NATUR VÅRDS VERKET

Extended Producer Responsibility in Sweden

An overview of Extended Producer Responsibility in Sweden for packaging, newsprint, electrical and electronic equipment, batteries, end-of-life vehicles, tyres and pharmaceuticals

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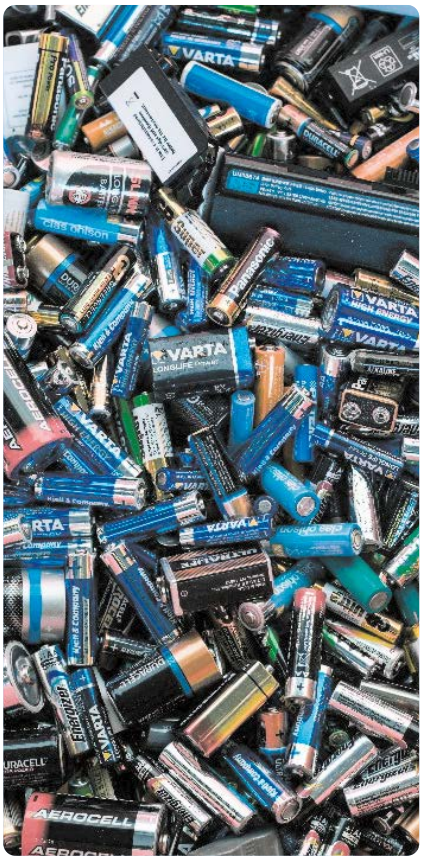

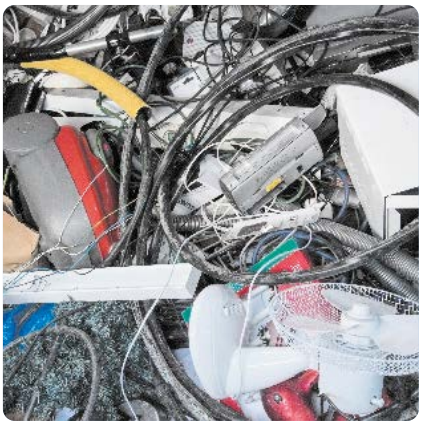

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Preface

The Swedish Environmental Protection Agency often receives inquiries from various international stakeholders who are interested in learning more about the Swedish experience from working with Extended Producer Responsibility.

Extended Producer Responsibility is a widely used environmental policy in which the producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. There are currently EPR schemes for seven product groups in Sweden: packaging, newsprint, electrical and electronic products, batteries, tyres, end-of-life vehicles and pharmaceuticals.

The purpose of this report is to provide an overview of the Swedish EPR schemes, to describe how they have developed over time and how they are currently organized and function.

The report has been produced by the International unit at the Swedish Environmental Protection Agency. Part of the report has been developed in cooperation with Miljö- och Avfallsbyrån i Mälardalen.

The Swedish Environmental Protection Agency would like to thank representatives of the producer responsibility organisations that have so generously shared their knowledge and insights of the producer responsibility system in Sweden. We also thank the Swedish Medical Products Agency and the Swedish Association for Pharmacies for their valuable inputs.

Stockholm 2020-10-07
Swedish Environmental Protection Agency

Martin Eriksson
Head of Policy Development Department, International unit

Contents

Abbreviations and expressions

EEE – Electrical and Electronic Equipment
EPR – Extended Producer Responsibility
EU- European Union
FTI – Förpacknings- och Tidningsinsamlingen (Packaging and Newsprint Collection Service)
PRO – Producer Responsibility Organisation
SEPA – Swedish Environmental Protection Agency
SDAB – Svensk Däckåtervinning
TMR – Tailor Made Responsibility
WEEE – Waste Electrical and Electronic Equipment

In the report the term "Producer Responsibility Organisation" or "PRO", is used frequently. This term refers to an organisation that is comprised of a group of producers. The organisational structure of these organisations can and does vary. In the report the term PRO is used regardless of the organisational structure. If producers are assembled in some type of organisation in order to fulfil their obligations as producers, the term PRO is used to describe this.

In this report the term "EPR specific targets" is used as a general term to describe the Swedish EPR legislative targets for EPR types of waste. These targets vary between the different EPR schemes and can include targets on collection rates, recycling or recovery, reuse or similar.

Summary

This report is a general account of different aspects of the Extended Producer Responsibility (EPR) for packaging, newsprint, electrical and electronic equipment (EEE), batteries, end-of-life vehicles, tyres and pharmaceuticals in Sweden. In addition, the final chapter of this report is dedicated to reflecting on the success of the Swedish EPR schemes and possible improvements.

In Sweden, the producers have ownership of the material, the infrastructure and the financing of the EPR scheme. The legislation, through ordinances for each EPR scheme, places the responsibility for the proper end-of-life management of waste products on the individual producers. However, in practice most producers work collectively to exercise this responsibility by setting up or affiliating themselves with Producer Responsibility Organisations (PROs).

The legislation mandates that collection systems, except for professional EEE, batteries and tyres, must have national coverage in order to give the entire Swedish population access to the systems. For producers of consumer EEE it is mandatory to be part of an authorised nationwide collection system. The same requirements will apply for packaging and newsprint in the future. Producers of batteries and professional EEE are required to be part of a collection system that does not need to have nationwide coverage. For pharmaceuticals another arrangement applies where individual pharmacies are required to take back proportionate amounts of discarded pharmaceuticals from households.

Most PROs in Sweden operate as not-for-profit companies, owned by individual producers or trade organisations within their respective EPRs. None of the organisations have a legislative monopoly but all operate on an open market. For some product groups there is, therefore, competition between the different PROs, namely for packaging waste and waste from electrical and electronic equipment (WEEE). Depending on the product group, the EPR schemes are financed by product fees that are added onto the retail price and/or income from sales of the recycled material. These financial transactions are, for most EPR schemes, administered by the individual PROs.

The EPR ordinances regulate the responsibility of the municipalities to inform the public about available collection systems for packaging, newsprint, WEEE and end-of-life vehicles. Regarding EPR for tyres and pharmaceutical waste, the municipalities have no defined responsibility to inform the public of available collection systems. Municipalities inform the public about collection systems for batteries in consultation with the producers.

The levels of collected and recovered (recycled) materials are relatively high and for many product groups, EPR specific targets are met or exceeded. In general, the producers have a well organised infrastructure for collection and recycling of EPR type of waste. Most PROs collaborate with the Swedish municipalities to enable households to easily drop off EPR products once they become waste.

1 Regulations and national objectives

1.1 Regulations

1.1.1 Overview

Sweden has a shared responsibility for managing household waste. The term *household waste* refers to waste originating from households and similar waste from businesses such as restaurants, shops, offices, etc. Each municipality is responsible for ensuring that household waste within the municipality is collected, transported and treated. Household waste that fall under municipal responsibility includes organic waste, residual waste, bulky waste and household hazardous waste. Commercial waste, on the other hand, is mainly handled through private collection and recycling service providers.

Waste covered by an EPR, i.e. waste disposed of in an EPR collection system that is separate from the residual household waste, is the responsibility of the producers (anyone who manufactures or imports a product that falls under the EPR legislation and makes it available on the Swedish market, see chapter 2.1). The responsibility of producers covers collection as well as recycling of EPR products once they reach their end-of-life stage and financing of the scheme.

1.1.2 EU directives

The overall legal framework regulating waste management in Europe is the Waste Framework Directive[1]. The overarching aim of the directive is to protect the environment and public health. The directive contains a description of the waste hierarchy and regulations on how to manage waste accordingly, requirements regarding permits, planning and reporting. The directive has been incorporated into Swedish law through the Ordinance on Waste Management and the Swedish Environmental Code.

Four EU directives regulate the management of end-of life vehicles, WEEE, batteries and packaging and stipulate the responsibility of the producers for their products. The aim of the directives is to harmonise national measures to tackle the end of life management of these product groups. This helps to both reduce the environmental impact of these products as well as to ensure the functioning of the EU's internal market. The directives have been implemented into national law in each member state, but exactly how this is done is not stipulated and thus differs across Europe. In Sweden, the EU directives on EPR have been incorporated into national law by separate ordinances on producer responsibility.

[1] Directive 2008/98/EC on waste.

Table 1. List of European directives and Swedish EPR ordinances connected to specific products. The list also contains product groups covered by voluntary EPR (office paper and farmers plastic) and other types of take-back systems (drinking bottles and cans).

Waste description	EU Directive	Swedish EPR ordinance	EPR start date
Packaging	94/62/EC	SFS 2018:1462	1994
Beverage Bottles and Cans[2]		SFS 2005:220	1982
Newsprint	-	SFS 2018:1463	1994
WEEE	2012/19/EU	SFS 2014:1075	2001
		SFS 2000:208	
Batteries	2006/66/EC	SFS 2008:834	2009
Tyres	-	SFS 1994:1236	1994
End-of life vehicles	2000/53/EC	SFS 2007:185, SFS 2007:186	2007
Pharmaceuticals	-	SFS 2009:1031	2009
Office Paper		-	1997
Farmers' Plastic		-	Unknown

1.1.3 Swedish ordinances for EPR

The EU directives have been implemented into Swedish law through ordinances for EPR for packaging, EEE, batteries and end-of-life-vehicles. In addition to the product groups regulated by the EU, Sweden has producer responsibility for another three product groups newsprint, tyres and pharmaceuticals[3]. Furthermore, there are ordinances for deposit system for drinking bottles and cans and for car scrapping.

Many EPR ordinances, such as EPR for packaging and EEE, are well elaborated in terms of legislative requirements, while others, such as EPR ordinances for tyres and pharmaceuticals, are rather brief. Therefore, the requirements stipulated in the ordinances differ. Most EPR ordinances include information on who is considered a producer, the definition of the respective product category and responsibilities of the producers. Most EPR ordinances also have EPR specific targets as well as requirements for collecting EPR type of products once they become waste, reporting and information to households. For some EPRs, such as packaging and EEE, there are also requirements regarding product design.

1.1.4 Voluntary EPRs

The voluntary producer responsibility schemes for paper and farmers' plastic is not regulated by law and therefore not covered in this report.

[2] Beverage bottles and cans are part of the packaging waste EPR. The ordinance regards the collection system and not the EPR.

[3] The definition of pharmaceuticals in the ordinance "Förordning (2009:1031) om producentansvar för läkemedel" is the same as in the law "Läkemedelslag (2015:315)".

1.1.5 Deposit return system for ready-to-drink bottles and cans

Ready-to-drink bottles and cans are covered by a supplementary ordinance in addition to the packaging EPR scheme detailing the deposit return system of plastic bottles and metal cans. The collection system for this material differs from the other types of EPRs described in this report in that the consumer pays a deposit upon purchase and receives the deposit back upon the return of the empty plastic bottle or metal can.

The deposit return system is not legally required for bottles and cans of beverages consisting mainly of dairy products or vegetable, syrup mixed with water, fruit or berry juice. However, some producers of such beverages are part of the deposit return system on a voluntary basis. For producers of beverages consisting mainly of dairy products or vegetable, syrup mixed with water, fruit or berry juice and who are not voluntarily part of the deposit return system, the EPR for packaging applies.

1.2 Changing regulations for packaging and newsprint EPRs

The ordinances for packaging waste and newsprint were updated in 2018 following several governmental investigations over the past fifteen years with the aim of improving the collection rate from households. A long-standing issue has been whether the responsibility for collection of certain types of EPR waste should be transferred from the producers to the municipalities, namely packaging and newsprint. The idea behind this suggestion was that the municipalities would then have the possibility to synchronise collection of municipal household waste (residual and food waste) with the collection of packaging waste and newsprint, thus bringing the collection service to the doorstep (see Appendix 1 for information on how waste covered by some EPR schemes is currently collected). This proposal was never adopted in parliament but because the issue of improving collection rates had gathered momentum, the ordinance was instead revised to mandate the producers to essentially provide a nationwide doorstep collection system for packaging waste and newsprint. The government stated that the ambition of the new regulations on producer responsibility for packaging and newsprint is to have a more accessible collection for citizens in order to increase the sorting and recycling of more materials.

