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key aspects for introducing an extended producer responsibility for textiles in Sweden

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A Mistra Future Fashion Report

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MISTRA
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preface

As a part of Mistra Future Fashion Phase 2, IVL Swedish Environment Institute (IVL), PlanMiljø and the International Institute of Industrial Environmental Economics (IIIEE) have investigated a selection of important aspects to consider when implementing an Extended Producer Responsibility (EPR) for textiles in Sweden.

The focus of the work was to identify, analyze and promote aspects that could help to balance upstream and downstream effects of an EPR. Large emphasis has been put on dialogue with actors in the textile value chain, to gather as much different knowledge and varying opinions as possible.

On behalf of Mistra Future Fashion we would like to thank all companies and organizations that have contributed with input to our work. Thank you for your interest and participation! Your inputs and reality checks are very important for us in creating research with stakeholder value.

Gothenburg, June 2019

Hanna Ljungkvist Nordin

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summary

The overall goal of this study is to illustrate the full potential of a mandatory Swedish Extended Producer Responsibility (EPR) for textiles by providing recommendations and stakeholder input feeding into the political discussion on the introduction of an EPR for textiles in Sweden.

As one part of this, we provide an analysis of selected aspects of a mandatory EPR system considered important to achieve the following upstream goals:

1. Increasing the market share of textile products from cleaner production
2. Extending lifetimes through more durable, repairable and reusable products
3. Increased fibre-to-fibre recycling through increasing the recyclability of products and through increasing the demand for recycled fibres

The analysis focus on different types of fee modulation and conclude that it should be possible to introduce modulated fees for recycled content and durability, since verifiable criteria for these features exist. No relevant criteria exist for recyclability, why this is more difficult to reward.

A stakeholder workshop and complementary interviews showed that upstream effects and increased circularity of the textile value chain are important to all actors. However, the responsibility for collection divides actors, as shown in below: charities and municipalities tended to prefer Scenario A, while producers and recyclers tended to prefer Scenario B.

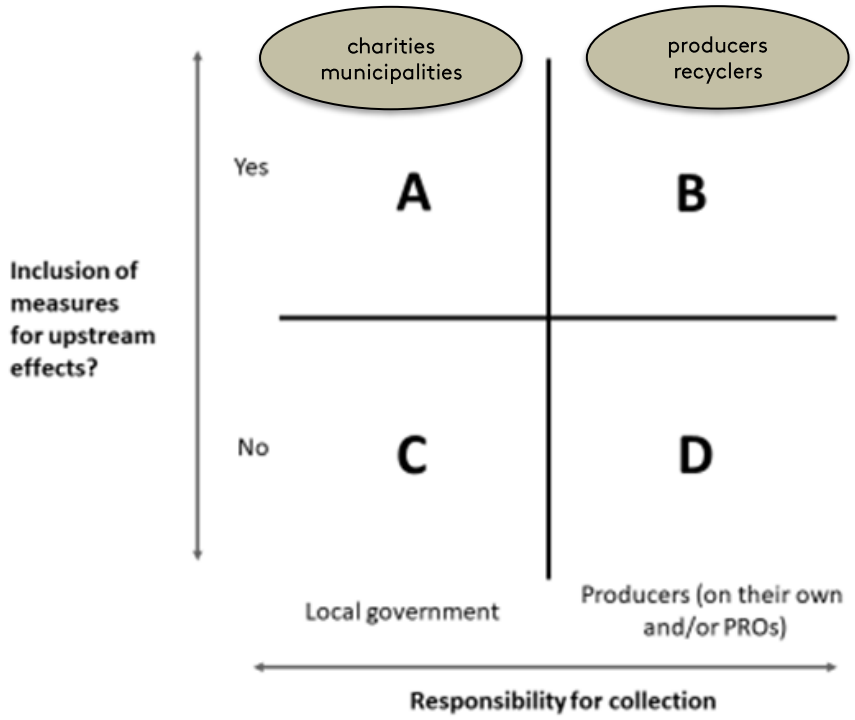

figure S 1 Different stakeholder opinions regarding responsibility for collection.

Based on the input from a workshop and interviews with a variety of stakeholders in the textile value chain, the following recommendations for the design of an ERP system that balances upstream and downstream effects are made:

Upstream recommendations

- When producers opt for fulfilling their responsibility by being part of a producer responsibility organisation (PRO), include recycled material content and durability as criteria for fee modulation, with the requirement that fulfilment should be third party verifiable. The exact standards and certificates to be used can be decided by the producers constituting a PRO.

- Investigate further what levels of fees are possible to introduce with the aim of introducing fee modulation that can have a substantial effect, taking into consideration the requirement stipulated under Article 8a (4a) of revised Waste Framework Directive (2018/851/EU) as well as experiences from existing EPR systems.

- Provide a possibility for a PRO to collect additional fees from producers to be used to research and development of fibre-to-fibre recycling technologies if agreed by its members (i.e. producers).

- Impose strict penalties for free-riders and make regular audits to ensure fulfilment of requirements stipulated in the law.

- Continuously monitor national reuse rates and take measures if they decrease or do not increase.

Downstream recommendations

- Use a mandatory reporting by PROs on the shares of textiles that are reused and recycled and the share of these treatments that occur within Sweden and outside of Sweden. The type of recycling should also be reported: mechanical or chemical recycling. This will require transparency in downstream routes for collected textiles.

- Include both targets for collection rates for post-consumer textiles, as well as (flexible) targets for collection systems to ensure convenience. The latter could include minimum collection point densities, minimum door-to-door collection frequencies or similar, but should allow some freedom of choice in the design of collection systems.

- Formulate quality and transparency requirements and structures for authorised collection systems that allow different partners to take part in collection and handling. The format from Fråne et. al (2017) could be used as a basis.

- Clarify which actors should bear the costs for collection, recycling and provision of information to consumers.

- Provide clear definitions of reuse and recycling (chemical and mechanical), point out where in the material handling chain reuse and recycling should be measured and prescribe how it should be measured.

Other recommendations:

- Promote, through economic incentives as well as use of various informative instruments, new business models for prolonged lifetime, reuse, remanufacturing and higher use frequency of textiles. The tax reduction for repairs is a good example.

- Include education about mending and remaking of textiles in school curricula.

- Keep a regular dialogue with all stakeholders throughout the development of a new EPR for textiles.

The research was carried out as part of Mistra Future Fashion by IVL Swedish Environmental Research Institute (IVL), the International Institute for Industrial Environmental Economics (IIIEE) at Lund University and PlanMiljø ApS. It builds on previous work in Mistra Future fashion Task 4.3.7, as well as previous studies regarding EPR design and evaluation, including the assessment made by the Swedish EPA in 2016.

We hope that this work helps future discussions relating to the concrete design and implementation of an EPR system for textiles in Sweden to start at a higher level and that it has contributed to a shared knowledge base among actors. We believe that bringing all stakeholders together on a regular basis, highlighting the common goal of a more circular handling of textiles, can result in constructive future solutions for both collection and handling of used textiles.

abbreviations

DKK	Danish crowns
EPA	Environmental Protection Agency
EPR	Extended producer responsibility
EU	European Union
FTI	Förpacknings- och Tidningsinsamlingen, packaging PRO
GPP	Green public procurement
IIIEE	International Institute for Industrial Environmental Economics
IVL	IVL Swedish Environmental Research Institute
OECD	Organisation for Economic Co-operation and Development
PRO	Producer responsibility organisation
R&D	Research and development
SEK	Swedish crowns
US	United States (of America)
WEEE	Waste electrical and electronic equipment
WFD	Waste Framework Directive

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1. introduction

1.1 background

Production, distribution and consumption of textiles is characterised by a linear value chain with high environmental and societal impacts (Ellen MacArthur Foundation, 2017; Sandin, Roos & Johansson, 2019; Sandin, Roos, Spak, Zamani & Peters, 2019). A low level of utilisation of textiles and ineffective handling of used textiles and textile wastes accentuates the depletion of natural resources in the textile value chain.

France introduced extended producer responsibility (EPR) for textiles and shoes in 2007. All EU Member States must set up systems for separate collection of used textiles by 2025 (Directive/2018/851/EU). Several EU Member States, including Germany, the Netherlands, Sweden and the UK, are considering introduction of new policy measures to increase collection, reuse and recycling of used textiles (Bundesregierung, 2018) (Deutscher Bundestag, 2017; WRAP, 2018; House of Commons Environmental Audit Committee, 2019; EY, 2016; Watson et al, 2018). Specifically, the January agreement between several political parties in Sweden (the Social Democratic Party, the Center Party, the Liberal Party and the Green Party) calls for further steps making it easier for households to reuse and recycle waste, e.g. by introducing an extended producer responsibility for textiles and testing potential ways of substantially increasing reuse and recycling of textiles (Swedish Social Democratic Party, 2019).

Already in 2016, the Swedish Environmental Protection Agency (EPA) was commissioned to carry out a government assignment regarding the sustainable handling of textile and textile waste. The Swedish EPA proposed two targets regarding textile waste aiming at reducing the amount of textile waste in the mixed municipal waste and at increasing reuse and recycling of collected textiles (Naturvårdsverket, 2016):

1. The amount of textile waste in the mixed municipal waste shall be reduced by 60 percent by 2025 (compared to 2015)
2. 90 percent of separately collected textile waste shall be prepared for reuse or recycled by 2025. The waste hierarchy shall apply, and textile recycling shall primarily be carried out as recycling into new textiles.

As a result of the governmental assignment mentioned above, the Swedish EPA suggested introduction of mandatory extended producer responsibility as one of two alternative proposals for used textile and textile waste management (Naturvårdsverket, 2016). In a previous task in the Mistra Future Fashion program policy options promoting (fibre-to-fibre) recycling of textile waste was investigated, among them a mandatory extended producer responsibility (Elander, Tojo, Tekie, & Hennlock, 2017). Findings and recommendations from both reports have served as important starting points of this report.

1.2. Goal and objectives

The overall goal of this study is to illustrate the full potential of a Swedish EPR for textiles and to provide stakeholder input feeding into the political discussion on the introduction of an EPR for textiles in Sweden. This goal is to be achieved by taking the following three research objectives:

1. Describe and analyse selected aspects of a mandatory EPR system considered important to influence upstream effects in the textile value chain.
2. Collect and present stakeholder views regarding the selected aspects and how a balanced EPR should be designed.
3. Provide recommendations for the design of an ERP system that balances upstream and downstream effects.

1.3. scope and delimitations

This report only addresses a mandatory EPR. This follows the recommendations of the Swedish EPA and the previous work in Mistra Future Fashion. The work is limited to the Swedish context, while at the same time considering the global nature of the textile value chain.

The definition of textiles included in an EPR is limited to clothing and household textiles, in line with the definition used by the Swedish EPA in previous assessments. This means that clothing, work clothing/uniforms, towels, curtains, sheets and blankets are included, while shoes, duvets, geo-textiles, bags, sacks, tents, inflatable matrasses, furniture textiles, sails, tarpaulins and other technical textiles are excluded (Naturvårdsverket 2016).

Selected aspects of a mandatory EPR have been chosen for analysis, rather than creating fully fledged scenarios for voluntary and mandatory EPR systems. Legal aspects were not analysed in detail, nor how control mechanisms should be designed and implemented. The following three aspects were chosen based on dialogue with stakeholders and the EPA:

- Balance of upstream and downstream effects in an EPR
- Organisation of collection
- Reporting requirements and transparency

The main focus is on the balance between upstream and downstream effects.

2. research approach

The main activities of the research comprised a workshop with stakeholders from all parts of the textile value chain and complementary interviews. As preparation for the workshop, a literature review was conducted in order to summarise previous research on the subject of a Swedish EPR and insights from other countries. Online searches of websites and reports as well as knowledge from previous work in Mistra Future fashion provided the input. The work in task 4.3.7 on aspects of an EPR served as a particularly important input to build on. Statistic references were also used to show the current status of collection and recycling of textiles, and research references on textile recycling were listed. A summary of eight selected reports from the literature review, plus statistics and examples of textile recycling reports was prepared in a powerpoint format for the stakeholder workshop, in order to give all actors the same knowledge base for discussion. Further preparation for the workshop involved a dialogue with the EPA and Ministry of Environment on what aspects of an EPR they wanted to discuss with actors. The research activities are summarised in figure 1 below.

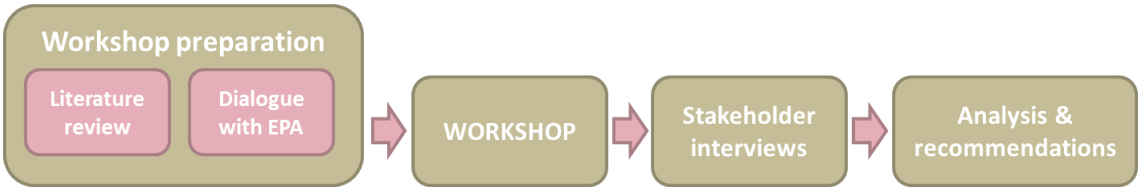


figure 1 Main activities of the research presented in this report

The main goals of the workshop were to collect stakeholders' views on upstream and downstream effects in an EPR and how the EPR should be designed. The opportunity to discuss with different actors in the textile value chain was welcomed by the invited authorities as valuable input to the EPA and Ministry of Environment, since no directions have yet been given regarding how to further prepare investigation and implementation of the EPR legislation in Sweden.

