.

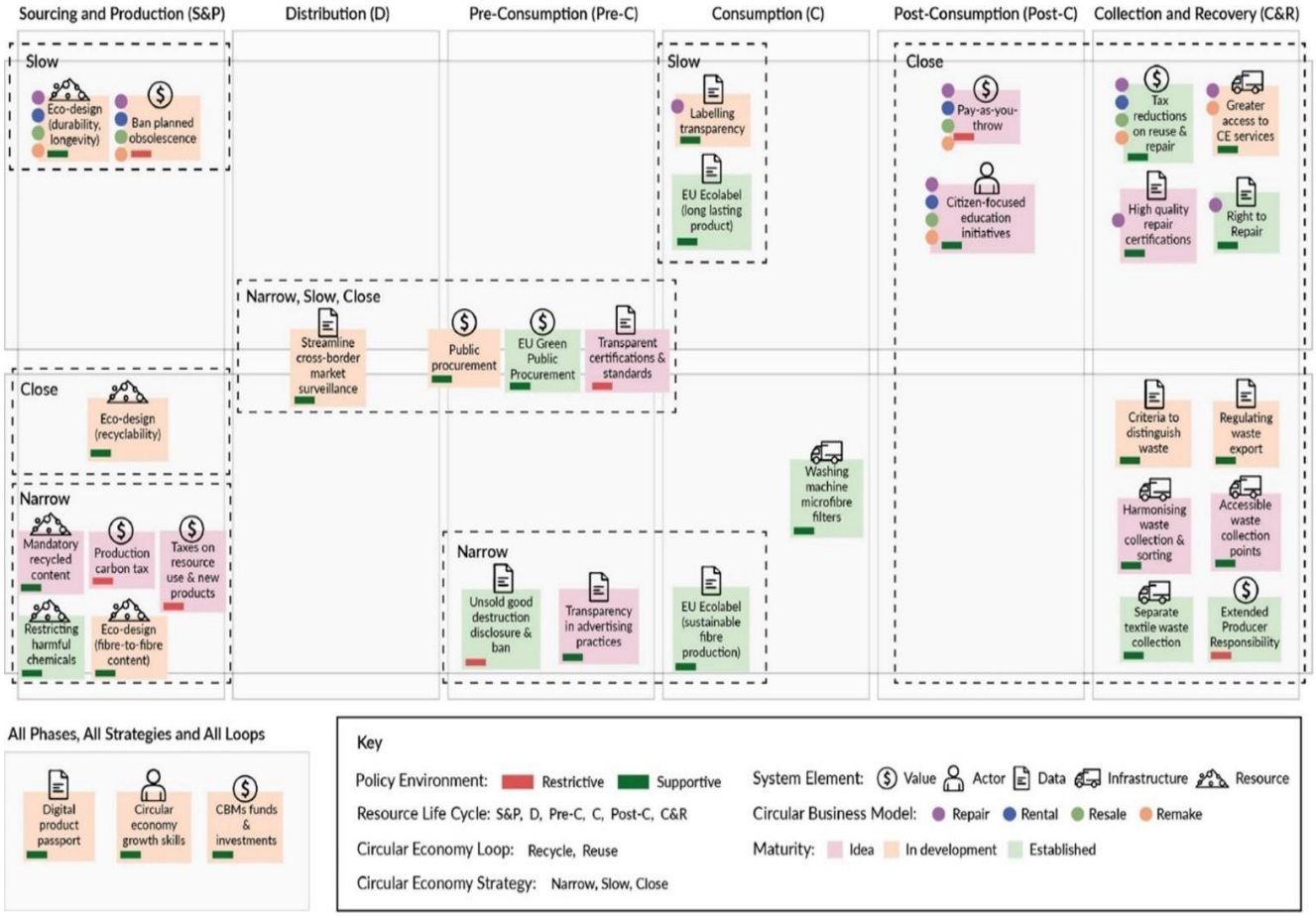
Regulation and economic incentives can also play a role in the production stage. Opportunities include:

- Governments can create standards by making definitions for garment waste, recycled content, and suitability for re-use. Harmonisation of these efforts where possible will ease compliance.
- Regulation to improve the chemical composition of products. For example, in the EU the Registration, Evaluation, Authorisation and Restriction of Chemicals regulation limits the use of formaldehyde. This is commonly used elsewhere for its capacity to make textiles 'non-iron.' This could also be used to increase the recyclability of products

- Regulation can require that producers disclose information on the composition of their products and production conditions.
- Economic incentives to encourage demand for recycled content. For example, Italy is considering the impact that a reduced VAT could have on encouraging the integration of recycled content in products.

EPR is a promising approach for addressing environmental impacts of garments. Its focus on producers and post-consumer products lends it well to addressing impacts at the end-of life and production stages. However, complementary policies can amplify its effect. As well, **complementary policies will also be helpful in the use stage to change household behaviour and extend the use phase of garments**.

Figure 5.1. Policy map for achieving sustainable fashion



Source: (Puglia et al., 2024[111])

6 Conclusions

Garments generate myriad environmental impacts through intensive use of primary materials for inputs and high rates of waste generation. The extended producer responsibility (EPR) approach is widely used in other product sectors to improve collection and recovery of targeted post-consumer products. However, there is only limited experience with EPR in garments.

The EPR scheme in France, the only OECD country with extensive experience, suggests that the approach helps improve collection and recovery of post-consumer garments. The scheme primarily funds sorting of collected materials and consumer awareness. Positively, France outperforms the EU average of collection and collection volume is growing. **The scheme has achieved relatively high rates of re-use and recovery of collected and sorted material (60%)**, significantly outperforming the European average re-use rate (8%) of collected post-consumer textiles. However, there is scope for improvement because the scheme is not achieving its own targets, such as its collection rate target (50%).

Additionally, there is the possibility that EPR can help to overcome several challenges of environmental impacts generated by the production, use, and disposal of garments. This is primarily for changing the economic incentives for producers, consumers, and waste managers. These challenges include:

- *Recycling:* **New recycling technology is available but will require investment and economies of scale to become competitive with primary material**. Pre-consumer waste is a potentially high-value resource for recyclers. This material could be 'low-hanging fruit' for developing recycling of textiles at scale. EPR could potentially help to stimulate improvements in the handling of this material by including pre-consumer waste recovery in targets for brands or offering a fee bonus.
- *Lengthening the use phase with repair:* Recognising the possibility for improvements, France has adopted several changes to its scheme in 2023. France's scheme is now supporting social enterprises that retail re-use products, and credits for households to repair their items. EPR's emphasis has historically been on recycling and treatment. **Garments are an opportunity to evaluate and identify effective 'upstream' EPR policies**.
- *Design for the environment:* The French EPR scheme varies fee liability of producers by the share of recycled content and may include recyclability criteria in the future.
- *Recovery of exported of used garments*: Investment in improvements in sorting and recycling both domestically and abroad are needed. EPR can help to financially support this investment and link producers, sorters and recyclers.

An EPR approach by itself will be insufficient to address all environmental impacts of garments. Governments can create standards by making definitions for garment waste, recycled content, and suitability for re-use. Harmonisation of these efforts where possible will ease compliance. Regulation is also needed to reduce the use of harmful chemicals during production and their treatment at end-of-life. Economic incentives can encourage demand for recycled content and stimulate investments in recycling infrastructure and technology. Complementary policies (e.g., awareness and behavioural interventions) can help households identify best practices to extend the use phase.

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