1.2.1 Authorised collection system for packaging and newsprint and requirement to collect packaging waste and newsprint closer to residential properties

The updated ordinance from 2018 stipulates that a permit is required to operate a collection system for packaging waste and newsprint. A permit can only be granted if the collection system includes packaging waste of all materials and newsprint, is appropriate, offered nationwide, easily accessible and free of charge for the user.

The ordinance also stipulates that the authorised collection system must enable collection closer to residential properties by essentially providing doorstep collection. The aim is to make it easier for households to sort packaging and newsprint at the source. The ordinance from 2018 stipulates that from 2021, 60 % of all residential properties must be offered a collection point near the house or neighbourhood block e.g. doorstep collection. From 2025, the target set in the ordinance is for all homes to be offered this opportunity.

If there is a reasonable objection, such as residential areas where traffic is to be avoided, a property owner may be exempt from the doorstep collection system and the producers may set up a collection system near the property instead, for example in the neighbourhood block.

Compared to the current collection system mainly using green recycling stations (See Appendix 1 for more information), the new requirements will lead to significant increase of doorstep collection of packaging waste and newsprint.

Since the new ordinance entered into force in 2018, some uncertainties were raised if the targets regarding the doorstep collection could be met within the set timeframes. Currently, no collection systems have been authorised by SEPA. Since no collection systems have been authorised and there is uncertainty if the targets can be met by set timeframes, the Ministry of Environment has decided on several transitional periods for the 2018-year ordinance. It is currently unclear when a large-scale doorstep collection will be implemented.

1.2.2 Abolishment of EPR for newsprint

In spring 2020 the Swedish government announced the intention to abolish the EPR scheme for newsprint. Currently, no formal decisions have been made on the abolishment of the EPR for newsprint. However, the Ministry of Environment has proposed that the Swedish municipalities become responsible for the collection and recycling of newsprint starting from year 2022. Since the EPR scheme has not been abolished it is included in this report.

1.3 National objectives

1.3.1 Environmental objectives

In 1999, the Swedish government decided on 15 (now 16) environmental objectives underpinning the overarching generational goal to ensure that the major environmental issues are dealt with now and not left for future generations. These environmental objectives form the basis for the environmental efforts in Sweden and range from climate change to aquatic life, forests and groundwater quality. Waste management is mainly included in three of the objectives – reduced climate impact, a well-built environment and a non-toxic environment. The producers within the EPR schemes have an important role to play when it comes to achieving these goals.

1.3.2 EPR specific objectives

EPR schemes for packaging, newsprint, batteries, EEE and end-of-life vehicles have targets concerning either collection rate and/or rate of material recovery or similar. The targets are defined within each EPR ordinance. The only EPR schemes without national targets are the ones regarding tyres and pharmaceutical waste. For tyres, the producers have set their own targets for collection and material recovery. In Appendix 2, the material recovery targets for all EPR schemes in Sweden are compiled.

Figure 1. Every day 700 tonnes of glass are received at the glass recycling facility.
Photo: Svensk Glasåtervinning.

Each year the producers or the PROs report the collection and recycling data regarding their products to the SEPA who in turn reports this information to the EU[4]. See chapter 8 for more information on compiling data and reporting.

[4] Annual reporting to the SEPA does not apply to pharmaceuticals.

2 Overview of Extended Producer Responsibility in Sweden

2.1 Definition of producers

The definition of who is to be considered a producer varies depending on the product group. Generally, a producer is anyone who manufactures or imports a product that falls under the EPR legislation and makes it available on the Swedish market. When it comes to packaging material, pharmaceuticals and tyres, the definition also includes retailers who sell the products to the end consumer.

Packaging – A producer is anyone who either a) fills or otherwise uses a package that is not a service package[5] for the purpose of protecting, presenting and facilitating the handling of a product, b) brings a packaged item to Sweden or c) manufactures a package in Sweden or brings a package to Sweden.

Ready-to-drink bottles and cans – Anyone who professionally fills ready-to-drink beverages into a plastic bottle or metal can or who professionally to Sweden brings a ready-to-drink beverage in a plastic bottle or metal can must ensure that the bottle or the can is part of an approved return deposit system, if the bottle or the can is intended for the Swedish market. Beverages consisting mainly of dairy products or vegetable, fruit or berry juice are exempt from this rule.

Newsprint – A producer is anyone that a) professionally manufactures newsprint in Sweden, to be sold on the Swedish market or b) brings newsprint or paper for newsprint to Sweden, to place on the Swedish market.

EEE – A producer is anyone who professionally either imports or produces electrical or electronic equipment in Sweden and makes this available on the Swedish market for the first time. The definition of a producer does not cover retailers or distributors, who do not themselves import or produce electrical or electronic products.

Batteries – A producer is anyone who professionally places batteries on the Swedish market for the first time.

End-of-life vehicles – A producer is anyone who professionally either imports or manufactures cars.

Tyres – A producer is anyone who professionally either imports, manufactures or sells tyres. Tyres that are part of an end-of-life vehicle are included in the EPR for end-of-life-vehicles.

Pharmaceuticals – A producer is anyone who is authorised to sell pharmaceuticals, i.e. pharmacies.

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[5] A service packaging is a packaging that is filled at the time of sale or used for unprocessed products from agriculture or the horticultural industry.

Table 2. Overview of who is considered a producer in the EPR.

EPR	Produce	Import	Sell	Fill
Packaging	X	X	X	X
Ready-to-drink bottles and cans	X	X	X	
Newsprint	X	X		
WEEE	X	X		
Batteries	X	X		
End-of-life vehicles	X	X		
Tyres	X	X	X	
Pharmaceuticals			X	

2.2 Understanding Sweden

To understand how EPR has developed in Sweden it is necessary to understand a few key features about Sweden and the Swedish people.

Sweden has a population of approximately 10 million with densely populated regions such as Stockholm (2.3 million) and Gothenburg (1 million), as well as rural areas and smaller cities. In contrast to the densely populated regions in the south, the northern half of the country is home to only one tenth of the population, most of whom live in cities along the coast, leaving vast, sparsely populated inland areas with their own challenges. Except for the larger cities, space is generally not a major limitation when it comes to waste management.

There are 290 municipalities, ranging from only a few thousand inhabitants to several hundred thousand. Each municipality has a high degree of self-governance in the areas of, for example, schools, healthcare and waste management. The municipalities have a comprehensive responsibility regarding waste management for household waste and about 80 % of all municipalities carry out separate collection of food waste. All municipalities have public recycling centres where households can drop off bulky waste after sorting them into several waste fractions. Less than 1 % of household waste is landfilled while the rest of the waste is either recycled or sent to energy recovery facilities and used as fuel for district heating and/or to produce electricity. Swedish people are generally keen recyclers and the amount of household type of waste each person generates have levelled off over the past five years[6].

A characteristic trait of Swedish society is that most people trust and respect authorities as well as laws and regulations. In addition to being considered an educated nation, Swedes also have generally easy access to nature and green areas. These are likely contributing factors to the high environmental awareness and support for environmental protection policies among the general population.

[6] Avfall Sverige. Svensk Avfallshantering 2018 and Svensk Avfallshantering 2017.

In addition, the decision-making process in society is typically accomplished through consensus, with clear processes ensuring different viewpoints are heard. This results in a generally good cooperation between the public and private sectors.

2.3 Description of the Swedish EPR system

EPR is a policy tool whereby producers take responsibility for the end-of-life management of their used products. This includes not only the obligation to finance an appropriate collection and recycling system for the products once they reach their end-of-life stage, but to also consider design for recyclability, waste minimisation and removing hazardous substances from products. The purpose is to shift the responsibility and the cost for the waste management of certain products from the municipalities to the producers and to provide incentives for producers to incorporate environmental considerations into the design of their products.

As stated in previous chapter, Sweden has EPR schemes for seven[7] product groups: packaging, newsprint, EEE, batteries, tyres, end-of-life vehicles and pharmaceuticals. There is also a supplementary ordinance detailing a deposit return system for ready-to-drink bottles and cans. In addition, there are also voluntary commitments to collect office paper and farmers' plastic.

The Swedish EPR schemes are regulated in specific ordinances and the responsibility for the end-of-life management of waste products falls on the individual producers. Through the EPR ordinances, the producers are obligated to provide collection systems for their products once they reach their end-of-life stage. As such, the producers have ownership of the material, the infrastructure and the financing of the system. This setup gives the producers full accountability and provide incentives to minimise the environmental impact of their products. This is one of the major reasons for choosing this model for EPRs. Also, producers for packaging, newsprint, EEE, batteries and end-of-life vehicles are required to reach EPR specific targets. The EPR specific targets vary between the EPR schemes and can include targets on collection, recycling or recovery, reuse or similar. See Appendix 2 for more information on EPR specific targets.

All EPR collection systems, except for professional EEE, batteries and tyres, must have national coverage in order to give the entire Swedish population access to the systems. For producers of consumer EEE it is mandatory to be part of an authorised nationwide collection system. In the future, same requirement will apply for packaging and newsprint[8]. Producers of batteries and professional EEE are required to be part of a collection system that does

[7] Radioactive products and stray radioactive sources were covered by EPR until 2018 but was replaced by the ordinance *Strålskyddsförordning 2018:506* in 2018.

[8] If EPR for newsprint is not abolished, see chapter 1.2.2.

not need to have nationwide coverage. For pharmaceuticals another arrangement applies where individual pharmacies are required to take back proportional amounts discarded pharmaceuticals from households depending on the pharmacies turnover.

Most producers work collectively to exercise this responsibility by setting up or joining Producer Responsibility Organisations (PROs). If an individual producer does not join a PRO, the burden of organising a collection system to reach legislated EPR specific targets falls on the individual producer. There is no PRO for pharmaceuticals and the obligation to take back pharmaceuticals from households falls on individual pharmacies.

All the largest PROs in Sweden operate as not-for-profit companies, owned by individual producers or trade organisations within their respective EPRs. None of the organisations have a legislative monopoly but all operate in an open market. Therefore, for some product groups there is competition between the different PROs, namely for packaging, newsprint[9] and EEE[10]. All EPR schemes, except EPR scheme for pharmaceuticals and end-of-life vehicles, are financed by product fees that are added to the retail price and/or income from the sale of the recycled material. These economic transactions are generally administrated by the individual PROs. Collection and treatment of pharmaceuticals is financed by pharmacies.

2.4 Development of the EPR schemes

In the year 1994, packaging and newsprint were the first product groups to be covered by an EPR scheme in Sweden. The main purpose was to relieve the municipalities of the responsibility (and cost) of collecting and treating these products once they became waste as well as creating incentives for reducing the environmental impact of packaging and newsprint. At the time, the idea of a circular system where waste was viewed as a valuable resource, rather than just waste to be disposed of, was starting to develop.

A guiding principle when designing the EPR legislation was to give the producers full responsibility for their products in accordance with the polluter pays principle. The producers were given a large degree of freedom as to how to implement a take-back system as well as treatment of the waste and financing of the system.

[9] For packaging and newsprint, FTI and TMR.
[10] For WEEE, El-Kretsen and Recipo

Figure 2. Green recycling station for packaging and newsprint. Photo: FTI.

The establishment of EPR for packaging and newsprint was not the first occurrence of producers taking back their products. Waste materials such as newsprint, glass and end-of-life vehicles had already been collected for many years. The driving force was mainly financial as collecting waste products and recycling them required fewer resources and was more profitable than making new products from virgin materials.

Glass packaging

Glass packaging was the first product group to have an organised collection system. Sweden has a long tradition of glass production and in 1986, the organisation Svensk Glasåtervinning (Swedish Glass Recycling) was established by two of the major glass packaging producers in conjunction with several municipalities. The municipalities had an interest in the separate collection of glass to improve the health and safety of the waste collectors who were at risk of getting cuts from broken glass in the garbage bags. A system of special containers for glass was implemented and they were placed at strategic locations, such as outside of shops and in car parks. These locations later became the foundation of the system of green recycling stations adopted by the packaging and newsprint PRO (see section *Development of collection of packaging and newsprint in the EPR scheme*).