To follow up the stakeholder workshop, complementary telephone interviews were conducted with selected stakeholders. The stakeholders were chosen to represent different parts of the value chain with different interests, in order to capture as many views as possible in more detail. The interviews were semi-structured, in order to leave room for the stakeholders to focus on their main concerns and aspects. The findings from the literature, workshop and interviews were then summarised in a report, structured around the three aspects of balancing upstream and downstream effects, organisation of collection and reporting requirements and transparency.

The intention of the research is that future discussions relating to the concrete design and implementation of an EPR system for textiles in Sweden can start from an informed knowledge level, saving time and contributing to a shared knowledge base among actors. By bringing the stakeholders together and highlighting the common goal of a more circular handling of textiles, we seek to aid a constructive future dialogue to find solutions for both collection and handling of used textiles.

3. current markets for used textiles

About 140 000 tons new clothes and household textiles were put on the Swedish market in 2018 (Swedish EPA, 2019). In 2016 about 38 000 tons of used textiles were separately collected via charitable organizations, of which about 29 000 tons were reused in Sweden and abroad (Belleza & Luukka, 2018). Approximately 6 800 tons of the textile waste collected in Sweden were recycled in 2016 (Fossilfritt Sverige, 2017). This corresponds to a reuse rate of 21 percent and a recycling rate of 5 percent. The most common waste management treatment for used textiles in Sweden is incineration with energy recovery. In 2014 72 000 tons of textiles were discarded and incinerated together with the mixed municipal waste (Hultén et al., 2016).

Analysis of the composition and price structure of used textiles from the Nordic countries shows that 10 percent with highest quality for reuse (the so called cream) account for over 50 percent of the total value of collected textiles (Watson et al, 2016). Recycling fractions account for only 4 percent of the material value. A large amount of reuse fractions are today sold to Africa, Middle East and Asia (Watson et.al. 2016). These markets for reuse are changing fast and there is a saturation of demand for export fractions particularly the lower quality reusable textiles (Ljungkvist et. al., 2018). These market realities are important to keep in mind, since increased collection through an EPR will probably lead to higher volumes and shares of lower quality textiles that need to be taken care of. New treatment pathways in terms of both sorting, mechanical recycling and fiber to fiber recycling will be needed to handle these volumes.

Today, both sorting and recycling capacity for lower quality textile fractions and demand for them are limited in Sweden, which drives export of these to countries with higher capacity. However, these markets are also getting saturated, partly due to the Chinese import ban of certain textile wastes (Ljungkvist et. al., 2018).

Previous work in Mistra Future Fashion has identified the following critical aspects for increased fiber-to-fiber recycling of textiles in interviews with value chain actors (Elander & Ljungkvist, 2016). The following aspects were rated having medium to large impact on fiber-to-fiber recycling:

- Low availability of textile recycling technologies
- Lack of economic viability of textile sorting and recycling
- Lack of guidance on ownership of used textiles / textile wastes
- Lack of information regarding content in textiles for recycling
- Low market prices for recycled textile fibers
- Presence of non-textile materials in textile products
- Low quality of textile fibers for recycling
- Trade barriers for textile waste
- Use of mixed textile fibers in textile products

Some of these challenges, such as guidance on ownership and support to new sorting and recycling technologies, could potentially be targeted through an EPR system. The interviews and the subsequent analysis indicated strong dependencies between actors and revealed a need for increased coordination and exchange of information across the textile value chain (Elander & Ljungkvist, 2016). It is therefore important to consider the entire value chain and clarify the roles and responsibilities of different actors when designing policy measures such as EPR legislation.

‘keep a regular dialogue with all stakeholders throughout the development of a new EPR for textiles’

4. How to design an EPR

As a legislator, there are many aspects to consider when designing an Extended Producer Responsibility system. Such aspects include allocation of responsibility among actors especially in relation to collection, various issues related to the organization of collective infrastructure (e.g. financial mechanisms, practical arrangements when infrastructure of individual producers and collective bodies coexist, problems of monopolies and competition, free riders), target setting, reporting mechanisms and enhancement of upstream changes. In this section, taking into account existing works, experiences and discussions in other countries, we will look into the following aspects - integration of upstream effects in an EPR system, how to organize collection, target setting and monitoring that enhances transparency.

4.1. Input from literature review

The work in MFF task 4.3.7.1 described nine aspects of an EPR system, with a particular focus on the enhancement of fibre-to-fibre recycling as the main policy goal (Elander et al., 2017):

- Take-back requirements
- Financing mechanisms that reflect the actual cost of recycling specific fibres
- Financing mechanisms that contribute to the development of fibre-to-fibre recycling technologies
- Waste diversion targets
- Collection convenience and information requirements
- Preparation for reuse/recycling targets
- Consultation with existing actors
- Monitoring and control
- Mandatory nature

table 1 summarises the potential impacts of a mandatory EPR system for textiles in Sweden, as proposed by Elander et al. (2017). The EPR system, as designed in the previous MFF task 4.3.7.1, has been estimated to have greater positive impacts on down-stream operations, such as higher collection and development of sorting technologies, than on upstream effects like prevention of unwanted chemicals and transparency. It should be noted, however, that the particular policy goal aimed when designing the system was to enhance fibre-to-fibre recycling. Moreover, design for fibre-to-fibre recycling was one of the upstream effects thought to be promoted by a mandatory EPR.

table 1 Summary of the potential impacts of a mandatory EPR system for textiles in Sweden aiming to enhance fibre-to-fibre recycling proposed in Task 4.3.7.1 of the Mistra Future Fashion programme.

	No/ little impact	Medium positive impact	Large positive impact
Increased collection of used textile products (post-consumer textiles)			X
Increased reuse of used textile products		X	
Increased overall recycling of used textile products			X
Increased fibre-to-fibre recycling of used textile products			X
Prevention of hazardous / unwanted chemicals		X	
Development of technologies for sorting and (fibre-to-fibre) recycling of textiles			X
Increased transparency of material flows		X	
Improved design for fibre-to-fibre recycling			X

The risk of a narrow downstream focus was already mentioned in a report on EPR-systems and new business models by the Nordic Council of Ministers (Watson et al., 2015) and aforementioned MFF work by Elander et al. (2017). It was concluded in Watson et al. (2015) that an EPR needs to be supplemented with additional measures to promote business models that strengthen a more sustainable textile consumption upstream.

Anthesis Enveco (Soutukorva & Wallentin 2016) compared costs and environmental benefits in Sweden of a textile EPR system (without upstream effects) and two other scenarios (no change from the current system and municipal separate collection responsibility) at different collection and recycling target levels (expressed as reduction levels of textiles in household waste). The main part of the study investigates which reduction levels are needed to reach socioeconomic benefits for each scenario, without regard to feasibility.

Not surprisingly, the scenario with no change in current legislation is the is least costly of the alternatives. It is assumed that textile collection will still increase due to the fact that textile waste is mentioned in the national waste prevention program and in the national waste plan. For this scenario, net socioeconomic benefit is achieved already at a 35 percent reduction of used textile in household waste. The net benefit is positive for all three scenarios at 50 percent reduction of textile in household waste. However, the likelihood of achieving reductions is believed to be higher for an EPR system that gives responsibility for collection to producers or municipal collection responsibility, since legal targets are imposed and more resources are allocated to information in these scenarios. The authors also suggest that a 60 percent reduction should be possible both for the scenario of EPR system with producers responsible for collection and for municipal separate collection in the future. That reduction level would represent a long-term net benefit of around 95-99 MSEK per year (Soutukorva & Wallentin 2016).

4.1.1. International outlook

France
The French textile EPR has been in operation since 2009 and includes clothing, household textiles and shoes from households. The only approved PRO is ECO-TLC, a not-for-profit, private company constituted by 29 associates including general large retailers, fashion retailers, direct sales and mail/online retailers, manufacturers and wholesalers and apparel industry associations. In 2017, 223 000 tons of textiles, household textiles and shoes from 4476 members were collected, amounting to 36 percent of the 564 000 tons put on the market. The target for 2019 is 50 percent (300 000 tons, 4.6 kg/person/year) and 95percent of the collected products are to be reused or recycled (Bukhari et. al. 2018).

Collection is organised in a variety of ways, but the main bulk is collected in on-street containers, owned by over 200 different organisations, both charities and commercial (Bukhari et. al. 2018). Larger cities such as Paris, have implemented a wide range of collection options including mobile collection banks, collection banks in schools, shops, work places and social housing and door-to-door collection (Watson et al, 2018).

The following conclusions were made by British WRAP when evaluating the French EPR and comparing to UK conditions (WRAP 2018):

- ECO TLC have a focus on job creation for individuals far from the labour market. This results in high costs of sorting compared to more professional sorting operations.
- Penalty levels for non-compliance with the EPR legislation are low and are rarely enforced.
- Differentiated producer fees for durable design and recycled content exist but have so far had very little effect (see following section 4.2).
- A majority of raised funds from producers go to sorting actors and to municipal information campaigns.
- Collection rates have increased but are still far from the ambitious target.
- Prerequisites and targets for an EPR differ between France and the UK. Textile collection rate is already higher in the UK than it was in France when the French EPR was introduced, and the UK would probably not design an EPR with job creation as the main priority.

United Kingdom
A report by the House of Commons (2019) concludes that current investigations of EPR legislation for textiles in the UK is too slow. The authors suggest many different policy measures to reduce environmental impact of textiles, including introducing an EPR. It states that:

"the Government must end the era of throwaway fashion. It should make fashion retailers take responsibility for the waste they create by introducing an Extended Producer Responsibility scheme for textiles and reward companies that take positive action to reduce waste".

A number of upstream measures are also called for, such as incorporating eco-design principles in the Resources and Waste strategy and offer incentives for design for recycling, design for disassembly and design for durability. A new investment fund is suggested to stimulate markets for recycled fibres, and a tax should shift the balance of incentives in favour of reuse, repair and recycling to support responsible companies, similarly to the Swedish VAT reduction on repair

services. Further recommendations include banning incineration or landfilling of unsold stock that can be reused or recycled and introducing lessons on designing, creating, mending and repairing clothes be included in schools. The recommendations were all rejected by the British Government in June 2019[1].

Germany

The German government states in its coalition treaty of March 2018 that they will "evaluate the recycling potentials of other relevant waste streams such as waste wood, old textiles or used tires and make greater use of them". Further development of producer responsibility (not mentioned for what products) is also mentioned, where manufacturers should pay more attention to longevity, reparability and reusability (Bundesregierung, 2018). Further, a voluntary Partnership for Sustainable Textiles, the so called Textilbündnis, was launched in 2018 by the fashion industry and the government[2].

The Netherlands

Investigations are ongoing in the Netherlands about how an EPR could be introduced (EY 2016) but no concrete plans have been presented yet[3]. While waiting for policy, the textile industry and collecting and sorting actors are forming alliances and formulating positions. In recent years, trade associations Modint, INretail and VGT have worked on sustainable social, ecological and economic improvements. In July 2016, the Dutch Agreement on Sustainable Garments and Textile was concluded for this purpose between the government, industrial organisations, trade unions and nongovernmental organisations. The focus is on raw materials, looking into new methods to extend the lifespan of textiles and turning discarded textiles into new fibres. The initiative Dutch Circular Textiles Platform promotes this development and has formulated a Circular Textile Road Map, which was released in 2017[4].

Another, similar example is the Dutch Center for Circular Textiles launched in March 2019. The initiative is a collaboration between the sorter Wieland textiles, the charity Leger des Heils, the clothing brand Loop. a life and Saanstad municipality[5], with focus on reuse and remanufacturing.

[1] http://www.climateaction.org/news/uk-government-rejects-1p-fast-fashion-tax
[2] 8 Textilbündnis. (2019). The Textiles Partnership. From https://www.textilbuendnis.com/en/
[3] Personal communication with Nicole Kösegi, Boer Group.
[4] https://www.afvalcirculair.nl/onderwerpen/helpdesk-afvalbeheer/publicaties/downloads-0/on-the-road-towards/
[5] https://www.dutchcentreforcirculartextiles.nl/

4.2. Policy objectives and measures related to upstream impacts

This section provides an analysis of feasibility and potential positive effects of selected measures that could be used to reach three upstream goals. It starts with describing the difference between upstream and downstream measures.

4.2.1. Upstream effects – what and why?

According to the OECD (2016)[6], EPR is an environmental policy approach in which a producer's responsibility for a product extends to the post-consumer stage of its life cycle.