Newsprint

Take-back systems also existed for newsprint before the introduction of EPR. With a large area of forests, Sweden has had a long tradition of paper production and the industry was keen on collecting newsprint to be reused in paper production. In the beginning, collection was concentrated in profitable locations and there was most likely competition between different producers.

When EPR was introduced, the individual producers saw the value of coordinating the collection to provide a nationwide collection system and thus established a newsprint material company.

Development of collection of packaging and newsprint in the EPR scheme

When the EPR legislation was introduced, the major players within the packaging industry wanted to avoid having to deal with several different collection systems across the country and therefore decided to cooperate. Most producers of packaging materials organised themselves by forming four material companies, i.e. for glass packaging, metal packaging, paper packaging and plastic packaging. The material companies were created to avoid unfair competition between the different materials.

The material companies (together with the material company for newsprint) created an umbrella PRO called Förpacknings- och tidningsinsamlingen (or the Packaging and Newsprint Collection Service in English (FTI)) that was mandated to organize a collection system for packaging waste and newsprint. FTI organised a collection system by establishing green recycling stations[11] across the country where households could bring all types of packaging waste and newsprint. There was no requirement to organise the collection system in an umbrella PRO to comply with the EPR, but it has proved to be an efficient structure to fulfil the producer obligations. The producers of different materials benefit from the synergy that the collaboration brings.

The process of implementing a collection system for packaging waste and newsprint was fast. In 18 months, the organisational structure was in place and the green recycling stations were established across the country. However, this process was possibly too quick because it was largely completed without consultation or collaboration with the municipalities. This caused a long-standing tension in this relationship which, to some extent, persists to this day[12].

The establishment of green recycling stations was a much more complicated process than the predecessor of glass collection as these required building permits. A collaboration with the municipalities therefore became very important.

The collection system with green recycling stations is still in use with approximately 5000 green recycling stations in Sweden. However, it is unclear in what capacity green recycling stations will still be in use in the future when packaging and newsprint will need to be collected through an authorised collection system that essentially advocates doorstep collection from households. See chapter 1.2.1 for more information.

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[11] Regeringskansliet. Mer fastighetsnära insamling av förpackningsavfall och returpapper – utveckling av producentansvaren. 2018.

[12] FTI website and interviews with Frank Tholfsson (former CEO of the material PRO Swedish Glass Recycling) and Henrik Nilsson (planning director at the PRO FTI)

The structure of the packaging and newsprint umbrella PRO has laid the foundation for some of the other PROs that followed.

In 2005, a privately-owned PRO named Tailor Made Responsibility (TMR) started to collect packaging waste and newsprint. Currently, TMR provides doorstep collection of packaging waste and newsprint from households through agreements with several Swedish municipalities and from businesses and multi-family residential properties through agreements with private service providers.

Ready-to-drink plastic bottles and metal cans

A deposit return system for metal cans was established in 1984. The decision to introduce a deposit return system was mainly based on a concern for littering. In 1984 the packaging industry, the breweries and the retailers decided to form a PRO (today known as Returpack) that became responsible for the deposit return system for aluminium cans. Ten years later, in 1994, the deposit system was expanded to also included PET-bottles.

Today there is one PRO that has an approved national deposit return system for ready-to-drink beverages from plastic bottles and metal cans, Returpack.

Figure 3. Return vending machine for ready-to-drink bottles and cans at a grocery store. Photo: Returpack/Pantamera.

Wood packaging

There was a voluntary deposit system for wood packaging from businesses before the implementation of packaging EPR scheme. This voluntary system was abolished with the creation of the EPR scheme for packaging.

WEEE

Collection and recycling of WEEE was taking place before the introduction of the EPR. In the '90s many municipalities had separate collection of electronic waste and organised manual disassembling that provided jobs for people outside the regular labour market. When the recycling industry got interested in the economic value of the electronic waste, they started industrial scale recycling and the municipalities sent the collected WEEE to them instead. By the start of the EPR, there was already an existing collection system in place and a recycling market.

The first PRO for WEEE, El-Kretsen, was formed by the trade associations for EEE that already existed, and conveniently had offices in the same building. In 2007 a second PRO, Recipo, was established for WEEE with the purpose of offering an alternative for producers to fulfil their responsibilities.

Figure 4. Facility for analysing WEEE. Photo: El-Kretsen.

Batteries

Separate collection of batteries existed before the EPR was introduced in 2009. In the early '90s there was a voluntary take-back system for certain types of batteries (nickel cadmium) and some municipalities had some form of separate collection. However, the different systems were not very successful and in 1998 the municipalities were instead given the responsibility of arranging separate collection of all types of batteries as well as organising the treatment. The municipal take-back system was financed by a fee the battery producers had to pay. When the EPR was introduced much of the collection system was already in place[13].

End-of-life vehicles

Collection and treatment of end-of-life vehicles has been regulated since 1975. A fee was then added to the sales price of new cars and saved in a fund controlled by a government authority. Car owners were then given a refund when returning an end-of-life vehicle to an authorized treatment facility i.e. dismantler. The refund was intended to cover the costs of dismantling and to provide a small economic incentive for the car owner to scrap the vehicle, but the refund gradually became insufficient. This caused problems with abandoned vehicles on both private and public properties. In 1997 an EPR scheme was introduced but only covering cars put on the market after the date when the EPR scheme was introduced. The problem with abandoned end-of-life vehicles that were placed on the market before the introduction of EPR persisted. The producer responsibility scheme was extended in 2007 to give the producers full responsibility for financing and organising the collection and treatment of end-of-life vehicles and the refund system was abandoned[14].

Tyres

Before the EPR for tyres was introduced in 1994, tyres mainly ended up in landfills. Because of their physical structure tyres created cavities in the landfills that easily filled with methane gas resulting in increased fire risks. Such fires were very difficult to extinguish and could cause severe environmental damage. The purpose of the EPR was to address these issues and subsequently the number of tyres that were landfilled drastically decreased[15]. In 2002 a legislation prohibiting landfilling of combustible waste, which includes tyres, was implemented.

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[13] Regeringens skrivelse 1998/99:63, *En nationell strategi för avfallshanteringen*, 1998 and Betänkande av Batteriutredningen SOU 1996:8, *Batterierna – en laddad fråga*, 1996.

[14] Lagrådsremiss *Bilskrotningsfonden m.m.* 2006-11-30 and Bilsport.se. *Skrotningspremien på väg att höjas*, 2000-11-15.

[15] Statlig utredning SOU 2001:102, *Resurs i retur*. Sinikka Bohlin. 2001.

How the waste was handled prior to EPR

Before the various EPR schemes were introduced the waste was handled differently depending on the material and product, see Table 3.

Table 3. Summary of how the EPR materials were treated prior to the start of the EPR.

Material	Treatment prior to EPR	Year of EPR introduction
Glass	Widespread collection and recycling	1994
Newsprint	Widespread collection and recycling	1994
Paper, metal and plastic	Residual waste, mostly to landfill	1994
Beverage bottles and cans	Not available on the market[16]	1984, 1994
Wood packaging	Voluntary collection and recycling	1994
WEEE	Municipal collection and recycling	2001
Batteries	Municipal collection and recycling	2007
End-of-life vehicles	Regulated through legislation since 1975	2007
Tyres	Landfill	1994
Pharmaceuticals	Residual waste, to incineration	2007

2.5 EPR systems in other countries

EPR schemes are relatively common in many parts of the world, for example, EU legislation mandates EPRs for four product groups and many EU member states have adopted additional national schemes. There are also many ways in which an EPR scheme may be organised in a country, depending on the national context such as existing waste management systems and infrastructure. The main differences are:

- *Degree of competition* – whether there are competing PROs or just one, which can be defined in legislation.
- *Economic structure* of the producer organisations – whether they operate as not-for-profit or as profit-driven businesses.
- *Range of responsibility* – the extent and type of responsibility that falls on the producer organisations, for example managing collections and ownership of the material in addition to the financial responsibility.
- *Scope of EPR scheme* –type of waste that is included in the EPR scheme; household, commercial and industrial waste.

Degree of competition

It is not uncommon for there to be several different producer organisations within a country competing on an open market. An example of this is the EPR scheme for packaging in the United Kingdom where there are over 30 competing producer organisations. However, usually there are only one or

[16] Metal cans and PET-bottles were not permitted to be put on the market before the implementation of a deposit return system for metal cans and PET bottles.

two producer organisations within an EPR scheme, either competing directly or with a slightly different focus (e.g. targeting different types of packaging).

Economic structure

In many countries the producer organisations operate as not-for-profit organisations, which is the case in France and the Netherlands. However, in Germany, for example, many producer organisations are profit driven.

Range of responsibility

The set-up of an EPR scheme can, and does, vary greatly and has a large impact on the running operations of the producer organisations. At one end of the spectrum there is the "financial EPR scheme", which is when the municipalities are responsible for the collection and treatment of the waste and the producers are left with the financial responsibility. At the other, there is the "organisational EPR scheme" where the producers are in control of the whole chain of waste management, including collection infrastructure, treatment and financial responsibility. France and the Netherlands are examples of countries with financial EPR schemes. Austria, Germany and Sweden are examples of countries with organisational EPR schemes.

3 Roles and responsibilities

The EPR system involves many different parties who all have their roles and responsibilities that need to be fulfilled for the system to work.

3.6 Producers and trade associations

Producers that fall under an EPR scheme are obliged to comply with regulations set out in EPR specific ordinances. In theory individual producers could arrange their own collection systems and recycling in accordance with the legislation, which in most cases would be unpractical and costly. Most producers of packaging, newsprint, batteries, EEE and tyres have therefore organised themselves by affiliating themselves with product specific trade associations or material companies. These associations and material companies, in turn, own or are affiliated with product specific producer responsibility organisations (PROs).

3.7 The PROs

There are several PROs in Sweden for different EPR schemes. In general, the function of a PRO is for producers to cooperate regarding their legal obligations to collect and reach EPR specific targets. The PROs organise collection systems for products covered by the EPR schemes and make sure that the collected waste is recycled and treated correctly. Some producers also mandate PROs to report data to SEPA.

Most PROs also administer the financial aspects of the EPR schemes by, for example, collecting fees from individual producers to finance their operations.

Organisational structures of PROs do vary. In this report the term “PRO” is used regardless of the legal entity or structure weather the PRO is a company, network, association or similar.

There is no PRO for pharmaceuticals since individual pharmacies are required to take back proportional amounts of pharmaceuticals from households.

3.8 National Agencies

SEPA is the main competent authority for the Swedish EPR schemes and represents Sweden in the EU on EPR related issues. Among SEPA’s responsibilities is to give guidance to individual producers and PROs on issues concerning the EPR schemes, such as interpreting the legislation in relation to specific products or circumstances.

It is SEPA that compiles statistics for most of the EPR schemes and annually reports this to the EU. SEPA is responsible for keeping and updating a

database for EEE and batteries where producers enter their data, while the other EPR groups keep their own registers and report statistics to SEPA.

SEPA issues permits for operating national collection systems for consumer EEE (currently there are two PROs with such permits, see chapter 4.1.2). Importantly, SEPA audits compliance for EPR for EEE, batteries, packaging (except ready-to-drink bottles and cans), newsprint, tyres and end-of-life vehicles, including identifying free-riders. SEPA also issues rules and guidance on compliance audits in waste management and regulations on treatment of WEEE[17].

The Swedish Board of Agriculture are responsible for issuing approval for operating national deposit return systems for beverage bottles and cans. They are also the supervisory board of the deposit return systems. The Swedish Board of Agriculture and the Swedish municipalities have a joint responsibility for auditing retailers selling ready-to-drink beverages to make sure that producers are part of an approved deposit return system.

For pharmaceutical waste, the Swedish Medical Products Agency has the equivalent responsibility and is the authority responsible for auditing pharmacies.

3.9 Municipalities

In Sweden the municipalities have a dual role when it comes to waste management, one executive and one supervisory.

3.9.1 Executive role

In their executive role the municipalities are responsible for the collection and treatment of household waste (organic waste, residual waste, bulky waste and household hazardous waste). The municipalities also collaborate with the PROs, mainly regarding collection of packaging waste and WEEE, see below.

Municipalities have a responsibility to keep the public informed about issues related not only to household waste but also to waste that falls within the EPR scheme for packaging and newsprint, EEE and end-of-life vehicles, see chapter 5.

Doorstep collection of packaging waste and newsprint

In many municipalities, the municipal waste management departments have extended the service they provide to households and, in addition to collecting household waste also offer doorstep collection of packaging waste and newsprint, see Appendix 1. This is not part of municipal responsibility and this service is complementary to the green recycling stations provided by the largest PRO for packaging and newsprint.

[17] NFS 2018:11 Om yrkesmässig lagring och behandling av el-avfall.

Collection points for packaging and newsprint

An important collection system for packaging waste and newsprint are the green recycling stations owned by the largest PRO for packaging and newsprint, FTI. These are often located on municipal property and close communication between the municipality and FTI is therefore necessary. The municipalities often suggest locations for new green recycling stations where the PRO can apply for building permits. The future of green recycling stations is unclear due to legislative changes. For more information, see chapter 1.2.1.

Collection of WEEE and batteries

The largest PRO for WEEE and batteries, El-Kretsen, has an agreement with individual municipalities that lets the municipalities organise the collection of WEEE and batteries on behalf of the PRO. The collection is carried out at the same location where households can drop off bulky waste at municipal recycling centres. This type of arrangement requires close collaboration between El-Kretsen and the municipalities.

Figure 5. Municipal recycling center. Photo: SEPA.

Drop of sites for end-of-life vehicles

The network for end-of-life vehicles, BilRetur, collaborate with some municipalities to collect end-of-life vehicles where there are no authorised car dismantlers. This collaboration enables households to drop of end-of-life vehicles at a municipal drop of point.

Collection of tyres

About half[18] of the municipalities have chosen to be part of SDAB:s collection system in which households can dispose of tyres at the municipal recycling centres for bulky waste.

3.9.2 Supervisory role

In their supervisory role, the municipalities conduct compliance audits at local companies and facilities. This is to ensure that local companies and businesses comply with waste management regulations. The local authorities also have the responsibility to audit any collection systems within the municipality, for example the green recycling stations (mainly regarding littering and noise pollution) and treatment facilities within the municipality[19].

For end-of-life vehicles, most compliance audits concern the dismantlers and how they meet environmental and waste management regulations.

3.10 Households

Households have a responsibility to use the collection systems that the producers provide. Without the participation of the consumers the EPR system would fail.

Figure 6. Source separation of different waste types in a household. Photo: Emilia Hultman, SEPA.

[18] Comment from Martin Lindkvist, SDAB.

[19] Some facilities are instead audited by the county, depending on the type of business and waste volumes handled.

For packaging waste, newsprint, WEEE and batteries this responsibility is stipulated in the waste ordinance and means that households must keep the waste separate from other residual waste and dispose of it in the separate collection system provided by the producers. The Environmental Code stipulates penalties for individuals who do not comply with separating waste, but it is very rare for individuals to be charged and penalized.

There is no regulated responsibility for households to dispose of tyres, end-of-life vehicles and pharmaceutical waste in the collection system provided through the EPR scheme. However, the Environmental Code always applies, and states that the waste producer is responsible for managing the waste in a manner that is acceptable with regards to human health and the environment[20]. In practice this means that households are still required to dispose of the waste products in the collection systems available for pharmaceutical waste, tyres and end-of-life vehicles.

[20] Miljöbalken 15 kap. 11 §.

4 Organisational structure of PROs

The purpose of this chapter is to provide an overview of the organisational structure of the different PROs.

4.1 Producer organisations (PROs)

There is only one PRO for all EPR schemes, except for WEEE and packaging, where there are currently two for each EPR scheme. A summary of all PROs in Sweden is presented in Table 4.

The structure of the different PROs differs somewhat depending on the specific conditions of their respective market. Generally, a PRO is owned by a range of different companies and/or trade associations which in turn consist of member companies. Most PROs finance their operations by collecting fees from producers and by selling the collected materials on the open market.

There is no PRO for EPR for pharmaceuticals.

Table 4. Organisational information of the different PROs in Sweden. A dash (-) indicates that the information does not apply.

EPR scheme	PRO (Swedish name)	Number of employees		Turn-over (million SEK)
		PRO or similar	Sub-contractors (approx.)	
Packaging and newsprint	Förpacknings- och tidningsinsamlingen	55	500-1 000	1 000
Metal packaging	Metallkretsen	1	0	100
Paper packaging	Returkartong	3	0	300
Plastic packaging	Svensk Plaståtervinning	35	0	330
Glass packaging	Svensk Glasåtervinning	40	Unknown	200
Newsprint	Pressretur	1	100	40
Packaging and newsprint	Tailor Made Responsibility	14	0	120
Packaging (ready-to-drink bottles and cans)	Returpack	70		3 100
Wood packaging	Träförpackningskommittén	0,4	-	-
WEEE and batteries	El-Kretsen	11	500	500
WEEE and batteries	Recipo	3	50	50
Lead batteries	Blybatteriretur	0	5	200
Tyres	Svensk Däckåtervinning AB	3	50-100	150
End-of-life vehicles	BilRetur	1	0	2,6
Pharmaceutical waste [1)]	-	-	-	-

[1)] For pharmaceutical waste there is no PRO. Each individual pharmacy arranges its own take-back system in the shop.

4.1.1 Packaging and newsprint

There are currently two main PROs for packaging in Sweden, FTI and TMR, where FTI is the larger of the two.

4.1.1.1 PACKAGING AND NEWSPAPER COLLECTION SERVICE (FTI)

Förpacknings- och Tidningsinsamlingen (FTI) or Packaging and Newsprint Collection Service in English, is an umbrella organisation for producers of packaging and newsprint. This organization is comprised of and owned by five material companies representing the paper, plastic, metal, glass and newsprint material companies. See Figure 7 for a schematic description of the organisational structure of FTI.

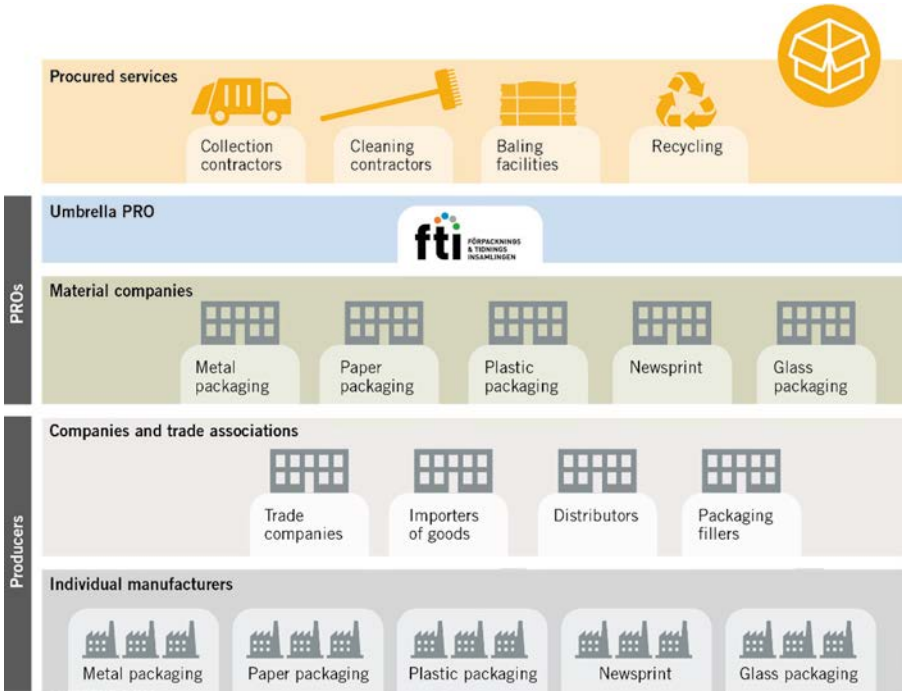

Figure 7. Organizational structure of the largest PRO for packaging and newsprint, FTI[21]. Illustration: SEPA.

FTI organises collection of packaging waste and newsprint in a nationwide collection system consisting of green recycling stations. The green recycling stations are the property of the FTI. The stations are publicly available for households and are placed on both municipal and private properties. To find new locations for green recycling stations and to maintain the existing ones, FTI maintain a close dialogue with the Swedish municipalities and private property owners. Collection and transportation of waste from the green

[21] Metal packaging manufacturers are no longer co-owners of material PRO for metal packaging, Svenska Metallkretsen.

recycling stations as well as cleaning of the stations and recycling of the collected materials is procured on the open market. Recycling of the collected material is done in several recycling facilities both nationally and abroad (see chapter 6.1.1 for more information). FTI collects packaging fees from the producers.

The material companies that constitute the FTI use the services that FTI offers to various degrees. There is no competition between the five material companies that constitute the PRO (FTI). Some of the material companies are merely legal constructs with few employees, while others are more autonomous, see Table 4.

Newsprint

The material company for newsprint, Pressretur, is owned by the paper industry as well as printing companies and distributors. Pressretur organises procurement of collection, sorting and transfer of newsprint from the green recycling stations and distributes the collected newsprint between the three owners in the paper industry. Pressretur uses the services provided by PRO, FTI for all other services such as, dialogue with municipalities and cleaning of the green recycling stations.

Paper packaging

The material company for paper packaging is Returkartong AB. It is owned by 15 producers of paper packaging and retail organisations. Previously it only existed in a legal capacity and gave FTI the full responsibility to carry out collection and recycling of paper packaging waste. Recently, Returkartong decided to carry out more operations themselves that is not related to collection of paper packaging. Collection of paper packaging is still delegated to the FTI.

Glass packaging

The material company for glass packaging, Svensk Glasåtervinning, is owned by the glass industry and their trade associations. Previously, Svensk Glasåtervinning was responsible for collection and recycling of glass packaging. However, recently the responsibility for collection of glass packaging has been transferred to the FTI. Recycling of glass is still carried out by the material company itself in its own recycling facility. All financial responsibilities are also retained by the material company, i.e. collection of packaging fees and selling the recycled glass. Svensk Glasåtervinning uses the services provided by FTI for other services as well such as dialogue with municipalities and cleaning of the green recycling stations.

Metal packaging

The material company for metal packaging is Svenska Metallkretsen. It is owned by two major retail organisations in Sweden. The main function of Svenska Metallkretsen is primarily administrative as it has the financial

responsibility for the collection and recycling of metal packaging. Svenska Metallkretsen uses the services of FTI for collection of the metal waste packaging as well as collecting the packaging fee from the producers. Svenska Metallkretsen organises recycling of the collected material through agreements with three recycling facilities and sales of the sorted metal on the open market.

Plastic packaging

The material PRO for plastic packaging is Svensk Plaståtervinning which has the financial responsibility for the collection and recycling of plastic packaging waste. FTI has been given the responsibility to collect plastic packaging waste, but Svensk Plaståtervinning has retained the responsibility for recycling the collected material.

4.1.1.2 TMR

Tailor Made Responsibility (TMR) is the other PRO for packaging in Sweden. TMR is a privately-owned for-profit company. They collect approximately one tenth of the total packaging volume by providing collection services in the form of doorstep collection as well as stationary and mobile collection stations[22]. The services are procured by TMR and performed by both municipalities and private service providers. In the future dominating form of TMRs collection will be doorstep collection.

All collected packaging and newsprint are delivered by TMR for sorting and material recycling at contracted recipients, such as paper mills and plastic sorting plants. In addition, TMR runs a plastic packaging material recycling plant in Sweden where plastic composite railway cross ties are produced from collected household plastic packaging.

The producers are affiliated to TMR through agreement where packaging fees are collected from the affiliated producers and these fees finance collection and recycling of the packaging waste and newsprint.