In this short definition EPR may appear as a policy focusing on **downstream effects** However, by shifting the financial burden of end-of-life management of products to the producer, EPR policy can also incentivise the producer to change the design of the original product to reduce the costs of end-of-life: this can occur through eco-design actions such as making the product durable, repairable, reusable, recyclable, reducing the material content and avoiding hazardous content. Such effects of EPR policy can be described as **upstream effects** and can significantly reduce the lifecycle impacts of products.

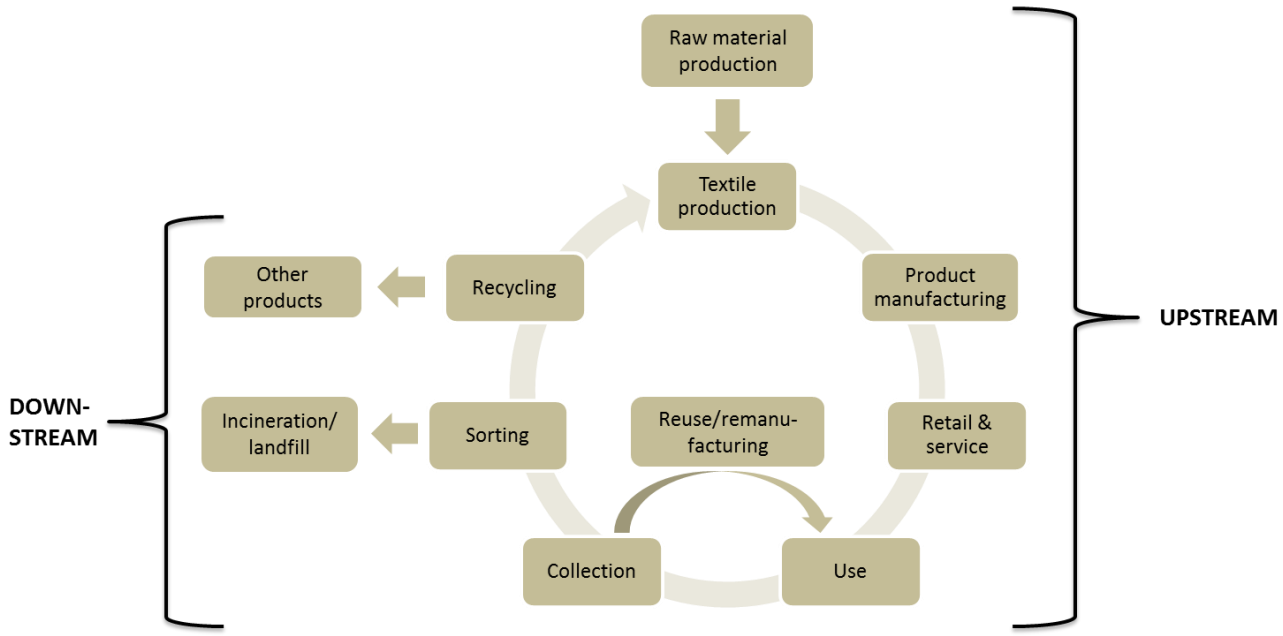


Figure 2: Upstream and downstream parts of the textile value chain

[6] https://read.oecd-ilibrary.org/environment/extended-producer-responsibility_9789264256385-en#page23

However, according to the OECD (2016), the European Commission (2014) and others, although EPR systems have been effective in terms of increasing collection and responsible management of waste products (downstream effects), there is less evidence in encouraging eco-design of the products (upstream effects).

The consensus of reviews of EPR systems appears to be that EPR can contribute to eco-design but that other factors and policies have had a more important driving role (OECD, 2016).

According to the European Commission (2014):

- Few or no targets or indicators regarding eco-design have been developed as part of EPR schemes.
- Collective EPR schemes, which share the responsibilities of many different individual producers, de-incentivise individual efforts for eco-design by 'averaging' the costs among all the producers.

However, some schemes include mechanisms that lower the fees for eco-designed products (or penalise least sustainable products) in order to favour industrial eco-design approaches (EC, 2014). This is true, for example, of the French EPR for clothing, linen and footwear. This has been implemented via a single collective system that covers the vast majority of producers, but where the fees the producers pay are reduced for 1) products that include recycled fibres (from post-consumer or factory waste) and for 2) products that meet a range of durability criteria. These mechanisms and their uptake so far are described in Box 1.

In its 2016 proposals for an EPR system for textiles in Sweden (Naturvårdsverket 2016), the Swedish EPA did not include mechanisms for encouraging upstream effects. Nor did they consider the potential environmental benefits resulting from upstream effects in their evaluation of an EPR system in comparison to an alternative municipality-led collection system.

In the meantime, the EU Waste Framework Directive (2008/98/EC) [7] has been revised to further promote the circular economy and now includes minimum requirements for EPR schemes. These include requirements to '*provide incentives for producers, when designing their products, to take better into account recyclability, reusability, reparability and the presence of hazardous substances.*' The revised Directive (2018/851/EU), under Article 8a (4b) (see Appendix 1), further details the so-called "modulation" requirement of financial mechanism when implementing an EPR system collectively. Any EPR for textiles in Sweden must, therefore, include elements that encourage such financial mechanisms. In the following sections we consider what types of upstream effects are of interest with respect to environmental improvements, how these could potentially be encouraged under an EPR, and identify obstacles to their implementation.

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0109.01.ENG

4.2.2. Potential policy goals of upstream measures

For textiles lifecycle environmental impacts can be reduced through **encouraging cleaner production**, **reducing the volume of production** and **reducing environmental impacts in the use phase** (mostly arising from the laundering of textiles). The latter is for the most part dependent on consumer laundering behaviour and the resource efficiency of washing machines, rather than on the design of products. The former two can be strongly influenced by product design.

Box 1: Upstream Measures used in the French EPR system

In an effort to incentivise eco-design in products the PRO under the French EPR system for clothing, linen and footwear (Eco TLC) has introduced a set of modulated producer fees for such items. Fee discounts can be claimed by producers for products that include three different eco-design elements: post-consumer recycled material content, pre-consumer recycled material content and durability.

Recycled content: from 2013 and onwards, producers could gain a 50 percent fee discount for products placed on the market with at least 15 percent post-consumer recycled content (i.e. material recovered from used textiles). From 2017 producers could gain a 25 percent discount for products placed on the market which contained at least 30 percent pre-consumer recycled content (i.e. fibres recovered from textile production waste). In both cases, the recycled content needs to be evidenced through a receipt or a certificate.

Durability: from 2018, Eco TLC producers can gain a 75percent discount products placed on the market that meet minimum durability criteria for a limited selection of textile items: T-shirts, jeans, jumpers and bedsheets. Items need to meet two minimum quality criteria, which vary depending on the product type but include: abrasion resistance, dimensional stability, colour fastness, and piling. The eligibility criteria are based on standard industry garment tests and ISO norms and producers are required to provide certification.

Effect: The recycled content discounts have only had a minute effect. Of the 2.6 bn items placed on the market in 2016, fee discounts have only been claimed for 93,000 or 0.004 percent of the total. Eco TLC postulates that the incentive per piece may be too low to cover the administrate costs of declaring and certifying the recycled content per unit.

The uptake of the more recent durability discount is significantly higher despite its shorter life and the fact that only some product categories are eligible. is low in what is its debut year, but it has already gained more traction than its predecessors. Of the 2.6bn items placed on the market in 2017, durability fee discounts were claimed for 7 m items or 0.3percent. This is, nevertheless, still insignificant.

Source: UK WRAP (2018) UK Textiles EPR – Final Report

Reduced volume of production can partially be achieved through **extending the active lifetimes of products** and thereafter by **increasing material recovery** from the worn-out textiles to reduce demands on virgin raw materials.

Extending the active lifetimes of products can be achieved both via upstream and downstream measures. Upstream measures can be used to increase the **durability, reparability and reusability** of textile products, but downstream measures such as increased collection, processing and resale of reusable products are also critical. In this section we only look at the upstream elements.

With respect to material recovery, while there are some existing downcycling markets for textile waste such as use as industry wipes, in automobile upholstery or insulation, greater environmental benefits can be gained from **fibre-to-fibre recycling** (F2F). According to Watson et al. (2017)[8], stimulation of F2F requires efforts at both ends: increased design for ease of recycling, but also increased demand for recovered fibres.

The above can be summarised as the following overall upstream goals for an EPR system:

1. Increasing the market share of textile products from cleaner production
2. Extending lifetimes through more durable, repairable and reusable products
3. Increased fibre-to-fibre recycling through increasing the recyclability of products and through increasing the demand for recycled fibres

It should be noted here, that more durable, repairable and reusable products do not guarantee extended active lifetimes or reduced consumption (and thereby production) of new textiles. An increased market share of these products needs to be combined with other measures that encourage changes in consumption behaviour and in business models that utilise these product characteristics. Similarly more readily recyclable products do not guarantee that they will be recycled. Efficient collection, sorting and recycling technologies and markets are also necessary.

4.2.3. Potential concrete measures for achieving the upstream goals

This section aims to translate the above upstream goals into concrete measures that can be included in an EPR system to achieve them. Experience from EPR regulations for a range of products demonstrate that the majority of producers opt to be part of a collective EPR system rather than carrying out their EPR responsibilities individually (OECD, 2016).

Under a collective EPR system, the most discussed mechanism for achieving upstream effects is via modulation in fees to the PRO according to characteristics of the products that the individual producer places on the market. However, despite numerous discussions and various attempts in, for example, sectors for electrical and electronic equipment, modulation has not been implemented in reality for very many existing EPR systems except for those for packaging and recently in the French EPR system for textiles. MFF Task 4.3.7.1. looked into various challenges

[8] http://norden.diva-portal.org/smash/record.jsf?pid=diva2percent3A1161916&dswid=7332

pertaining to implementing modulation in reality, as found in Section 6.2.2 of Elander et al. (2017). Importantly, these characteristics need to be verifiable, preferably by independent actors.

A further potential measure is that PROs can make use of fees to promote aspects that are indirectly connected to upstream measures. A key example is the use of fee for enhancing recycling technologies, as discussed as one potential component of a mandatory EPR system under the MFF Task 4.3.7.1 (See Section 6.2.3 of Elander et al. (2017) for more concrete examples). In the textile sector, the French EPR system for clothing, linen and footwear uses 20 percent of the income of the PRO to fund recycling technologies for textiles waste.

The following measures would seem to have some potential but require additional analysis:

1. Increasing the market share of textile products from cleaner production
    a. Reduced PRO fee for clothing that has been awarded with an eco-label that includes criteria for cleaner production
2. Extending lifetimes through more durable, repairable and reusable products
    a. Reduced PRO fee for more durable clothing
3. Increased fibre-to-fibre recycling through stimulating demand for recycled fibres
    a. Reduced PRO fee for clothing with recycled content
    b. Reduced PRO fee for clothing which is readily recyclable (e.g. single fibre type)

4.2.4. Analysis

Further analysis of the potential measures for encouraging upstream effects within a collective EPR is described in this section. The measures were analysed as far as possible against the following criteria:

- **Feasibility:** can the measure be administered? Does robust documentation/certification exist?
- **Positive impact:** would the measure have the wished-for effects and under what circumstances?

Feasibility
All the measures proposed above concern modulations in the fee paid by producers to the PRO. For this type of measure to be able to operate, the actors involved in the EPR system, i.e. producers, and/or PROs need to be able to develop criteria for eligibility for reduced fees which are measurable, documentable and verifiable. Experiences in the other sectors, such as electrical and electronic equipment, indicate that coming to an agreement with a set of criteria is a formidable, if not impossible, process (van Rossem, 2008, Elander et al., 2017).