4.1.1.3 WOOD PACKAGING COMMITTEE

Packaging wood mainly consists of pallets, crates, cable drums and other commercial products and is also covered by the packaging ordinance. Currently there is one PRO for wood, Träförpackningskommittén (Wood Packaging Committee in English) which is a part of the trade association Svenskt Trä (Swedish Wood in English). Currently there is no coordinated collection of wood packaging organised through Träförpackningskommittén nor are they part of the FTI or TMR. Instead it is up to the individual producers to organise take-back systems for their products where the products, for the most part, are reused. The PRO compiles statistics and reports this to SEPA.

In the future, wood packaging will need to be part of an authorized collection system for packaging from households. See chapter 1.2.1.

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[22] Interview and written comments from Peter Mellgren, TMR.

4.1.1.4 RETURPACK – DEPOSIT RETURN SYSTEM FOR READY-TO-DRINK PLASTIC BOTTLES AND METAL CANS

The deposit return system for ready-to-drink bottles and cans is organised through a PRO, Returpack who is owned by trade associations within the brewing industry and retailers (Sveriges Bryggerier, Livsmedelshandlarna and Svensk Dagligvaruhandel). Returpack operates under a commercial brand well known as "Pantamera".

Returpack organises the deposit return system mainly using return vending machines that are installed in some 3 100 grocery stores. At the stores, customers can get their prepaid deposit back by using the vending machines to drop off their empty ready-to-drink plastic bottles and metal cans. The vending machines are installed and owned by the stores but Returpack compensates the stores for the handling of the returned bottles and cans. Returpack also organises the collection and transportation of the collected bottles and cans from the stores. Additionally, some 50 larger return vending machines (Pantamera Express) are placed at municipal recycling centres where households can drop off bulky waste. These larger vending machines are attached to a container and are owned by Returpack. There are also some 9 500 smaller collection points for ready-to-drink bottles and cans at for example restaurants, camping grounds and festival grounds.

Returpack collect fees from producers and administer the financial transitions for the deposit return system. Ready-to-drink plastic bottles and metal cans must be labelled with a symbol to be part of the deposit return system.

Figure 8. Larger return vending machine "Pantamera Express" for plastic bottles and metal cans. Photo: Returpack/Pantamera.

4.1.2 WEEE and batteries

There are currently three PROs for WEEE and batteries. The Electrical Equipment Collection Service (El-Kretsen) is the largest, owned by 19 trade associations for EEE and batteries. The second one is Recipo, a member association focusing on collection of WEEE in stores, their members being individual producers (retailers) and the third is Blybatteriretur, a PRO for lead batteries.

A producer of consumer EEE is required to collect consumer WEEE through an approved nationwide collection system. Two PROs, El-Kretsen and Recipo, have an approved collection system for WEEE. For professional EEE and batteries, the collection system does not need to be authorised.

The arrangement for collection of commercial WEEE varies depending on local circumstances and is done in collaboration with both municipalities and private service providers. The largest collection structure of WEEE originating from households is carried out in collaboration with the municipalities at the municipal recycling centres.

4.1.2.1 EL-KRETSEN

El-Kretsen, organises the collection of WEEE at approximately 600 municipal recycling centres. This is done through collaboration agreements that El-Kretsen has with the Swedish municipalities. El-Kretsen also offer retailers selling EEE a collection system for WEEE.

El-Kretsen is responsible for communication with the municipalities and authorities, collection of product fees and procurement of collection services and recycling. They have contracts with approximately 30 transport companies and approximately 20 recycling facilities. Figure 9 shows a schematic organisational structure of El-Kretsen. El-Kretsen also conducts annual reporting of collected and recycled amounts of WEEE to SEPA.

El-Kretsen owns an analysis facility where approximately 2 % of collected WEEE is sampled and its content analysed. The analysis provides detailed information about components in the collected waste. This information is valuable for El-Kretsen when procuring recycling and treatment services.

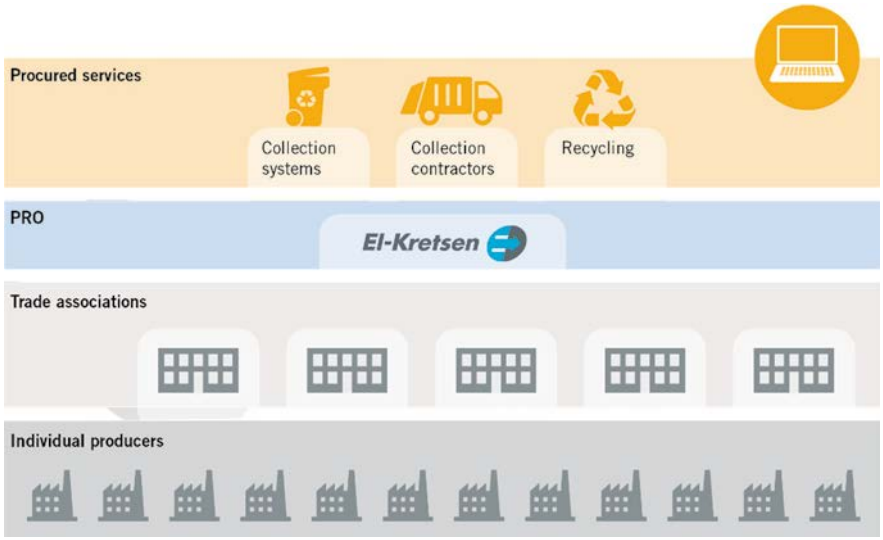

Figure 9. Organizational structure of the largest PRO for WEEE, El-Kretsen. Illustration: SEPA.

4.1.2.2 RECIPO

Recipo is an economic association which focuses on collection of WEEE and batteries in consumer stores and is situated in Sweden, Denmark and Norway. Currently Recipo has 14 members and approximately 230 affiliated companies in Sweden. These companies fulfil their producer responsibility through membership or affiliation with the PRO and its activities.

Regulations stipulate that all larger consumer stores have an obligation to collect small WEEE[23]. Recipo has a widespread collection system for WEEE from retail stores that sell EEE. They organise transport of WEEE collected in stores through some 20 procured transport companies. The collected material is transported to different recycling facilities in Sweden depending on product group.

In addition to the collection in stores Recipo fulfils the producer responsibility of their members and affiliated companies through an agreement with the other PRO, El-Kretsen, who organises collection of WEEE at municipal recycling centres. This agreement has enabled the two PROs to create a well-developed clearing system in which the PROs cooperate in the transportation and recycling of collected WEEE from the municipal recycling centres. Through the clearing system the collected waste as well as costs and revenues are distributed between the parties.

In 2020 Recipo opened a plastic recycling facility in Latvia that produces plastic pellets from recycled WEEE. The pellets are used in the production of new EEE.

[23] Stores larger than 400 m2, WEEE smaller than 25 cm. Förordning (2014:1075) om producentansvar för elutrustning.

4.1.3 Tyres

Currently there is one PRO for tyres in Sweden, Svensk Däckåtervinning AB (SDAB), of which 80 % is owned by the trade association for tyre producers and 20 % is owned by the trade association for tyre retailers (tyre workshops), see Figure 10. SDAB finances a system for nationwide collection and recycling of waste tyres. This has traditionally been done through procuring a single contractor. The contractor is reimbursed after completed recycling to ensure accordance with the agreement.

Collection is carried out at both individual tyre retailers and other locations for disposal of waste tyres, such as, municipal run recycling centres where almost half of the municipalities in Sweden accept waste tyres. In addition, SDAB is responsible for communication with authorities, collection of product fees from the producers, procurement of collection and recycling services. SDAB also supports research to develop recycling methods and better use of end-of-life-tyre derived materials.

Figure 10. Organizational structure for PRO for tyres, SDAB. Illustration: SEPA.

4.1.4 End-of-life vehicles

BilRetur is the PRO for end-of-life vehicles. The collection system for scrapped cars is organised through a national network of authorized car dismantlers.

Bilretur is partly owned by the trade association of car dismantlers (Sveriges Bilåtervinnares Riksförbund, SBR) and a recycling company (Stena Recycling), see Figure 11. Stena Recycling has agreements with car importers, the trade association for car importers (BIL Sweden) and other obligated producers. BilRetur's objective is to ensure a nationwide collection system, i.e. that there are collection facilities (car dismantlers) or other suitable drop-off facilities across the country. They also provide the car dismantling companies with information and training.

BilRetur's affiliated car dismantlers are obliged to take end-of-life vehicles without any cost to the last owner so long as the car is complete. All car

dismantlers must comply with regulation for depolluting and dismantling the end-of-life vehicles. For example, removing fuel, oils, batteries, air-conditioning fluids, as well as the removal of glass, tyres and neutralizing of airbags, etc. The dismantlers then sell the car body to recycling companies.

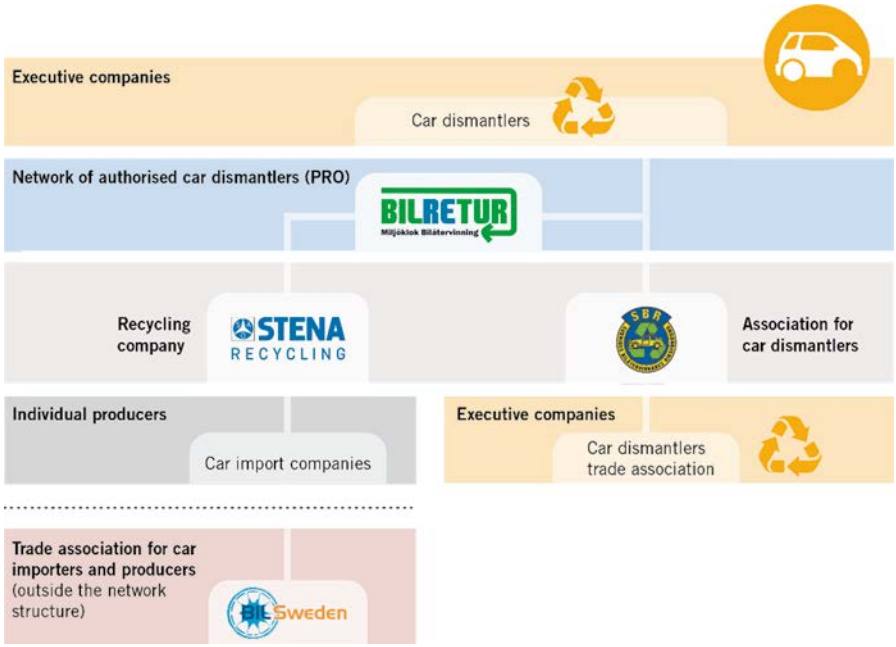

Figure 11. Organizational structure for PRO for end-of-life vehicles, BilRetur. Illustration: SEPA.

4.1.5 Pharmaceutical waste

For pharmaceutical waste, there is no PRO organising the responsibilities of the producers to collect and treat pharmaceutical waste. Instead the individual pharmacies have contracts with service providers to collect and treat the waste. This means that pharmacies are responsible for accepting discarded pharmaceuticals from households and to organise for the waste to be treated. However, the pharmacies are not obliged to collect pharmaceuticals classified as hazardous waste such as cytostatic medicine and thermometers containing mercury. Households can dispose of household hazardous waste in municipal collection systems for hazardous waste.

Furthermore, municipalities are also responsible for the collection and treatment of discarded syringes from households. Most municipalities have agreements with pharmacies in which pharmacies take back discarded syringes that households store in closed containers. Municipalities compensate pharmacies for the provision of the closed containers and for the transportation and disposal of the collected waste.

4.2 Collaboration between producers and municipalities

As mentioned above some of the PROs have a close collaboration with the municipalities for the collection of waste but also regarding communicating information to households. This collaboration mainly regards the two PROs for packaging and newsprint (FTI and TMR) as well as the largest PRO for WEEE and batteries (El-Kretsen). In a few municipalities where there are no car dismantlers, municipalities collaborate with the PRO to collect end-of-life vehicles at municipal sites. Some municipalities also collaborate with the PRO for tyres and accept tyres at municipal recycling centres.