Despite the existing challenges, we could still explore potentials to utilise existing certification standards and/or standardised measurement methods. To ensure confidence for the PRO in awarding fee reductions these should ideally be third-party verified.

table 2 below identifies the availability or not of existing standards/certifications for each of the proposed measures and whether or not these are third party verified/verifiable.

table 2 The availability of relevant standards/certificates

Measure	Certificate/ standard	2nd party/3rd party verified	Comments
Reduced PRO fee for eco-labelled clothing	Nordic Swan Eco-label for textiles	The label is issued by the 2nd party organisation (Ecolabelling Sweden). 3rd party documentation is required for many of the tests	The Nordic Swan label includes a wide range of criteria for textiles (and leather goods). Most of the criteria concern cleaner production measures with emphasis on avoidance of the use of hasardous chemicals in fibre production and in fabrication and management of emissions to water. It also includes durability criteria (see below). The label is awarded to individual products and not to the producer itself. Certification normally lasts until new criteria have been issued.
	EU Ecolabel for textiles	As above	The EU Ecolabel for textiles is similar in many respects to the Nordic Swan label. Chemical restrictions are somewhat less stringent.
	Global Organic Textile Standard (GOTS)	3rd Party certified (3rd parties must be accredited according to ISO 65/17065)	The GOTS label only covers products that predominantly comprise natural fibres (cotton, wool, hemp,flax etc.). Many of the criteria concern cleaner production and restrictions on hasardous chemical use in all stages of production.
	Bra Miljöval	As for Swan and EU Ecolabel	The label covers a wide range of cleaner production criteria from fibre production through to a finished product with a similar level of protection as the Swan and EU Ecolabel.
	Oeko-Tex 100, Better Cotton Initiative	3rd party certified	These labels have significantly less stringent criteria than the four labels above and are less comprehensive in their coverage of the lifecycle
Reduced PRO fee for more durable clothing	Testing standards for colour fastness to dry and wet rubbing (SO 105 X12), colour fastness to washing (SO 105 C06), colour fastness to light (ISO 105 B02), dimensional changes in washing and drying (SO 5077), fabric resistance to	The results of such tests can be 3rd party verified by certified testing laboratories. There are a number of these in Sweden	These standards to not specify minimum levels that must be achieved by the tests but rather standardise and provide documentation requirements for the tests. This gives the PRO the freedom to/challenge of setting minimum thresholds themselves for eligible products. Different types of products can be expected to have different levels of resistance to these qualities and therefore it is normal to specify product-specific thresholds; e.g.

	abrasion/pilling (ISO 12945-1:20; ISO 12945-2:2000).		thresholds for T-shirts, thresholds for bedlinen etc. This is the way that the standards have been used in EcoTLC's fee modulation for durability.
	Nordic Swan or EU Ecolabel	See above	These labels contain a range of durability requirements: minimum standards for colour fastness to dry and wet rubbing, colour fastness to washing, colour fastness to light, dimensional changes in washing, fabric resistance to abrasion/pilling. Verification that these have been met is provided via the test standards named in the row above. However, under the ecolabels, thresholds are set and can't be adjusted by the PRO.
Reduced PRO fee for clothing with recycled content	Global Recycled Standard	Third party verified by	The Global Recycled Standard is a holistic certification for products with recycled content. The standard provides verified labelling of the recycled content by weight of a given product. The traceability element of the standard also allows the content to be distinguished between pre-consumer and post-consumer recycled materials. The PRO would have the freedom to specify thresholds themselves.
	Nordic Swan, EU Eco-label and Bra Miljöval	See above	These labels all include criteria on recycled content. However, recycled content can give points towards an Ecolabel, BUT having an eco-label is no guarantee that a product has recycled content.
Reduced PRO fee for clothing which is readily recyclable	Regulations (EU) No 1007/2011 of the European Parliament and of the Council of 27th September 2011 on textile fibres and related labelling	Manufacturers make these fibre content declarations themselves. There is no gurantee that this is correct	Products with a single fibre type are generally more readily recyclable than products comprising a fibre mix. The EU Regulations require that textile labels include the fibre composition in percent share. However, not for shares under 10percent. Since many recycling processes cannot tolerate 10percent impurities this labelling is of little use for this upstream measure in its current format.

Relevant and verifiable standards/certificates exist for eco-labels (cleaner production), recycled content and durability. These can be split into two types: 1) standards/certificates which verify that a declaration from a producer is correct but do not specify thresholds for the given

characteristic, and 2) a label/stamp which states that a product has met thresholds for certain criteria.

For the former, the PRO would be free to define its own thresholds and to apply varying fee rebates for different levels of achievement. For example, a 20 percent fee reduction for products with 5 percent recycled content and a 50 percent reduction for products with 20 percent recycled content.

For the latter, the thresholds are set within the label and can't be altered by the PRO. On the other hand, some labels have varying levels of stringency with respect to cleaner production. This could support a two tier rebate system e.g. a 50 percent fee reduction for labels with stringent criteria (e.g. Nordic Swan, EU Ecolabel, GOTS and Bra Miljöval) and a 25 percent reduction for textiles with labels with less stringent criteria such as Oeko-Tex 100 or Better Cotton Initiative.

Eco-labels can cover more than one of the potential upstream effects and thus can kill several birds with one stone. For example, the Nordic Swan and EU Ecolabel include both cleaner production criteria and durability criteria. Higher fee rebates could be considered for these labels.

Having said this, there are a wide range of eco-labels for textiles globally, and including some but not others as being eligible for fee rebates could potentially create disagreement among participating producers.

Regarding recyclability, no relevant standard/certification exists as of now, and the feasibility for including modulated fees according to ease of recycling seems limited.

Positive impacts
The degree of impact of an upstream measure ultimately depends on the strength of a string of causal links. In the case of a reduced fee for more durable textiles in a collective system, these links would be as follows:

Reduced PRO fee for more durable textiles > increased market share of more durable textiles > textile products are used by one or more consecutive users until their technical lifetime is reached > consumers buy fewer textiles > total production impacts are reduced

Bauer et al (2018)[9] took account of such links when estimating the potential impacts at EU level of proposed Eco-design criteria for textiles. In this report we limit ourselves to the first link only: the degree to which the adjusted fees would actually affect the market share of textiles with the given characteristic.

The determining factors in this effect will be similar for each of the instruments since they all concern modulated fees: *is the economic benefit for eligible producers significant enough to make it worth their efforts to 1) change their product design/production and 2) verify such changes?*

In other words: is the result of the following equation (Equation 1) positive or negative?

[9] http://norden.diva-portal.org/smash/record.jsf?pid=diva2percent3A1221509&dswid=6919

Benefit of upstream changes = Fee modulation x standard fee per item x quantity of production – costs of transition to eco-designed product - costs of gaining and maintaining verification for such changes

Carrying out a detailed analysis of this equation is beyond the scope of this project. However, a few broad indications can be drawn out.

Both the latter two factors in the equation can include fixed costs that are independent of the number of items of a product produced, and per item costs. The higher the fixed costs the less likely smaller companies will see any economic advantage in carrying out eco-design changes in order to gain reduced producer fees in an EPR.

Fee systems for ecolabels and standards tend to be rather complex and are dependent on numbers of site visits and audits required etc. table 3 gives a very simplified overview of fees that are applied under the Nordic Swan, EU Ecolabel and Global Recycle Standard. The full fee schemes can be found by following the footnote links. The first two have a fixed application fee, but a license fee which is set as a percentage of turnover. The Global Recycle Standard fees are all fixed and for most companies will be considerably cheaper than the two eco-labels. This is understandable since it has a much more limited scope.

table 3 application and license fees for some selected relevant labels/certificates for a single product

Eco label/ certificate	Application fee		Licence fee (per year)
	Standard	SMEs	
Nordic Swan textiles[10]	**3000 Euro + site visit fees (ca. 2000 Euro per visit)**		**0.3percent of annual turnover (min. 2000 max. 100 000 Euro)**
EU ecolabel[11]	**2000 Euro + site visit fees (ca. 2000 Euro per visit)**	**Max. 1 500 Euro**	**0,15percent of annual turnover (min. 1 500, Max. 25 000 Euro)**
Global Recycle Standard[12]	**900 Euro + site visit fees (260 Euro per visit)**	**No rebate**	**900 Euro**

Looking only at the cost of gaining an ecolabel, a fee modulation benefit would need to be a minimum of around 0.5 percent of the price of a garment to provide any overall economic benefits. If price modulations were in the order of 50 percent this would mean that the standard EPR fee would need to be in the order of at least 1 percent of the garment price to even provide a balance in costs and benefits and perhaps more than 2 percent to provide a real incentive.

The costs of transition to production processes that would meet eco-label criteria also need to be taken into account. While, initial investments in machinery and processes may be high the transition can potentially lead to long term cost reductions due to savings in energy use, water use, waste water treatment etc. On the other hand, transition can be also done by changing the

[10] https://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=039
[11] http://ec.europa.eu/environment/ecolabel/documents/eu-ecolabel_fees.pdf
[12] https://textileexchange.org/wp-content/uploads/2019/05/Textile-Exchange-Standards-Fee-Schedule-2019.pdf

supplier. It is therefore not possible to develop any rules of thumb on the fixed or running costs of the transition.

For use of recycled materials, while the Global Recycle Standard fees are relatively low, switching to recycled content fabrics will generally cost the producer money. Brands claim that recycled content fabrics currently cost around 5-15 percent more than the equivalent fabric from virgin fibres, dependent on the fibre type (Watson et al, 2017). Fabrics comprise approximately around 20 percent of the final price of a garment (this is highly dependent on the brand), suggesting that the additional price of recycled content might typically be 1-2 percent of the product market price.

Thus, the modulated EPR fee would need to be larger than this in order to provide an incentive, suggesting that the standard EPR fee would need to be at least 2-3 percent of market price for garments in order for modulations to have an impact on the market share of products with recycled content.

As described in Box 1, the fee modulations included in the French EPR system for durable products and recycled content products have hardly had any effect on the market share of these products. The standard producer fee for medium sized textile products is under 1 Eurocent with modulations for eco-design elements ranging from 0.2 to 0.6 Eurocent (WRAP, 2018). Taking a conservative average item market price of 10 Euro the standard producer fee represents less than 0.1 percent of the market price. It is perhaps little wonder that the modulated fees have not led to an increase in the eco-design of textile products.

For modulated fees for any of the areas to have a significant incentivising effect the standard producer fee under a Swedish EPR system would likely need to be in the order of at least 2-3 percent of the product market price. It seems unlikely that such a price would meet the requirements of Article 8 (4c) of the revised WFD;

'Member States shall take the necessary measures to ensure that the financial contributions paid by the producer of the product to comply with its extended producer responsibility obligations..... do not exceed the costs that are necessary to provide waste management services in a cost-efficient way.'

To make a differentiation of the size of the fee meaningful enough for producers to work on upstream changes is not a new challenge for EPR systems - it has been one of the criticisms posed by the opponents of individual producer responsibility systems for electrical and electronic equipment (Tojo, 2004). Meanwhile, industry actors who have been engaged in existing EPR systems for packaging also expressed that the minute difference in fees did provide sufficient motivation for them to modify their packaging. More detailed analysis of equation (1) with respect to costs experienced by companies in following through with eco-design changes and certification for textile products is needed to more clearly define the necessary fee modulation levels necessary to have an effect.

4.3. Organisation of collection

The question regarding how to organise collection of used textiles in an EPR has been debated for years and is also high on the agenda for many textile actors in Sweden. In addition to issues of collection efficiencies, interests of existing actors have exerted various influences when implementing existing EPR systems, not least in relation to collection (Tojo et al., 2004, Elander et al., 2017). It was therefore discussed as a separate topic at the stakeholder workshop (see chapter 5 about input from stakeholders).

Today a number of collection models for used textiles co-exist in Sweden. Many large retailers organise collection in their stores, sometimes in collaboration with charities and sometimes with textile sorters and recyclers. Some brands re-sell their own brand as second hand in their stores. Many municipalities collect used textiles in civic amenity centres, often in collaboration with charities. One municipality, Eskilstuna, has provided kerbside collection of textiles since 2017[13].

Charities collect textiles both in containers and by letting consumers donate textiles across the counter in their second-hand stores. In recent years, new businesses have appeared that collect used textiles and other fractions directly from private households, for example TipTapp[14]. This goes against the municipal waste collection monopoly and was forbidden by the environmental and health protection board of Stockholm in October 2018. The prohibition was challenged by TipTapp, and the dispute continues[15].

If an EPR system is introduced and puts responsibility for collection on producers, it would replace the municipal waste collection monopoly and open up for collaboration between many different actors as long as the system meets the requirements formulated in the legislation. The following suggested criteria for an authorised collection system were presented by the EPA (Naturvårdsverket 2016):

- the collection system shall provide easily accessible collection points so that anyone who wants to leave used textiles and textile waste can do so easily and without having to pay any compensation to the system,
- the operation is conducted in such a way that it effectively contributes to achieving the objectives of the regulation and must not make it difficult for preparation for reuse or recycling and otherwise ensure that the waste is handled in an acceptable manner with respect to health and environment,
- the system must have a "financial security" corresponding to the cost of collection and treatment of the textile waste that the system is to handle in accordance with the provisions and purpose of the Regulation,
- all producers who wish to join the collection system shall be allowed to join,
- the operator of the system must cooperate with others who have permission under the Regulation on how the costs for the collected textile waste should be distributed.

In line with the last point, the EPA also leave the details of economic setup and transactions between producers and different collecting actors to the authorised system to solve. This opens up for differentiated fees and use of funds for research and innovation, recycling technology development etc. as discussed in section 4.2 above.