The largest PRO for packaging and newsprint, FTI, meet with each of the 290 municipalities once a year to discuss the local collection system. In most municipalities there is a continuous issue of finding new locations for the green recycling stations as well as maintenance of the existing ones.

The collaboration between the largest PRO for WEEE and batteries, El-Kretsen, and the municipalities mainly concerns the collection of WEEE and batteries at the municipal recycling centres. The collaboration with the municipalities is less complicated than for packaging and newsprint, partly because the collection is done through already existing municipal waste collection systems. The nature of the communication between PROs and municipalities is mainly to ensure a smooth operation of the collection system.

As mentioned in chapter 4.1.5, municipalities collaborate with many individual pharmacies in which municipalities compensate pharmacies for the provision of and the handling of discarded syringes from households.

Figure 12. Collection of waste electronics at the municipal recycling centre. Photo: El-Kretsen.

4.3 Free-riders

There is a certain problem in all producer responsibility systems with so-called free-riders, i.e. producers who put products on the market but avoid their responsibilities by not being affiliated with a PRO or by not taking their own responsibility to collect and treat their products once they become waste. SEPA acknowledges that there are problems with free-riders, where the issue is more widespread for some product groups. Recent studies suggest that the problem with free-riders might be larger than previously believed. One study has estimated that there are between 50 000-100 000 producers that fall under the definition of a producer[24] for packaging, newsprint and EEE (see chapter 2.1 to read more about who is considered a producer). That is far more than number of producers that are currently affiliated with the PROs.

Packaging, EEE and batteries

PRO's for packaging (FTI), WEEE and batteries (El-Kretsen) that were interviewed for this report in 2018 stated that the problem with free-riders is limited. These PROs are owned by the major trade associations covered by the EPR scheme who, in turn, represent most individual producers. The system is largely self-governing since the producers that fulfil their obligations have an interest in bringing their competitors into the system. For household packaging, it is assumed that even though there are numerous companies that are not part of the PRO, the volumes that they represent are only minor. However, there has always been a large number of free-riders concerning commercial packaging.

A growing problem is online retail where producers can be hard to locate, and the definition of a producer is somewhat unclear. To address this issue, SEPA is collaborating with other EU member states in different forums.

From 2021, all packaging producers must register with SEPA, which facilitates supervision and should therefore eventually reduce the problem with free-riders. For EEE and batteries, this type of registration is already in place.

Newsprint

Not all newsprint reaches the PRO's collection system and because newsprint is a valuable commodity, initiatives exist where the newsprint is sold on the open market where the compensation might be higher compared to the collection system. These initiatives, however, do not comply with the legislation.

Tyres

The problem with free-riders for tyres is considerable. Currently, the EPR system for the collection and recycling of tyres is solely financed by a product fee that is included in the sale price of every tyre sold. However, there are

[24] Regeringskansliet. Mer fastighetsnära insamling av förpackningsavfall och returpapper – utveckling av producentansvaren. 2018.

free-riders that sell tyres without paying any fees to the PRO. This combined with the direct import of tyres from outside of Sweden via online retailers results in many producers not sufficiently contributing to the cost of collecting and recycling the tyres.

Another problem is that there are two EPR schemes covering tyres. Tyres that are mounted on the vehicle when it is scrapped are not covered by the EPR for tyres but belong to the EPR for end-of-life vehicles. The car manufacturer has a responsibility for the entire car, including the car's tyres, when it is put on the market. During the life of the car, the tyres are replaced, usually several times, and replaced with new tires. The new tyres that are fitted to the car have been sold separately and therefore fall under the EPR scheme for tyres. Since it is not practical to keep track of exactly which tyres are the car manufacturer's and tyre manufacturer's responsibility, the practice is for the PROs for tyres and end-of-life vehicles to waive the tyres that were on the car when it came on the market against those on the car when they are scrapped. From the PROs point of view, the system with parallel EPR schemes for one product group is somewhat problematic and a clarification in the legislation would be welcomed.

End-of-life vehicles

Since there is no product fee added to the sales price of the car, the question of free-riders is not a big issue for end-of-life vehicles. However, there are illegal dismantlers that do not dispose of end-of-life vehicles according to the environmental legislation and there is also illegal export of end-of-life vehicles. Authorised car dismantlers that are affiliated through BilRetur finance their business, i.e. depollution and dismantling of end-of-life vehicles, by selling the car body to recycling companies which in turn recycles and sells the metals and other fractions of value.

Figure 13. Dismantling of end-of-life vehicles. Photo: Stena Recycling.

5 Public awareness

Awareness on source separation and recycling has gradually increased since at least the 1980's with campaigns on the importance of separate collection of batteries. Since then, numerous campaigns focusing on awareness raising on waste issues have been carried out by individual municipalities as well as by SEPA, the Swedish Waste Management Association[25] and by the PROs.

From a legal point of view, municipalities are responsible to inform the public about available collection systems for packaging, newsprint, EEE and end-of-life vehicles. For batteries, there is no clear responsibility for municipalities to provide information on available collection systems for batteries, but this information may be undertaken by municipalities after consultation with producers. For tyres and pharmaceutical waste, municipalities have no defined responsibility to inform the public about available collection systems.

However, the communication and information for most EPR waste types, regardless if there is a legal obligation to do so or not, is primarily taken by the municipalities as they have closer access to the citizens in their jurisdictions and therefore is simpler to inform the public regarding local collection systems. The information from municipalities can include:

- the obligation to separate packaging, newsprint, WEEE and batteries from other waste;
- how to separate the different types of waste;
- available collection systems in the municipality;
- available car dismantlers for end-of-life vehicles;
- the results achieved from waste separation.

This information can be provided to households through a variety of channels. Traditionally, many municipalities would have information posted on their websites, post ads in local newspapers as well as send pamphlets or calendars filled with information to all households. These methods are less common as social media and information on websites is now commonly used for the distribution of information. These digital platforms include information for creating awareness about how to handle different types of household waste, recycle and re-use products as well as how to create a more environmentally sustainable lifestyle. Besides digital platforms, municipalities also use banners and advertisements on buses, garbage trucks, bus stops and other visible spots. In addition, many municipalities use direct communication and education through school visits, public events as well as language classes for immigrants.

Moreover, households can obtain general information about household waste, including EPR type of waste, and how it should be sorted and handled

[25] Swedish Waste Management Association (Avfall Sverige) is a waste management and recycling association with 400 members from both the public and the private sectors, primarily municipalities.

from the website www.sopor.nu (which translates to www.garbage.now). In addition, most PROs provide information on their websites, for example, PROs for batteries have a joint website named www.batteriåtervinningen.se that provides information to the general public about batteries.

The PRO for the return deposit system for beverage plastic bottles and metal cans, Returpack, have informed about the return deposit system since 1984. Returpacks communication campaigns are well known by the public in Sweden.

Figure 14. Communication campaign from the PRO for deposit return system, Returpack. Photo: Returpack/Pantamera.

6 Material streams

6.1 Market for recovered materials

The market for recovered materials differs greatly depending on how valuable the material is. In general, clean fractions that are easy to recover have a higher economic value while materials that are difficult to recover have a lower economic value. In several industries the use of recovered materials constitutes an important part of the production processes, for example in the glass and paper industries. Clean fractions, and thus a functioning recycling system with a market for the recovered products, are essential in building trust in the system, which is vital if households and industry are to continue sorting their waste.

6.1.1 Packaging and Newsprint

Glass packaging – glass is exclusively recycled in Sweden. Sweden has a glass industry with a strong demand for the recycled glass cullet. Apart from new glass bottles and jars, recycled glass is also used for making foam glass (construction material) and glass wool[26].

Metal packaging – nearly all the metal packaging is recycled in Sweden and the recycled raw material is sold on the open market[27]. Aluminium metal cans from the deposit return system are sent to smelters in Germany and France. The PRO, Returpack, have chosen smelters that guarantee that the metal from the deposit return system is recycled to new metal cans[28].

Paper packaging – approximately half of the paper packing is recycled in Sweden and the other half is sent for recycling abroad[29]. Paper packaging can be recycled without much difficulty and the paper fibres are used when making new products.

Plastic packaging – all collected plastic packaging is processed in two plastic sorting facilities in Sweden. One sorting facility is owned by the Svensk Plaståtervinning and the other is owned by a company named Swerec. The sorting facilities have the capacity to process and sort all collected plastic packaging from households in the country. The purpose of the facilities is to better sort collected plastics that in turn will enable more material recovery. After the initial processing, the material is either sent for recycling mainly in the EU or sold on the open market. For various reasons, plastics can be difficult to recycle, and a large proportion of the collected plastic packaging is not recycled but sent to energy recovery. Plastic bottles collected through the deposit return system are sorted in the PRO Returpacks sorting facility in

[26] Interview with Hans Standar, Svensk Glasåtervinning.
[27] Interview with Henrik Nilsson, FTI, Peter Mellgren, TMR and Peter Trimell, Svenska Metallkretsen AB.
[28] Comment from Anneli Niva, Returpack.
[29] Interview with Henrik Nilsson, FTI and Peter Mellgren, TMR.

Norrköping and processed in Sweden. A large amount of the material from the processed clear plastic bottles from the deposit return system are used to produce new food packaging (new beverage plastic bottles)[30].

Newsprint – most of the collected newsprint is reused in Sweden. Approximately 85 % of the paper produced in Sweden is exported to other countries. The demand for recovered paper is high because it is easy to use in new products.[31].

6.1.2 WEEE and batteries

Electronic waste collected by the largest PRO, El-Kretsen, is dismantled and depolluted in Sweden. Some raw materials such as metal is recycled in Sweden while others are exported. Illegal export of WEEE and portable batteries does exist but constitutes only a small fraction[32]. Lead batteries collected through the PRO (Blybatteriretur) are recycled at smelters in Sweden, however, due to the high material value, lead batteries are to some extent susceptible to theft and illegal export[33].

6.1.3 End-of-life vehicles

Most vehicles are dismantled and depolluted in Sweden. There are currently 280 authorized car dismantlers who sell dismantled cars to a variety of recycling facilities.

6.1.4 Tyres

Almost two thirds of tyres collected are sent to energy recovery and to the cement industry as fuel. The remaining third is granulated and used in artificial turf and asphalt both in Sweden and abroad. Smaller amounts are reused as blasting mats and as material in drainage and water filters[34].

The demand for recycled tyres is modest outside of the energy recovery plants and cement industry. This may partly be due to the legal status of the processed tyres where processed recycled tyres (i.e. granulated or shredded) are still classified as waste rather than a raw material and therefore makes it difficult to use as a material in new applications. In addition, the increasing concern regarding the release of microplastics in artificial turfs or water filters have also dampened the market for recycled tyres. However, moulded products from granulated tyres such as gym mats, roof tiles and railway sleepers are seen as promising products for future markets[35].

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[30] Comment from Anneli Niva, Returpack.
[31] Interview with Andreas Boo with revised comments from Rolf Johannesson, Pressretur.
[32] Interview with Martin Seeger, El-kretsen.
[33] Interview with Carl Ranhög, Blybatteriretur.
[34] Comment from Martin Lindkvist, SDAB.
[35] Comment from Martin Lindkvist, SDAB.

7 Financing models

Most EPR schemes in Sweden are financed either by a product fee added to the sales price or by the material value of the recycled products or both. Financial transactions are handled by the PROs. The exceptions to this are the end-of life vehicles and wood packaging where the financial transactions are handled by the industry where the inherent value of the material is the financial motive for collection and recycling. For pharmaceuticals, collection and treatment is financed by the individual pharmacies.

7.1 Packaging and newsprint

A packaging fee is added to the sales price for all packaging. The fees vary depending on the packaging material, weight, volume and who the end consumer is, i.e. the public or industry. Packaging used by industry have a lower packaging fee since these products are easier and cheaper to recycle than packaging used by the public. Historically, there has been no differentiation in packaging fees depending on product design, but a free structure based on product design for plastic packaging was introduced in 2019 and for paper packaging in 2020[36]. In 2018 a household paid approximately 200-300 SEK in packaging fees per year[37] though this fee is likely to increase to finance the large-scale doorstep collection system, see chapter 1.2.1.

The two PROs, FTI and TMR, use the same fee structure, but have individual pricing. Approximately two thirds of the total revenue are currently derived from packaging fees, but this varies depending on the material and market value for the recycled material. The two extremes are newsprint, which is solely financed by the value of the collected material, and plastics which is solely financed by product fees. The collection and recycling of metal, glass and paper packaging is currently financed by a combination of recycled material sales and packaging fees.

7.2 Deposit return system for beverage plastic bottles and metal cans

Upon affiliation with the PRO, Returpack, the producer pays an affiliation fee and a collateral deposit. The affiliation fee is transferred to the Swedish Agricultural Board and the collateral deposit is returned to the producer after the termination of the agreement with Returpack.

[36] Comment from Henrik Nilsson, FTI.

[37] Based on collected amounts of packaging waste and the packaging fee presented in the annual report from Packaging and Newsprint Collection Service (FTI) and the average of two people per household.

A producer pays an administrative fee per plastic bottle and metal can placed on the Swedish market. The fee varies depending on the type and volume of the bottle and can. A sorting fee is added if the material needs to be sorted. The producers also pay a deposit for the bottle or the can. All bottles and cans that are part of the deposit return system must be labelled so they can be identified as part of the system. The consumer pays a deposit fee when the beverage plastic bottle or metal can is purchased. The deposit is returned to the consumer upon the return of the bottle or the can to Returpacks system.

Apart from the administrative fee and the sorting fee, Returpack finance their operations by revenues from sold materials.

7.3 WEEE and batteries

WEEE

When the EPR scheme was first introduced, the only existing PRO for WEEE at the time, El-Kretsen, financed the whole EPR system with product fees. However, the degree of product fees decreased as the recycling processes became more efficient, there was more competition on the market and with higher prices for raw materials. Currently approximately one third of El-Kretsens operations is financed by product fees and the rest by material revenues. To avoid some products subsidising others, the product fees are differentiated depending on the product's material content, complexity and size.

The other PRO for WEEE and batteries, Recipo, finance their operations through a member-fee, and a fee per product which varies depending on the type of product as well as from sales of recycled material. Approximately 80-90% of their revenue is derived from product fees.

Batteries

About 85 % of the collection system and recycling of portable batteries are financed by product fees and the rest by material revenues[38]. Lead battery collection and treatment is financed by the material value, i.e. private entrepreneurs collect and sell the batteries to the PRO who in turn sell them to a smelter in Sweden. Collection and treatment are thus financed by the material value, but the operation of the PRO is financed by product fees, equivalent to approximately 1 % of the turnover of the collection system[39].

[38] Interview with Martin Seeger, El-Kretsen.

[39] Comment from Carl Ranhög, Blybatteriretur.

7.4 End-of-life vehicles

The EPR scheme for end-of-life vehicles is solely financed by the material value of the scrapped cars. The PRO, BilRetur, is financed by their associated members. Bilreturs function is to mainly inform and educate car dismantlers, oversee the collection system and to function as a platform for involved parties. There is no product fee for subsidising the collection system, which makes the system vulnerable to decreasing market prices for metal.

7.5 Tyres

The EPR system for tyres is solely financed by product fees. These vary depending on type and size and are added to the sales price. The fee is used to finance a system for collection and recycling of the tyres which traditionally has been set up through a single contractor.

Figure 15 Used tyres. Photo: Emilia Hultman

7.6 Pharmaceuticals

The collection of discarded pharmaceuticals started before the monopoly of the state-owned pharmaceutical company, Apoteket AB, ceased in 2009. The costs of collection and removal of the pharmaceuticals are paid by individual pharmacies.

8 Compiling data and reporting

SEPA is the competent authority responsible for compiling and reporting national statistical data for ERP schemes. SEPA is also responsible to report data on waste to the EU. To compile data, SEPA collaborates with the Swedish Environmental Emissions Data (SMED)[40], a consortium which consists of national agencies and research institutes.

Compiling data and statistics can be challenging due to issues related to definitions and measurements and the fact that data is often collected and presented in different ways. The purpose of this chapter is to explain how the data for the different EPR schemes is reported and compiled.

In the EPR specific ordinances, both producers and whomever is authorised to organise a collection system is obligated to report data to SEPA. What type of data needs to be reported varies between the different EPRs schemes. There are no requirements regarding reporting for EPR scheme for pharmaceuticals.

8.1 Production of waste statistics in Sweden

In some countries the national statistics on waste are based on legal requirements to report detailed administrative data. The corresponding legislative requirements are lacking in Sweden for both generated and treated waste. Therefore, SEPA uses data that is primarily collected in other contexts, for example data from PROs, sectorial authorities that are deemed to have a good quality data and data found in annual environmental reports that licensed facilities are required to report to the authorities. In addition, supplementary studies are carried out in the form of surveys to selected companies. SEPA continuously reviews the reported data and can, if necessary, adjust the published statistics. To ease the centralization of data, SEPA has developed a digital platform for data registration and combining statistical data for EEE, WEEE and batteries. This platform also allows both producers and PROs to report their data.

8.1.1 Packaging and newsprint

Most of the producers of packaging and newsprint are affiliated with a material company. The data is primarily reported by the PROs using a questionnaire that SMED sends out on the behalf of SEPA. Producers who fulfil their producer responsibility without being affiliated with a material company must report the corresponding data directly to SEPA. SMED compiles the combined data for packaging and presents it to SEPA.

[40] The Consortium SMED was established in 2001 with the aim of long-term gathering and development of competence in Sweden in emission statistics in the areas of air and water pollution, waste and hazardous substances and chemicals.

Starting 2021, producers will need to report to SEPA which collection system they are affiliated with. In 2022, individual producers will need to report data on quantities of packaging and newsprint put on the Swedish market starting from year 2021 directly to SEPA. In addition, producers will also need to report collected waste amounts for 2021.

8.1.2 WEEE and batteries

According to the EPR for EEE, both producers and authorized operators of the collection systems for WEEE are required to report data to SEPA. Producers are obligated to report to SEPA the quantity of EEE that the producer has made available on the Swedish market. Producers report this data by mainly using SEPAs digital data registration platform.

There are currently two authorized collection systems operated by PRO's El-Kretsen and Recipo. Both PRO's must report which producers are affiliated with their collection systems and the quantity of the collected waste that has been submitted for treatment in and outside of Sweden. The information must be specified per product category and how the WEEE has been treated based on preparation for reuse, material recovery, other types of recovery and disposal.

The EPR ordinance for batteries requires battery producers to notify SEPA before a producer places a battery on the Swedish market. Producers must provide information on the types of batteries that will be placed on the market and which battery collection system the producer intends to use.

8.1.3 Tyres

According to the EPR ordinance for tyres, producers must provide information to SEPA about the results for the reuse, recycling and other conditions relating to the final disposal of tyres. Information on tyres is provided by the PRO for tyres, SDAB.

8.1.4 End-of-life vehicles

For end-of-life vehicles producers are required to provide information to SEPA that the producers receive from authorised car dismantlers on how end-of-life vehicles have been treated in accordance with the car scrapping ordinance (SFS 2007:186). According to the car scrapping ordinance, end-of-life vehicles must be dismantled by separating components such as glass, tyres and metals. End-of-life vehicles also need to be depolluted of hazardous substances such as motor oils and motor filters, fuel, filters containing PCB or PCTs, etc.

The information related to the EPR for end-of-life vehicles is compiled by the trade association for car importers, BIL Sweden. BIL Sweden sends the information to SEPA and if necessary, SEPA contacts BIL Sweden for data verification or to request supplemental information.

9 Reflections

The purpose of this chapter is to reflect over the success of the Swedish EPR schemes, to discuss potential improvements and to summarize some key recommendations to countries looking to implement EPR schemes. Note that the reflections made in his chapter are from SEPAs point of view and do not necessary represent point of view of other stakeholders.

9.1 Are Swedish EPR schemes successful?

Generally, the success of EPR schemes depends on the EPR scheme and how success is measured and by whom. The most obvious method to measure success of EPR schemes is by examining whether the legislated EPR specific target have been met. For this type of performance metric, most EPR schemes in Sweden meet or in some cases exceed the legislated target rates. Results on how well different ERP schemes have met national targets can be found in Appendix 2. However, it is important to point out that targets have been set, to some degree, depending on how realistic it is for producers to meet them. For example, the targets are higher for glass and newsprint than for plastics because of the stronger markets for these raw materials. Furthermore, since 2020 a new method on how to measure recycling was implemented by the European Commission. The newly applied method means that what is considered as recycled is measured later in the recycling processing chain and thus more accurately reflects what becomes new materials. With this change of measuring recycling, SEPA predicts that several of the EPR specific targets regarding recycling for packaging waste may become difficult to achieve.

Another way of measuring success is the extent that the producers have taken ownership and led the development and organization of the EPR schemes. All EPR schemes in Sweden, except for pharmaceuticals, are organised by PROs. This type of collaborations makes it easier for individual producers to reach national EPR specific targets. In addition, some PRO's collaborate to make it easier for households to drop off different wastes in one location. A prime example of this is the green recycling stations for packaging waste and newsprint where households can also drop off their portable batteries.

Success can also be measured in the level of public support and participation in the schemes, as well as the environmental awareness that the schemes has helped generate. In general, the Swedish public is environmentally conscious, and most people participate in the source separation system but by no means is all the waste covered by the EPR schemes recovered in the producers' collection systems. Results from waste composition analysis for residual waste

show that approximately 35 % of residual waste contains materials that fall under an EPR scheme with the majority of this being packaging and newsprint[41].

International comparisons are difficult as not only do the EPR schemes vary between countries but also the definitions that form the basis for statistical data. Even so, the Swedish EPR schemes tend to rank relatively high in comparisons with other EU member states[42].

From SEPA's point of view, several factors have been particularly important for the development of the Swedish EPR schemes. The factors listed below are true for some of the EPR schemes, but not necessarily all.

- A high level of trust between the individual producers and PROs and a willingness for producers to fulfil their respective obligations where such obligations are clearly stipulated.
- Clear division of responsibility for municipalities and producers to inform households about collection systems.
- A high level of trust in the system (that the waste is recycled and not landfilled) has created a willingness for many households to source separate waste and participate in the collection systems. However, the degree of participation among households varies and it is common to find EPR types of waste in residual waste.
- For the most part a clear division of roles and responsibilities in legislation between municipalities and producers.
- High quality waste streams, for example separate collection of coloured and clear glass or newsprint and paper packaging, have a strong market demand (maximising the material value).
- Cooperation between municipalities and most PRO's.
- Cooperation between some PRO's.
- National manufacturing industry with a demand for the recycled material and/or capacity to process the collected material, e.g. paper, glass and metal.
- Ambitious policy targets well beyond EU targets.
- A cohesive responsibility for the producers to collect and treat the EPR product after their end-of-life stage and to finance the EPR systems.
- Most PROs are not-for-profit organisations which creates transparency for individual producers to pay into a collective system.

Despite the Swedish system working well, there are still improvements to be made throughout the whole value chain which includes producers, municipalities, households and authorities.

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[41] Avfall Sveriges rapport 2016:28. Vad slänger hushållen i soppåsen? Nationell sammanställning av hushållens mat- och restavfall.

[42] Data from Eurostat. Comparison of EPR for packaging, end-of-life vehicles, batteries and EEE.

9.2 Potential improvements from stakeholders' perspective

The existing Swedish EPR schemes are generally functioning quite well even though there is room for improvement. However, what the improvements might look like depends somewhat on the perspective of the different stakeholders. Listed below are some general examples on potential improvements from different stakeholders' perspective.