[13] https://www.eem.se/privat/atervinning/fargsortering/fargsortera-textilier/
[14] https://www.tiptapp.com/sv
[15] https://insynsverige.se/documentHandler.ashx?did=1967696

Another important aspect raised by MFF Task 4.3.7.1. (Elander et al, 2017) when developing a potential mandatory EPR system for textiles in Sweden is how to enhance convenience for consumers who wish to hand in their products for reuse/recycling. The following requirement for convenience and information provision was suggested:

> In setting up collection sites, producers must ensure a minimum collection point density of 1 per 5000 inhabitants or where this is not possible provide other measures to ensure convenience of delivery for consumers (e.g. setting up the collection sites close to the shopping areas, train stations, kerbside collection via vehicle several times a year) are provided. In whichever way, collection should be at least free of charge for consumers. Collection sites must be equipped in such a way that it should allow consumers to bring textile products both for reuse and recycling. Producers must see to it that information regarding their responsibility, as well as information that enhance the participation of consumers in collection and sorting (e.g. location of collection sites, what needs to be sorted) are provided to the consumers. (Elander et al., 2017, p. 51)

A recent project Circular Textile Initiative[16] provide new insights regarding different solutions for textile collection in municipalities (Hellström, 2019). Ten municipalities within the region of Västra Götaland tested textile collection in different places during a short trial period. The most successful collection arrangements were:

- Collection at recycling centers combined with information campaigns. This resulted in much larger volumes of collected textiles than the usual collection without campaigns. The containers should however not be placed next to the combustible waste fractions, to avoid mix-up of the two fractions.
- Containers at receptions in municipal buildings like city halls was the most attractive solution for users. People liked the fact that it was a well-lit and safe environment, and the ability to talk to staff (receptionist) about the collection.
- In Borås, collection in libraries was tested. This was very popular and has been continued after the trial period. The same factors as for city halls were appreciated (safe, well-lit), and the library staff got many questions from people leaving textiles.
- In the island community Öckerö collection was organised at the local supermarket, combined with information on Facebook. Staff was present at certain collection times and over 500 kg was collected during only a few hours over a three-day period, with most of the textiles arriving on the first day.

The most challenging collection was in rural areas with low population density. A pick-up service was arranged but did not result in any significant volumes. This kind of service is costly and difficult to adapt to fit the needs. The project concluded that collection does not have to be permanent to be successful: specific collection times can work well with sufficient information (Hellström 2019).

There are many different possibilities to include different actors in the collection under an authorised collection system. Municipalities can collect textiles at recycling centers in their city halls, libraries and through kerbside systems on behalf of the producers. Charities can collect material in the same manner that they do today and be supported by producers. Retailers can collect textiles in their stores and some new circular business models like clothing rentals or libraries can collect their material after it cannot be used in their business anymore.

[16] https://www.circulartextile.se/

The collecting actors in turn need to have agreements with sorting actors who sort for reuse and/or recycling. Sorting for reuse should have priority and has to be made manually to ensure quality and market value. Sorting for recycling can be made manually or automated and will need to handle large volumes efficiently in order to be economically viable. Today there are two initiatives developing automated textile sorting in Sweden; WargoTex[17] and SIPTex[18]. figure 3 shows an illustration of different actors involved in collection and sorting.

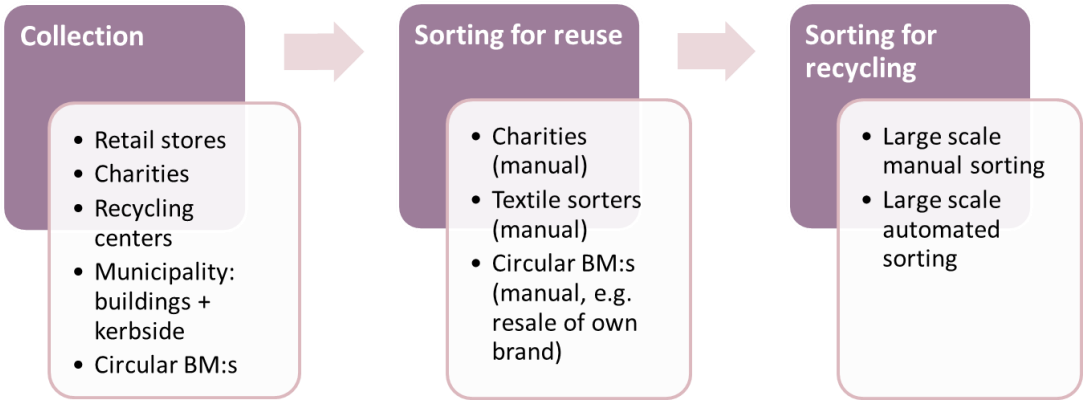


figure 3 Illustration of potential collecting actors and the sorting actors in the next steps of the chain. BM is short for Business Model.

After sorting, the material needs to find viable markets for reuse and recycling. These markets are partly national, but largely international today. Regardless of the final destination, used textiles should be tracked to ensure that qualitative and quantitative goals for reuse and recycling are met. The following section discusses how this could be done.

4.4. Target levels

The targets of 60 percent less textiles in mixed municipal waste and 90 percent of collected textiles being prepared for reuse and recycling as proposed by the Swedish EPA (Naturvårdsverket 2016) do not set any detailed targets for reuse versus recycling. There are different stakeholder views on this. Some think that specific targets for reuse should be set in order to avoid sending reusable fractions to recycling, while others argue that it is difficult to stimulate reuse markets and that transparent reporting of volumes to reuse and recycling is a better way to go (see section 5.2).

MFF 2 Task 4.3.7.1. sought to develop both waste diversion targets and targets for preparation for reuse and recycling targets. Regarding the latter, the following target was suggested:

Out of the products collected, producers must meet preparation for reuse/recycling targets, which consist of a) preparing the collected textile products for reuse of the whole products or its part, b) fibre-to-fibre recycling, and c) recycling in other forms (downcycling), but not energy

[17] https://wargoninnovation.se/projekt/wargotex-development/
[18] https://www.ivl.se/sidor/aktuell-forskning/forskningsprojekt/avfall-och-atervinning/textilatervinning-med-automatiserad-sortering.html

recovery. The overall preparation for reuse/recycling targets is set to be 95 percent by 2020. Out of recycling (b and c above) 50 percent should be achieved by fibre-to-fibre recycling by 2025. The recycling targets should be increased over time to enhance the innovation in the product design (e.g. types of textile fibres used, composition), as well as in the downstream technologies (e.g. fibre identification, sorting, recycling) (Elander et al., 2017, p 53).

To increase transparency regarding the division of volumes to reuse and recycling, an alternative could be the following (additional targets compared to the EPA suggestion in *italics*):

- 60 percent diversion of used textiles from mixed waste in 2025
    - whereof at least X percent is diverted to reuse or redesign
    - whereof at least X percent to material recycling (mechanical or chemical)
    - whereof maximum 10 percent to energy recovery.

Further additional requirements for increased transparency could include reporting of final destination country and transparency regarding sorting and recycling losses sent to energy recovery. Since the Swedish government has expressed that reuse in Sweden should increase, it would be helpful to at least measure national reuse and redesign through the EPR reporting. It should, however, be understood that only reuse of fractions collected within the EPR will be measured, not other options like peer-to peer resale/reuse or the activities of rental businesses. It is important that the legislation provides clear definitions of reuse and recycling and point out where in the material handling chain reuse and recycling should be measured. As an example, reuse could be calculated as textile volumes that enters a second-hand shop (physical or online) or as the volumes that are actually sold. The latter should be the preferred definition.

Another important topic are requirements regarding occupational health and safety and fair wages for workers in the textile sorting and recycling chain and there are certification schemes that can cover some of these issues, such as the occupational health and safety standard OHAS 18001:2007, replaced in 2018 by ISO 45001[19].

4.5. Reporting and transparency

Given that many different actors could be involved in an authorised collection system, transparency and traceability is key to follow up the actual circularity of the textiles, both in Sweden and abroad. Certification of collectors and sorters and a standardised format for reporting is called for by actors in the value chain (see chapter 5). Its importance (and prevailing lack of such in the existing EPR systems for other products), was also highlighted in MFF Task 4.3.7.1., which suggest monitoring and control as one of the essential elements of a mandatory EPR (see Section 6.2.8 of Elander et al. 2017).

[19] https://www.sis.se/produkter/ledningssystem-e07b0fe8/ledningssystem-for-kvalitet/arbetsmiljohsas18001bliriso45001slyckasdumedvergngen/

4.5.1. Standardised reporting format

The Nordic textile reuse and recycling commitment was a voluntary system developed jointly by four Nordic research actors in a project funded by the Nordic Council of Ministers (Palm & Elander, 2015). The idea was to promote serious actors to set up common goals and participate in a third-party certified system for legitimate sustainable collection, sorting, reuse and recycling of used textiles. A Code of Conduct with detailed criteria was developed in collaboration with actors, with the aim of reaching the following goals:

- Enable legitimate actors to collect, sort, reuse and recycle textiles in cooperation with producers, importers and authorities
- Eliminate illegal collection, export and trading of post-consumer textiles
- Increase transparency of the fate of collected textiles and increase public confidence in collecting organisations.
- Double the collection of post-consumer textiles in the Nordic region within ten years, compared to 2012
- Strive towards a ten-year goal of at least 50percent reuse and a total of 90 percent reuse or recycling of collected textiles, with preference to closed loop recycling
- Ensuring compliance with the Code of Conduct by all certified actors

Criteria were developed both for collection in general and specifically for in-store collection, kerbside collection and container collection. Further criteria for sorting, recycling, reuse and sales of reused textiles, export of used textiles as well as environmental performance, transparency and reporting were also developed. A specific set of criteria was developed for charities. The criteria were divided into "may" and "shall", where "may" are aspirational criteria and "shall" criteria should be fulfilled and documented (full criteria available in Fråne et.al. 2017).

To ensure transparency of collection and handling, textile volumes at all the different steps illustrated in figure 4 (below) should be reported.

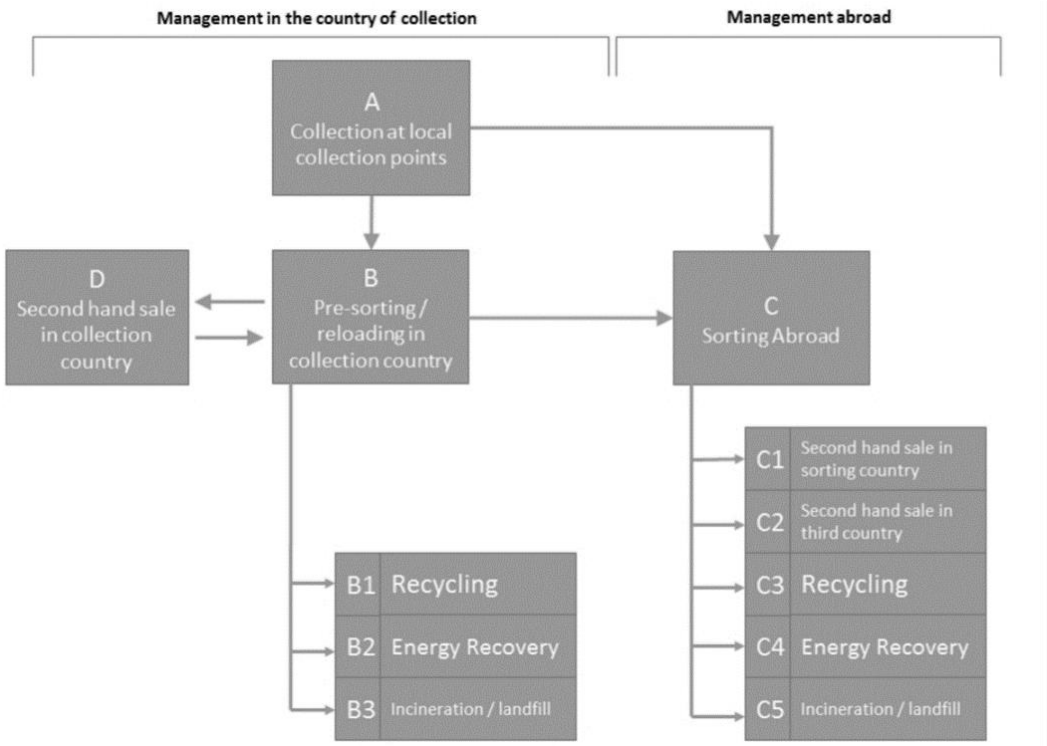


figure 4 Flow chart of the different steps related to collection and handling of used textiles that should be covered in reporting (Fråne et.al. 2017).

The suggested format for reporting of volumes and calculation of reuse and recycling rates is presented in table 4. The letters in the first column describe the position in the flow chart in figure 4.

table 4 Annual data on textile flows to be filled in by the collector (Fråne et.al. 2017)

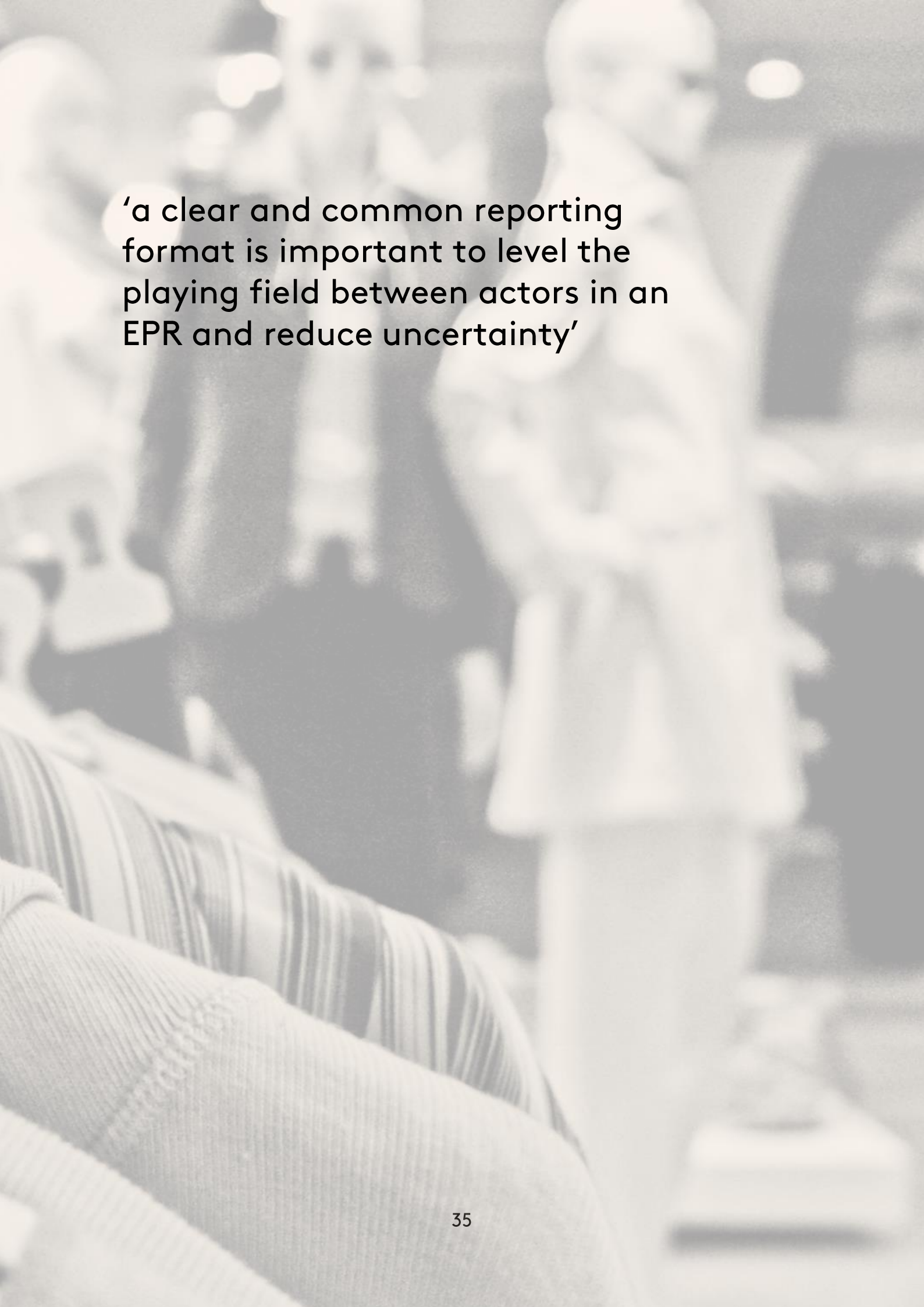
Position in flow chart	Description	Quantity	
A	**Collected amounts of original textiles** (please distinguish between in-store, container, kerbside collection and other collection options)	**Original textiles** (tonnes/ year)	**Textiles** (tonnes/ year)
	In-store collection		
	Container collection		
	Kerbside collection		
	Other collection options		
B	(Pre)-sorted / Re-loaded amounts		
	...of which is sent to:		

B1	Recycling		
B2	Energy recovery		
B3	Incineration without energy recovery or landfill		
C	Amounts sent to sorting abroad		
	...of which is sent to:		
C1	Second-hand sale in the sorting country		
C2	Second-hand sale in a third country		
C3	Recycling		
C4	Energy recovery		
C5	Incineration without energy recovery or landfill		
D	Second-hand sale in the collection country		
$(C1+C2+D)/A_{textile}$	Re-use rate percent	percent	
$(B1+C3)/A_{textile}$	Recycling rate percent	percent	
$(C1+C2+D+B1+C3)/A_{textile}$	Re-use and recycling rate	percent	

The voluntary commitment received broad support from collection actors, including charities and municipalities. Trials with collection, certification and third-party audits were conducted, as well as legal assessment of the developed criteria. However, the project was not able to find an actor willing to take the role of Certification system operator to continue operation (Fråne et.al 2017).

We believe that a clear and common reporting format is important to level the playing field between actors in an EPR and reduce uncertainty. It ensures transparency and traceability of the material through the value chain from collection to end use of the collected material and provides a good basis for detailed statistics and follow up of progress. Third party audits are critical to ensure compliance but may be costly. Depending on the setup, funds from the EPR could be used to cover these costs.

With a mandatory EPR in place, it feels logical that the Swedish EPA should assume the role of system operator, similar to the way it operates the EEE register connected to the WEEE Directive implementation today. The EPA could also instruct another public body or independent actor to take the role of system operator on their behalf.



‘a clear and common reporting format is important to level the playing field between actors in an EPR and reduce uncertainty’

5. Stakeholder views on a textile EPR system

The input from stakeholders was collected through a workshop and complementary interviews. The stakeholder dialogue in MFF task 4.3.7 pointed out the following important aspects for a mandatory EPR:

- Minimum quality criteria for producer responsibility organisations (deal breaker)
- Certification of involved actors (deal breaker)
- Logistics for collection and sorting (deal breaker)
- Cooperation between different actors in the value chain

To add to these mainly downstream focus topics, the aspect of upstream effects was added to the workshop program.

5.1. Workshop

Based on previous work and dialogue with the textile value chain stakeholders in task 4.3.7.1 (Elander et.al. 2017), investigation by the Swedish EPA (Naturvårdsverket,2016) and other studies, a workshop was arranged to discuss a future Swedish EPR system. The goals of the workshop were:

- To share previous research and experiences related to textile EPR systems.
- Receive input from stakeholders regarding organisation of collection and the balance between upstream and downstream targets and measures.
- Provide input to the political discussion on the Swedish EPR from multiple stakeholders.

During preparation of the workshop a model was developed to illustrate the flexible scales of collection responsibility and upstream vs downstream focus, see figure 5 Illustration of the flexibility in EPR setup relating to collection responsibility and upstream vs downstream focus.. The letters A-D represent different possible directions of a future EPR legislation.

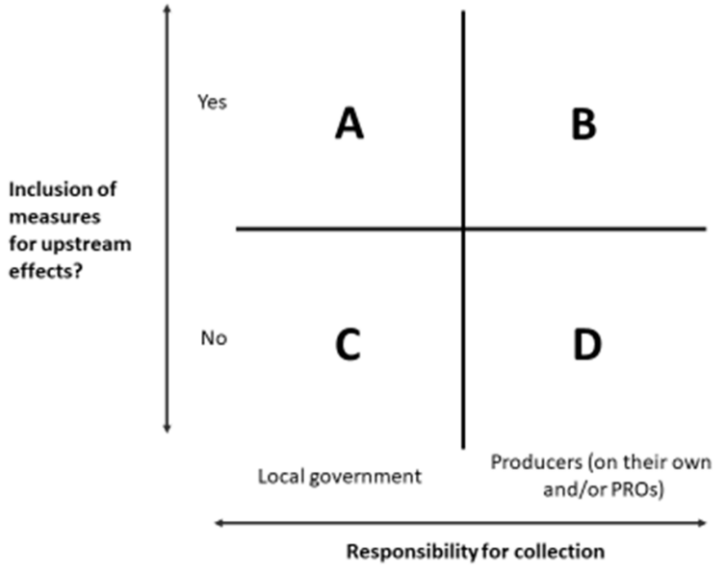


figure 5 Illustration of the flexibility in EPR setup relating to collection responsibility and upstream vs downstream focus.

Around 50 stakeholders were invited, and 23 people attended the workshop, representing the following stakeholder groups and organisations:

table 5 Workshop participants per stakeholder group

Stakeholder group	Organisations represented
Producers/retailers	HM, Lindex, Stadium, Filippa K, KappAhl, ICA, Swedish Trade Association (Svensk Handel)
Waste management, collection, sorting	Sysav, Stockholm Vatten & avfall, Eskilstuna Energi och Miljö, Avfall Sverige, Wargön Innovation
Recyclers	Re:newcell, Swedish Recycling Industries (Återvinningsindustrierna)
Municipalities/regions	Region of Gothenburg (Göteborgsregionen)
Charity organisations	Myrorna, Röda korset, Human Bridge
Government	Swedish EPA, Ministry of Environment
Research	Mistra Future Fashion, Högskolan Borås, IVL

The diversity of represented actors was very positive for the discussions, since many different views and positions were provided. This helps the understanding of the complexity of the different issues related to an EPR and increases understanding and exchange of knowledge between actors.

The agenda for the workshop was divided into two blocks, both including a presentation and group discussions. The presentations covered a short introduction to MFF, an overview of previous studies related to used textile management and EPR, targets and measures for upstream and downstream effects, related aspects of an EPR system presented by MFF task 4.3.7.1. and some learnings from the French EPR for textiles as found in WRAP (2018).

Following the presentation, the participants were divided into five groups, mixing stakeholders from different organisations as much as possible to get diverse views in each group. Each group selected a secretary to take notes and a reporter to provide a summary of their discussions to the other groups.

The discussions covered the following two themes: 1) organisation of collection, and 2) EPR goals and measures. The summary of the discussion is presented below.

5.1.1. Discussions regarding organisation of collection

The first discussion session related to organisation of collection, based on the following questions:

1. **How can physical collection be arranged within an EPR system for textiles? What roles can the following stakeholders take:**
   - Government
   - Municipalities and municipal waste management companies
   - Charity organisations
   - Producers, brand owners, retailers

2. **What are the pros and cons of putting overall collection responsibility on municipalities vs producers? Think about the following aspects:**
   - Fulfilment of collection, reuse and recycling targets
   - Consequences for collectors (municipalities vs producers)
   - Consequences for consumers
   - Consequences for charity organisations
   - Control and transparency issues

3. **What can be learned from existing EPRs and municipal collection systems? (additional question)**

4. **How could internet purchases from abroad be covered by an EPR? (additional question)**

The focus for discussion was on the first two questions, and only a few groups had the time to discuss questions three and four. Stakeholder views from the first discussion are summarised in table 6.

table 6 Views from the workshop discussion about organisation of collection.

Question	Stakeholder views
1. **Organisation of collection and roles of stakeholders**	• One central Producer Responsibility Organisation (PRO) should have the main responsibility for organising a collection system. • The EPA is responsible for approving the collection system and control fulfilment of criteria and targets. • Many different actors should be able to be involved as collectors to provide high coverage (municipalities, retailers, second hand actors etc.) Actor cooperation should be regulated in contracts and through payments. • The collection system should be easy to use and convenient for consumers; an app with collection points and instructions is one suggestion. • Important to regulate which actors are responsible for information to consumers. • Regional adaptation to address challenges in areas with low population density will be needed. • Quality criteria/certification for collectors are important to ensure professional collection. • Handling of collected textiles should not be limited to certain actors: flexibility is needed. • Clear definition of what should be included in collection is needed: how to handle shoes and accessories if they are not part of the EPR? • Shoes have a different value chain and will likely not be included (EPA view).
2. **Pro´s and con´s of collection responsibility of municipalities vs producers**	• Heavy administration for producers could occur if municipalities are responsible: avoid that each retail chain reports to each municipality where they are active. • Current municipal collection has been efficient: Eskilstuna collects about 4 kg/person/year after 1.5 years of operation. • Containers in recycling centres and kerbside collection are examples of safe collection systems that work well today. • Kerbside collection together with other waste fractions has challenges related to contamination, Eskilstuna are

	trying out new bag solutions since 10 – 20 percent of collected textiles are contaminated today.

It is interesting to note that the collection levels in Eskilstuna are already around 50 percent of the textiles discarded per person in Sweden each year. It is also not far from the French goal of collecting 4.6 kg per person and year (Bukhari et. al. 2018).

5.1.2. EPR goals and measures

The following questions were used to guide the second discussion on EPR goals and measures:

1. **List the following goals of EPR in order of priority:**
   - Divert used textiles from energy recovery
   - Increase reuse if textiles in Sweden and abroad
   - Stimulate fibre- to- fibre recycling for non-reusable textiles
   - Reduce the consumption of "fast fashion"
   - Create new jobs
   - Other?

2. **What measures can be used to achieve the different goals?**

3. **What goals are most difficult to achieve?**

4. **Are there goals that cannot be achieved if collection is organised by producers or by municipalities? (additional question)**

The fourth question was not discussed. table 7 summarises stakeholder views on the three first questions.

table 7 Views from the workshop discussion about ERP goals and measures.