Households

Feedback gathered by Swedish municipalities shows that the easier it is for households to drop off EPR waste for recycling, the lower the risk of this waste being disposed of with residual waste[43]. This suggests that collection of EPR type of waste closer to the household could lead to better source separation. Some confusion would also be prevented by a less complex waste management system. It can be difficult for some households to understand the difference between the various recycling systems, i.e. the same material but different responsibilities and therefore different collection systems. For example, a broken drinking glass is not a packaging and is therefore to be disposed of in the residual waste rather than in the glass packaging collection.

In the future, producers of packaging and newsprint will need to enable collection closer to residential properties by essentially providing doorstep collection of packaging and newsprint. The aim is to make it easier for households to sort packaging and newsprint at source.

Authorities

The overall purpose of EPR schemes is to fulfil the national environmental objectives, to reach EPR specific targets and to ensure regulatory systems where waste management is environmentally optimised. From the perspective of authorities, lower quantities of waste, plus increased levels of recycling and recovery are desirable, for example, through products that are easier to disassemble and recycle. Producers have largely been successful in collecting and recycling the material. However, for some product groups such as packaging, there has been no reduction in the amount of packaging material since the introduction of EPR for packaging in 1994 and the development has been towards more mixed material packaging that can even be more difficult to separate and recycle. There is also potential to improve the collection rate of WEEE since many households still store WEEE in their home.

As with any type of data collection system, improvements can always be made in both the data collection and reporting methods. As described in chapter 8, SEPA has developed a digital platform for registering producer responsibility data and combining statistical data for EEE, WEEE and

[43] Regeringskansliet. Mer fastighetsnära insamling av förpackningsavfall och returpapper– utveckling av producentansvaren. 2018.

batteries. This centralized system aims to simplify both the data analysis and reporting process, with the goal of improving SEPA's ability to meet national and EU reporting directives. As such, the platform will be expanded in 2021 to include packaging with future goals to include the other EPRs. Although SEPA has a good cooperation with PRO's, such as for end-of-life vehicles which has resulted in improved statistics in recent years, centralizing data collection and reporting through one digital platform is likely to improve data quality through standardized data validation and quality control techniques.

In 2018, the Swedish authorities intercepted close to 100 illegal shipments of waste intended to be imported to and exported from Sweden[44]. Many of the transports included waste types that fall under EPR schemes, such as end-of-life vehicles, car parts, WEEE and packaging waste. Many authorities are involved in working with cross-border shipments of waste and ten Swedish authorities have developed an action plan to reduce cross-border transport of waste.

Producers

Important for the producers is a fair and open market, both nationally and internationally. A fair and open market also implies the participation of all producers and not just some. Currently, the system of compliance audits is not functioning optimally to deal with free-riders who do not fulfil their responsibilities.

SEPA sees that there is a need for clearer international rules regarding platforms working with online trading.

Municipalities

From the municipality's perspective, an improvement would be if less EPR related waste ended up in the residual waste as this burdens the municipal waste management system as well as increases littering. Another issue concerning EPR waste is thefts at municipal recycling centres for bulky waste where lead batteries and cables are sought-after commodities.

9.3 Recommendations to countries wanting to implement EPR schemes

Several things should be considered when proposing to implement EPR schemes similar to the Swedish ones. Firstly, it is not advisable to copy the Swedish EPR scheme – or any other scheme – but instead, use it as a source of inspiration. The Swedish schemes are based on a certain type of infrastructure and social culture which may be very different elsewhere. Listed are a few recommendations for countries looking to implement EPR schemes based on SEPA's experience of working with EPR schemes since 1994:

[44] Information on illegal shipments of waste (Article 24 and Article 50(1)).

- Identify the type of infrastructure and social cultures that already exist and build a system based on that as much as possible.
- Prioritize waste streams with the highest environmental impact rather than products with a high financial value since the market tends to find a solution for high value products anyway.
- Identify the problem to be solved and what you want to achieve by introducing an EPR scheme. It could be increased recycling, shifting the cost of handling the waste from municipalities to the industry, less littering, etc. Be clear about the purpose of the EPR scheme.
- Decide which stakeholders will be responsible for products placed on the market before the implementation of the EPR scheme.
- Design legislation with a clear allocation of roles and responsibilities so that all parties involved know what is expected of them.
- Set clear objectives for the producers, preferably in collaboration between the competent authorities and the producers.
- Focus on building collection systems that generate high quality materials. High quality is key for creating demand for the recycled material.
- Analyse the market for the recycled material before introducing large scale collection and address the issue if the market has insufficient capacity. Public confidence and trust in the system can easily be ruined if material collected for recycling is, in fact, not recycled.
- Keep an open dialogue between different stakeholders.
- Have patience – building a functioning EPR system is a long-term project.

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Appendix 1 Collection Systems

This chapter briefly describes the different collection systems for EPRs covering consumer products, i.e. packaging waste, ready-to-drink beverages, newsprint, electrical waste and batteries.

Households can leave discarded pharmaceuticals at pharmacies. Pharmacies provide transparent plastic bags where households can store their discarded pharmaceuticals and hand over the plastic bag to the pharmacy.

In some municipality's households can drop off tyres at municipal public recycling centres for bulky waste. Used tyres can also be returned at tyre garages.

End-of-life vehicles can be brought to an authorised car dismantler. In some municipalities where there are no car dismantlers, households can drop off their end-of-life vehicle at a municipal drop off point.

A.1 Packaging waste and newsprint

There are mainly three ways in which packaging waste and newsprint is collected in Sweden: through green recycling stations, doorstep collection from apartment buildings (specific rooms or buildings for source separation of waste) and doorstep collection from single family houses. The first is, for the most part, organised by the largest packaging and newsprint PRO (FTI) and the two latter are, currently, organised by either private service providers (from apartments) or the municipality (from single family houses). When others collect the waste, the producers are still the final receiver of most of the material. Regardless of the system, there are containers for each of the packaging materials and newsprint in order to keep the waste streams as homogeneous as possible. This requires that the households separate the waste at the source.

Figure 1. Green recycling station for packaging waste and newsprint. Photo: FTI.

Figure 2. Doorstep collection from an apartment building where collection of EPR waste is done simultaneously with municipal waste. Photo: Miljö & Avfallsbyrån.

Doorstep collection from single family houses in multi compartment bins requires a custom designed vehicle with four waste compartments. A system with different coloured bags requires an optical sorting facility to separate the bags.

Figure 3. Doorstep collection from single family houses in multi compartment bins and coloured plastic bags where EPR waste is collected simultaneous with the municipal waste (food and residual waste). The bin for coloured bags is only see through for informative purposes.
Photo: PWS AB and Envac Optibag.

A.1.1 Requirement for collection system of packaging waste and newsprint closer to home

In the future, collection of packaging and newsprint will need to be organised through an authorised collection system. The authorised collection system/s will need to enable collection closer to residential properties by essentially providing doorstep collection. The aim is to make it easier for households to

sort packaging and newsprint at source. The new requirements will lead to significant increase of doorstep collection of packaging waste and newsprint. Currently, no collection systems have been authorised by SEPA.

A.2 Deposit return system for ready-to-drink plastic bottles and cans

There are three ways in which consumers can return their ready-to-drink plastic bottles and metal cans, that are part of the deposit return system, for recycling. The most commonly used system is through return vending machines that can be found in some 3100 grocery stores across the country. In addition, consumers can also return plastic bottles and metal cans by using larger return vending machines that are located at municipal recycling centres. By using the return vending machines consumers can get their deposit back after returning the bottles and cans. Consumers can choose if they want to use the deposit as means of payment in grocery stores, to exchange the deposit for money or to donate the deposit for charity.

In addition, collection points for ready-to-drink bottles and cans can be found at camping grounds, restaurants and festival grounds.

Figure 4 Left: Return vending machine in a grocery store. Right: Larger return vending machine attached to a container. Photo: Pantamera/Returpack.

A.3 Electronic equipment and batteries

Most of the consumer electronic waste is collected at the municipal recycling centres, see Figure 8, but doorstep collection of electronic waste and batteries frequently occurs from both apartments and single-family houses. It is also possible to dispose of batteries at the green recycling stations where small red boxes are placed. Since 2014 it is also possible to bring electrical waste back to the shops where such products are sold, though the quantities received this way are low. In some municipalities it is common that small WEEE and batteries are collected through secure collection boxes placed in public places.

Figure 5. Battery box at a green recycling station. Photo: Batteriåtervinningen.

Figure 6. Secure collection box for small WEEE and batteries. Photo: Jonna Nilimaa.

Figure 7. Collection of small WEEE in a secure container in stores (Secure-Collection). Photo: Recipo.

A municipal recycling centre is the main facility for receiving bulky and hazardous waste from households and many also accept products for reuse. The recycling centre is free for all households in the municipality to use – the cost is included in the local waste management tariff. Waste is collected in many different waste fractions in order to maximise the amount that can be recycled.

Figure 8. Municipal recycling centre in Åhus for bulky waste. Photo: Renhållningen i Kristianstad.

Appendix 2 Summary of national EPR targets

Below is a summary of the targets for all EPR wastes in Sweden together with the achieved recycling results where this information has been available.

Table 1. Compilation of the national targets regarding each EPR 2018.

		Swedish EPR targets		Achieved 2018	
EPR	**Type of product**	**Material recovery**	**Collection rate**	**Material recovery**	**Collection rate**
Packages[1)]	Metal	70 %		84 %	
	Paper	65 %		82 %	
	Plastic	30 %		46 %	
	Glass	70 %		93 %	
	Wood	15 %		51 %	
Newsprint[2)]	Newsprint	75 %		>90 %	
WEEE[3)]	Large household equipment	80 %		85 %	53 %
	Small household equipment	70 %		76 %	24 %
	IT and telecom equipment	80 %		86 %	52 %
	Audio and visual equipment	80 %		84 %	131 %
	Lighting equipment	55 %		78 %	85 %
	Toys and sporting equipment	55 %		70 %	13 %
	Medical equipment			84 %	20 %
	Surveillance and control equipment			86 %	10 %
	Vending machines			66 %	9 %
Batteries[3)]	Car and industrial batteries containing lead		95 %		53 %
	Car and industrial batteries not containing lead		95 %		61 %
	Other batteries		75 %		47 %
	Batteries containing mercury	98 %			
	Batteries containing lead	65 %		99 %	
	Batteries containing cadmium	75 %		97 %	
	Other batteries	50 %		65 %	
End-of-life vehicles[4)]	Vehicles	85 %		87 %	
Tyres	Tyres	None		>100 %	
Deposit return system	Plastic bottles (PET),	90 %		83 %	
	Metal cans[5]	90 %		81 %	

1)Rate of material recovery defined as the amount of material recovered compared to the amount entering the market. Objectives until 2020.

2) The amount of newsprint put on the Swedish market is not reported due to confidentiality reasons. However, according to Papperskretsen, over 90% of newsprint is recycled

3) Rate of material recovery is defined as the amount of material recovered compared to the amount collected in a separate collection system.

3) Batteries have both targets concerning collection rates, defined as the amount of batteries collected in relation to the amount put on the market, as well as targets for material recovery or special care concerning the metal content of a battery. Note that the collection rates for batteries are based on what is reported through the producer responsibility schemes, which does not necessarily reflect all batteries collected. The collection rate used in Swedish statistics is also based on the amount collected compared with the amount placed on the market in the same year.

4) Rate of material recovery is defined as the proportion, by weight, of the car that is reused or recycled.

5) There are indications that show that, due to export from Sweden to Norway, a large proportion of the Swedish ready-to-drink metal cans are returned to the Norwegian deposit return system. The exported cans are still utilized, however, not within Sweden.

Extended Producer Responsibility in Sweden

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An overview of Extended Producer Responsibility in Sweden for packaging, newsprint, electrical and electronic equipment, batteries, end-of-life vehicles, tyres and pharmaceuticals

Extended Producer Responsibility is a widely used environmental policy in which the producer's responsibility for a product is extended to the postconsumer stage of a product's life cycle. There are currently EPR schemes for seven product groups in Sweden. The purpose of this report is to provide an overview of the Swedish EPR schemes, to describe how they have developed over time and how they are currently organized and function.

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