Question	Stakeholder views
1. List EPR goals in order of priority	• Two of the groups listed goals in line with the waste hierarchy: 1: Avoid waste: divert from incineration, reduce "buy and throw away" behaviour and increase lifetime of textiles 2: Increase reuse in Sweden and abroad 3: Stimulate recycling 4: Create jobs

	Additional targets: - Stimulate circular design - Improve motivation and knowledge in consumers!
2. Measures to reach targets	• Clear regulation of which actors can do what, combined with transparency. • Increased communication/information can be used to change behaviours. • Differentiated fees based on chemical content, recyclability/circularity and climate impact. • Do not forget the charity actors and always encourage the best path environmentally (reuse first etc.) • Stimulate markets! • Producers need to use recycled fibres and make supply chains more efficient! • PRO fees should finance technology development. • Set PRO fee based on what is produced rather than what is put on the market, to avoid overproduction. • Economic incentives should be given to business models for reuse/circularity!
3. Most difficult targets	• Influencing customer behaviour (buy & throw) • Increase fibre-to-fibre recycling

When answering the first question, some actors suggested that the job creation target should be taken out and should not be in focus. Others argued that it is a side effect. There were strong opinions that the concept "fast fashion" should not be used. Stakeholders preferred to call if "buy and throw behaviour".

5.2. Complementary interviews

To add to the opinions obtained at the workshop, five telephone interviews and two email interviews with selected stakeholders were conducted. The aim was to give each stakeholder more time to develop their detailed opinions and standpoints. The following stakeholders were interviewed:

table 8 Interviewed stakeholders

Stakeholder	Type of stakeholder	Abbreviation
Återvinningsindustrierna	Recyclers (private)	ÅI
Svensk Handel	Retailer organisation	SH
TEKO, Sveriges Textil och Modeföretag	Producer organisation	TEKO
Myrorna	Charity organisation	MY
Stockholm Vatten och Avfall	Waste management, collection, sorting	SVOA
Avfall Sverige	Waste management, collection, sorting	AS
TexAid	Charity organisation	TA

The interviews were structured around the following six questions, but did not require each stakeholder to answer all of them:

- What should be the main goal of a producer responsibility?
- How should collection be organised?
- Which actors can / should be included in a collection system?
- What requirements should be placed on a collection system?
- How can upstream effects be addressed (e.g. increased life and use, more recycled content, design for repair / recycling and reduced consumption)?
- Can such effects be achieved with a producer responsibility?

Additionally, a representative from Göteborgsregionen was interviewed specifically about their learnings from a project testing different collection opportunities in municipalities (Hellström 2019). The results from that interview are presented above in section 4.3.

Input from the interviews is summarised in table 9 below. Views not directly related to the six questions are listed as “additional views”.

table 9 Stakeholder views interviews

Question	Stakeholder views
What should be the main goal of a producer responsibility?	• Focus on circularity! Increased reuse must be promoted (AS, Myrorna, ÅI) • Ensuring that there are reuse and recycling markets available to absorb and valorise the material is key and should be solved before an EPR is introduced (SH) • Ensuring that more material gets collected and recycled through a meaningful recycling (TA). • The EPR should raise money to fund new sorting and recycling capacity that ensures valorisation by increasing both reuse and recycling (SVOA) • Not in favour of a "traditional" EPR focused of collection and recycling (TEKO, ÅI) • Internet trade must be included (SH) • Regulation on EU level would be preferable (AS, SH)
How should collection be organised?	• Municipalities should have main responsibility (will be the case if current regulation is not changed), but other parties could also be involved in collection through contracts or procurement (AS, SVOA) • Collection and sorting need to be organised in a transparent manner and following the legal aspects in regards of public tenders. The collectors and sorters need to have a specific Certificate from the state making sure that they have the rights to handle waste from the state. Municipalities can make a tender to find the best suitable company for their collection and sorting of the ones providing this certificate (TA) • Transparency regarding funds and payments in the system is important (where is the money and what is it used for?) (SVOA) • The system must be able to collect large volumes (ÅI) • Many different actors should be allowed to collect textiles (TEKO, SH, Myrorna, ÅI) • Only the Sorters and Recyclers can make sure that the EU waste Hierarchy is followed (TA)

	• Ownership of material should not be limited to one actor. Fair and competitive market in focus (ÅI) • Collection in recycling centres (ÅVC), in stores and through charities all work well today and should be allowed to continue (SH) • Current municipal waste collection monopoly is sometimes hindering circular business models, like take-back of own brand textiles (TEKO, ÅI) • Kerbside collection systems provide better results (AS)
Which actors can / should be included in a collection system?	• Do not exclude voluntary/charity actors! (AS, ÅI) • Many different actors should be allowed to collect textiles (TEKO, SH, Myrorna, ÅI) • Municipalities, retailers, charities. Open for collaboration (SH, SVOA) • Retail & Brands, Sorters and Recyclers (TA).
What requirements should be placed on a collection system?	• Needs to be easy and convenient for consumers (SH, SVOA, TA) • The sorting should follow the EU waste hierarchy and should be audited and reported according the EU Waste hierarchy (TA). • The collected material must be protected from theft and moisture (SVOA) • Transparency and traceability of amounts and amounts to reuse and recycling is very important (SVOA, Myrorna, ÅI) • Try to balance transparency and reporting administration: the latter should not be too heavy, to avoid "killing" companies (TEKO, ÅI) • Certification is needed to ensure transparency (SH, SVOA, Myrorna) • The system should carry its own costs or generate profit (Myrorna, SVOA) • Control and audit by responsible authority must be better than for previous EPRs (e.g. packaging) (AS)

How can upstream effects be addressed?	• Product requirements/eco design requirements for textiles put on the market are needed (AS) • Promote recyclability and use of recycled fibres (ÅI) • Part of the fees used in a fund for research and innovation (SVOA) • Fee per garment rather than per ton, and differentiate between garment sizes (SVOA) • Information to improve public awareness of environmental impacts of textiles (Myrorna) • Make reuse more diverse, attractive and trendy through incentives (Myrorna) • When markets and technologies for recycling are in place, these will govern how upstream effects should be designed, e.g. what eco design measures are needed (SH) • Create incentives for Retailer and Brands, to make the products (pieces or amounts) which they put on the market: - Designed for Recycling - Using Recycled fibres in their Products - Other measures making sure that the Textiles industry is moving towards a closed loop (TA)
Can such effects be achieved with a producer responsibility?	• Product requirements can partly be included in an EPR, but issues related to the EU inner market could be problematic (AS) • It may be difficult to modulate fees to promote environmentally friendly garments (SVOA) • Provide economic incentives to producers who work with greener production etc. (SVOA) • Additional economic incentives and investments in recycling technologies are needed (ÅI) • Incentives to producers can be created within an EPR (TA)
Additional views	• Set out a long-term Swedish strategy, but do not "lock in" the development through a rigid EPR: adaptive and flexible legislation is desirable (ÅI, SH, TEKO) • Waste/reject fractions that cannot be reused or recycled should be incinerated in Sweden to avoid landfilling in other

	countries (Myrorna) • No specific target for reuse should be set in the EPR, but improved handling should be followed up continuously (Myrorna) • Chemical content is difficult to regulate through an EPR (and difficult in general) (ÅI) • When designing an EPR, it is important to avoid competition between reuse and recycling. Today this is not a problem, but it may become an issue in the future if large scale recycling is then available. Reuse shall always have priority (ÅI, AS)

A general conclusion from the combined stakeholder input is that all actors are highlighting the importance of upstream effects. Harmonisation at EU level is mentioned by many actors. One large Swedish actor, IKEA, promotes an European EPR for textiles to avoid diverse legislation and heavy administration[20].

The question that really divides actors is the one regarding ownership of material and municipal waste collection monopoly. The right of companies to set up their own circular models for reuse and recycling of the products they put on the market is raised by many industry actors, including IKEA, SH, ÅI and TEKO. The actor's positions on organisation of collection are mainly in line with the referral responses to the Government investigation in 2016 (Naturvårdsverket 2016), which is interesting to see. Producers and recyclers are more in favour of putting overall collection responsibility on producers, while charities and municipalities think that local government should be responsible (see also **Fel! Hittar inte referenskälla.** in the following chapter).

[20] IKEA position paper 2019

6. Discussion

This chapter discusses the summarised findings from the work conducted, with focus on stakeholder input.

6.1. Upstream effects

Stakeholders mention a number of measures to achieve upstream effects; promoting recyclability and use of recycled fibres, funding research and innovation, and using an item based fee with levels depending on garment size, like in the French EPR. An item-based fee based would be more transparent than a weight based fee with regard to what types of textiles are put on the market, but requires more administration in the system.

Modulated fees are seen as difficult to introduce by one actor, but given that this is included in the revised Waste Framework directive it will probably be introduced in more EPRs in the future. As an example, one of the Swedish PROs for packaging, FTI, introduced modulated fees in early 2019. Lower fees were introduced for packaging fulfilling a number of recyclability criteria, in line with specific guidelines created by FTI[21]. The analysis of modulated fees in section 4.2.4 concludes that a number of standards and certification schemes exist that could be used as verification for modulation to promote recycled content and durability. Regarding recyclability, no relevant standard or certification exists today, which makes introduction of modulated fees according to ease of recyclability difficult.

The level of producer fees is a complicated matter. With reference to the French experience, it seems that modulation need to be substantial in order to have any major impact. Our analysis suggest that the standard producer fee would likely need to be in the order of at least 2-3 percent of the product market price for modulation to make a difference. It seems unlikely that such a price would meet the requirements of Article 8 (4c) of the revised WFD;

*'Member states shall take the necessary measures to ensure that the financial contributions paid by the producer of the product to comply with its extended producer responsibility obligations... **do not exceed the cost that are necessary to provide waste management services in a cost-efficient way**.'*

Further analysis is needed on this issue in order to find out whether article 8a (4c) overrides Article 8a (4b) on modulation (see Appendix 1).

Information to consumers about environmental impacts of textiles should also be used to promote reuse as normal and mainstream in Sweden and reduce consumption of new textiles. It is important for the legislation to clarify which actors are responsible for the information to consumers and outline what types of information should be included.

[21] https://www.ftiab.se/2509.html

There are mixed opinions regarding to what extent the upstream effects can be achieved through an EPR; some actors think that at least partial effects can be achieved, while others say that additional measures and initiatives are needed. The upstream effects that actors see as most difficult to achieve are control of chemical content, influencing consumer patterns and increasing fibre to fibre recycling. Increasing (F2F) recycling capacity could however be supported by funds from PRO fees, which is also suggested by some actors.

6.2. Balancing upstream and downstream

In prioritising between goals, most stakeholders agree that upstream impacts are most important, and that circular business models and sustainable consumption should be supported. The waste hierarchy and circularity principles should be used as guidelines when setting priorities. This would mean that job creation would not be in focus, as in the French EPR.

There are different views regarding whether specific goals for reuse should be included in the EPR, but most actors seem to believe that reuse levels at least need to be reported. We argue that levels of national reuse should also be reported in order to follow up development towards the more general government goal of drastic increase of reuse in Sweden. A more ambitious level of reporting could include final destination countries for all collected textile volumes, divided into reuse, recycling and incineration or landfill.

Many stakeholders call for clear quality and transparency requirements in reporting. Full transparency, certification systems and third-party audits are mentioned. We believe that the reporting format and criteria suggested by Fråne et.al. (2017) (section 4.5) provides a good basis to start from when developing requirements. However, there is a strong fear among producers that the reporting transparency could come at a very high administrative cost. In this context, the importance of governmental audits and control mechanisms is viewed as very important by stakeholders, especially to avoid free riders who would benefit from avoiding the administrative burdens of transparency, and penalties are also suggested.

When it comes to organisation of collection, the interviews reveal more diverse positions of stakeholders than was evident the workshop discussions. The municipal waste collection monopoly is a divider where producers and private recyclers have different opinion than charities and municipalities. This is illustrated in figure 6, and compares well to the ongoing discussion between municipalities and producers about collection responsibility within the revised EPR for packaging[22].

[22] https://www.avfallsverige.se/pressmeddelanden/artikel/avfall-sverige-avbryter-samarbetet-tills-vidare-1/

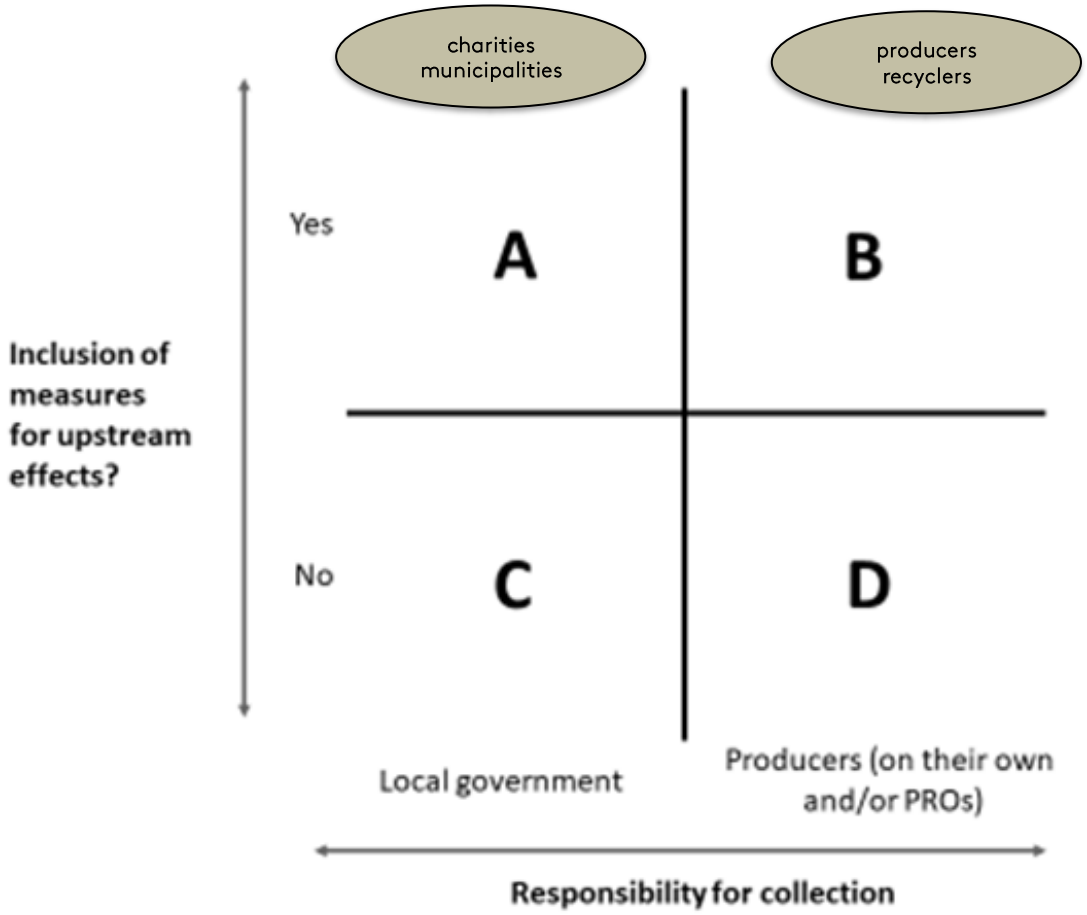


figure 6 Positions on collection responsibility divides different types of actors, while they agree on the importance of upstream effects.

We assume that an EPR would be an exception to the municipal waste collection monopoly, as is the case with other EPRs. It will then be up to the actors to arrange collection, and the requirements for a certified collection system will decide what type of collaborations are set up. Hopefully, clear directions on economic responsibility and the need of actors to cooperate to fulfil collection system criteria could help avoiding conflict in the textile EPR case. The value of the material and the costs for collection, sorting and treatment will have to be divided between the actors in the collection system. Continued dialogue between stakeholders should be promoted to find solutions that are accepted by all involved actors.

6.3. Critical voices

Some actors on the producer side are sceptical about the introduction of an EPR. They argue that a legislation is premature and that more reuse and recycling solutions need to be in place before national targets are set up. This is to some extent a typical "chicken and egg-problem", as at least the large investments needed in new recycling technologies are depending on sufficient volumes of material (as argued in Elander et.al. 2017).

The same type of actors also promote that Sweden should wait for a possible harmonised EPR legislation, which could potentially avoid the burden of separate reporting requirements and targets in different countries. However, differences may still occur with EU legislation, since each member state has some degrees of freedom regarding how the EPR directive is implemented in national law. One example is the WEEE directive, whose implementation differs greatly even between the neighbouring countries Sweden, Denmark and Norway (Kjellsdotter Ivert et.al. 2015).

Another concern expressed by stakeholders is the potential future conflict between reuse and recycling. This is another important reason to require separate reporting of reuse in the EPR legislation. Monitoring of trends in reported reuse levels, in combination with promotion of reuse and other upstream measures should limit the risk of reusable textiles going to recycling. Another option is to set goals for reuse in the legislation and stepwise increase those goals over time.

7. Recommendations

Based on the findings of this work we make the following recommendations for the further development of a Swedish EPR for textiles that balances upstream and downstream effects:

Upstream recommendations

- When producers opt for fulfilling their responsibility by being part of a producer responsibility organisation (PRO), include recycled material content and durability as criteria for fee modulation, with the requirement that fulfilment should be third party verifiable. The exact standards and certificates to be used can be decided by the producers constituting a PRO.

- Investigate further what levels of fees are possible to introduce with the aim of introducing fee modulation that would give a significant incentive for producers to engage in eco-design, taking into consideration the requirement stipulated under Article 8a (4a) of revised Waste Framework Directive (2018/851/EU) as well as experiences from existing EPR systems.

- Provide a possibility for a PRO to collect additional fees from producers to be used to research and development of fibre-to-fibre recycling technologies, if agreed by its members (i.e. producers).

- Impose strict penalties for free-riders and make regular audits to ensure fulfillment of requirements stipulated in the law.

- Continuously follow up national reuse rates and take measures if they decrease or do not increase.

Downstream recommendations

- Use a mandatory reporting by PROs on the shares of textiles that are reused and recycled and the share of these treatments that occur within Sweden and outside of Sweden. The type of recycling should also be reported: mechanical or chemical recycling.

- Include both targets for collection rates for post-consumer textiles, as well as (flexible) targets for collection systems to ensure convenience. The latter could include minimum collection point densities, minimum door-to-door collection frequencies or similar, but should allow some freedom of choice in the design of collection systems.

- Formulate quality and transparency requirements and structures for authorised collection systems that allow different partners to take part in collection and handling. The format from Fråne et. al. (2017) could be used as a basis.

- Clarify which actors should bear the costs for collection, recycling and provision of information to consumers.

- Provide clear definitions of reuse and recycling (chemical and mechanical), point out where in the material handling chain reuse and recycling should be measured and prescribe how it should be measured.

Other recommendations:

- Promote, through economic incentives as well as use of various informative instruments, new business models for prolonged lifetime, reuse, remanufacturing and higher use frequency of textiles. The tax reduction for repairs is a good example.

- Include education about mending and remaking of textiles in school curricula.

- Keep a regular dialogue with all stakeholders throughout the development of a new EPR for textiles.

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WRAP (2018) UK textiles EPR - How could a textiles Extended Producer Responsibility (EPR) system help prevent textile waste and divert used textiles from landfill in the UK?

appendix 1

'Article 8a of the revised Waste Framework directive[23]:

General minimum requirements for extended producer responsibility schemes

1. Where extended producer responsibility schemes are established in accordance with Article 8(1), including pursuant to other legislative acts of the Union, Member States shall:

(a) define in a clear way the roles and responsibilities of all relevant actors involved, including producers of products placing products on the market of the Member State, organisations implementing extended producer responsibility obligations on their behalf, private or public waste operators, local authorities and, where appropriate, re-use and preparing for re-use operators and social economy enterprises;

(b) in line with the waste hierarchy, set waste management targets, aiming to attain at least the quantitative targets relevant for the extended producer responsibility scheme as laid down in this Directive, Directive 94/62/EC, Directive 2000/53/EC, Directive 2006/66/EC and Directive 2012/19/EU of the European Parliament and of the Council (*4), and set other quantitative targets and/or qualitative objectives that are considered relevant for the extended producer responsibility scheme;

(c) ensure that a reporting system is in place to gather data on the products placed on the market of the Member State by the producers of products subject to extended producer responsibility and data on the collection and treatment of waste resulting from those products specifying, where appropriate, the waste material flows, as well as other data relevant for the purposes of point (b);

(d) ensure equal treatment of producers of products regardless of their origin or sise, without placing a disproportionate regulatory burden on producers, including small and medium-sised enterprises, of small quantities of products.

2. Member States shall take the necessary measures to ensure that the waste holders targeted by the extended producer responsibility schemes established in accordance with Article 8(1), are informed about waste prevention measures, centres for re-use and preparing for re-use, take-back and collection systems, and the prevention of littering. Member States shall also take measures to create incentives for the waste holders to assume their responsibility to deliver their waste into the separate collection systems in place, notably, where appropriate, through economic incentives or regulations.

3. Member States shall take the necessary measures to ensure that any producer of products or organisation implementing extended producer responsibility obligations on behalf of producers of products:

(a) has a clearly defined geographical, product and material coverage without limiting those areas to those where the collection and management of waste are the most profitable;

[23] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0109.01.ENG

(b) provides an appropriate availability of waste collection systems within the areas referred to in point (a);

(c) has the necessary financial means or financial and organisational means to meet its extended producer responsibility obligations;

(d) puts in place an adequate self-control mechanism, supported, where relevant, by regular independent audits, to appraise:

(i) its financial management, including compliance with the requirements laid down in points (a) and (b) of paragraph 4;

(ii) the quality of data collected and reported in accordance with point (c) of paragraph 1 of this Article and with the requirements of Regulation (EC) No 1013/2006;

(e) makes publicly available information about the attainment of the waste management targets referred to in point (b) of paragraph 1, and, in the case of collective fulfilment of extended producer responsibility obligations, also information about:

(i) its ownership and membership;

(ii) the financial contributions paid by producers of products per unit sold or per tonne of product placed on the market; and

(iii) the selection procedure for waste management operators.

4. Member States shall take the necessary measures to ensure that the financial contributions paid by the producer of the product to comply with its extended producer responsibility obligations:

(a) cover the following costs for the products that the producer puts on the market in the Member State concerned:

- costs of separate collection of waste and its subsequent transport and treatment, including treatment necessary to meet the Union waste management targets, and costs necessary to meet other targets and objectives as referred to in point (b) of paragraph 1, taking into account the revenues from re-use, from sales of secondary raw material from its products and from unclaimed deposit fees,

- costs of providing adequate information to waste holders in accordance with paragraph 2,

- costs of data gathering and reporting in accordance with point (c) of paragraph 1.

This point shall not apply to extended producer responsibility schemes established pursuant to Directive 2000/53/EC, 2006/66/EC or 2012/19/EU;

(b) in the case of collective fulfilment of extended producer responsibility obligations, are modulated, where possible, for individual products or groups of similar products, notably by taking into account their durability, reparability, re-usability and recyclability and the presence of hasardous substances, thereby taking a life-cycle approach and aligned with the

requirements set by relevant Union law, and where available, based on harmonised criteria in order to ensure a smooth functioning of the internal market; and

(c) do not exceed the costs that are necessary to provide waste management services in a cost-efficient way. Such costs shall be established in a transparent way between the actors concerned.

Where justified by the need to ensure proper waste management and the economic viability of the extended producer responsibility scheme, Member States may depart from the division of financial responsibility as laid down in point (a), provided that:

(i) in the case of extended producer responsibility schemes established to attain waste management targets and objectives established under legislative acts of the Union, the producers of products bear at least 80 percent of the necessary costs;

(ii) in the case of extended producer responsibility schemes established on or after 4 July 2018 to attain waste management targets and objectives solely established in Member State legislation, the producers of products bear at least 80 percent of the necessary costs;

(iii) in the case of extended producer responsibility schemes established before 4 July 2018 to attain waste management targets and objectives solely established in Member State legislation, the producers of products bear at least 50 percent of the necessary costs,

and provided that the remaining costs are borne by original waste producers or distributors.

This derogation may not be used to lower the proportion of costs borne by producers of products under extended producer responsibility schemes established before 4 July 2018.

5. Member States shall establish an adequate monitoring and enforcement framework with a view to ensuring that producers of products and organisations implementing extended producer responsibility obligations on their behalf implement their extended producer responsibility obligations, including in the case of distance sales, that the financial means are properly used and that all actors involved in the implementation of the extended producer responsibility schemes report reliable data.

Where, in the territory of a Member State, multiple organisations implement extended producer responsibility obligations on behalf of producers of products, the Member State concerned shall appoint at least one body independent of private interests or entrust a public authority to oversee the implementation of extended producer responsibility obligations.

Each Member State shall allow the producers of products established in another Member State and placing products on its territory to appoint a legal or natural person established on its territory as an authorised representative for the purposes of fulfilling the obligations of a producer related to extended producer responsibility schemes on its territory.

For the purposes of monitoring and verifying compliance with the obligations of the producer of the product in relation to extended producer responsibility schemes, Member States may lay down requirements, such as registration, information and reporting requirements, to be met by a legal or natural person to be appointed as an authorised representative on their territory.

6. Member States shall ensure a regular dialogue between relevant stakeholders involved in the implementation of extended producer responsibility schemes, including producers and distributors, private or public waste operators, local authorities, civil society organisations and, where applicable, social economy actors, re-use and repair networks and preparing for re-use operators.

7. Member States shall take measures to ensure that extended producer responsibility schemes that have been established before 4 July 2018, comply with this Article by 5 January 2023.

8. The provision of information to the public under this Article shall be without prejudice to preserving the confidentiality of commercially sensitive information in conformity with the relevant Union and national law.

(*4) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).';"