circnets

WP3 REPORT

D.3.1.1 Report about the implementation of EPR in the NPA area

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Interreg
Co-funded by the European Union
Northern Periphery and Arctic
CIRCNETS

Contents

ACRONYMS AND ABBREVIATIONS

EEA	European Economic Area
EU	European Union
WFD	Waste Framework Directive
SUP	Single-use plastics
SUPD	Single-use plastics directive
EPR	Extended producer responsibility
NPA	Northern Periphery, and Arctic
CIRCNETS	Blue Circular Nets project
EOL	End-of-life
ARF	Advance Recycling Fees
DRS	Deposit Refund Systems
PRO	Producer responsibility organization
WEEE	Waste electrical, and electronic equipment

EXECUTIVE SUMMARY

The Northern Periphery and Arctic (NPA) area, comprising of Finland, Ireland, Iceland, Norway, and Sweden, has made significant strides in implementing Extended Producer Responsibility (EPR) schemes to manage waste more sustainably. These countries have shifted the financial and operational responsibility for waste management from municipalities to producers, encouraging more sustainable product design and higher recycling rates. The EPR systems in the NPA region cover a wide range of product categories, including packaging, waste electrical and electronic equipment (WEEE), batteries, end-of-life vehicles (ELVs), tires, and, in some cases, fishing gear and agricultural plastics.

Finland has a well-established EPR system, with Producer responsibility organizations (PROs) managing waste streams such as packaging, WEEE, batteries, ELVs, and tires. The country employs a highly effective deposit-refund system for beverage packaging, which has achieved high return rates. Finland has also recently introduced EPR for fishing gear, with a transition period underway to establish collection networks.

Ireland, on the other hand, has six active EPR schemes covering packaging, WEEE, batteries, ELVs, tires, and agricultural plastics. The country has successfully met EU recycling targets, particularly for packaging waste, through schemes like Repak. Ireland has also introduced EPR for single-use plastics (SUP), requiring producers to cover the costs of litter cleanup.

Iceland's EPR system, managed by the Icelandic Recycling Fund (IRF), covers packaging, WEEE, batteries, ELVs, fishing gear and textiles. The country has a deposit-refund system for beverage containers and is working to improve recycling rates, particularly for plastics. However, Iceland faces challenges due to its small population and remote location, which increase the costs of waste processing and export.

Norway has stringent EPR regulations, particularly for packaging, WEEE, batteries, and ELVs. The country operates a highly effective deposit-refund system for plastic bottles, with return rates exceeding 90%. Norway is also preparing to implement EPR for textiles by 2025, aiming to address the high consumption and short lifespan of textile products. Norway was also planning to implement an EPR system for fishing gear, but this process is delayed and will probably not take place until 2026.

Sweden's comprehensive EPR system covers packaging, WEEE, batteries, ELVs, tires, and, more recently, fishing gear. The country has a strong focus on kerbside collection and recycling stations, with municipalities playing a significant role in waste collection. Sweden has also introduced EPR for single-use plastics, including tobacco filters and wet wipes. Across the NPA region, municipalities play a crucial role in waste collection, particularly for household waste, but the financial responsibility for managing waste is increasingly shifted to producers through EPR schemes.

Despite the progress, the NPA countries face several challenges. High costs associated with waste processing and export, low collection rates for certain materials like small batteries, and the need for improved infrastructure for recycling complex waste streams such as textiles and fishing gear remain significant hurdles. The expansion of EPR to new product categories and the continued collaboration between producers, municipalities, and waste management companies will be crucial for achieving sustainable waste management goals in the NPA area. The NPA countries are well-positioned to lead in sustainable waste management, but ongoing efforts to improve infrastructure, increase public awareness, and enhance recycling technologies will be essential for future success.

1 INTRODUCTION

Blue Circular Nets (CIRCNETS) is an INTERREG project funded by the Northern Periphery and Arctic 2021–2027 (NPA) program, which addresses marine litter issues. Single-use plastics and fishing gear containing plastics are the most significant sources of marine plastic litter in Europe, and the European Union has taken substantial steps in tackling these threats to the marine environment. Many single-use plastic (SUP) items have been banned and replaced with items made from more sustainable materials, but a similar approach is not yet possible with fishing gear containing plastic. Therefore, a different kind of approach has been taken. End-of-life (EOL) fishing gear, nets and other fishing gear, which are approaching their best-before date, should be collected separately and recycled in order to prevent them from ending up in oceans and contributing to the marine plastic pollution.

The more specific aim of CIRCNETS is to support the setting up of a collection system for EOL fishing gear in the NPA region. EU's SUP directive requires that producers and importers of plastic containing fishing gear in all EU member countries organise collection of EOL fishing gear based on the extended producer responsibility (EPR) principle. Finding out how collection can be organised regionally in the most efficient and economical way, which also adheres to the "do no significant harm" principle, requires solutions to be looked at from other product categories, for which steps have already been taken towards this. However, the collection of fishing gear opens a possibility to proceed towards a more circular economy and find ways of how to recycle the waste regionally.

In this report, we go through the different EPR schemes in the NPA area. We highlight the various good practices implemented in the different longer-running EPR schemes, which should be considered, as EPR collection and treatment systems for fishing gear (FG) are currently being implemented in the NPA countries. Some of the NPA countries have already started to implement this, whereas others are still at the planning stage. This report will provide background information, based on which, the EPR of fishing gear can be developed further. These findings from other schemes and their suitability for EPR of fishing gear, will be analysed and discussed in detail in an upcoming report of the project, D.3.3.1. An EPR is, first and foremost, a tool to ensure that the actors who put products on the market are also responsible for their whole life cycle to the end-of-life. The producers will have to cover costs related to the various stages of the waste management chain: collection, loading, unloading, sorting, transport, logistics, storage, handling and treatment for each necessary step, as well as any administrative costs. Correctly designed, an EPR can provide better incentives for more circular value chains of the products for which it is implemented.

For more information about the project, visit the website of the project at
https://www.interreg-npa.eu/projects/CIRCNETS/home/

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THE BASICS OF EPR

2 THE BASICS OF EPR

2.1 What is EPR, and what impact does it have?

Lindhqvist (2000) defines EPR as; "*the responsibility for managing the lifecycle of products*" (p. 29). The responsibility of collection, sorting and recycling goods is shifted from consumers and waste management authorities to the producers of those products. Similarly, the OECD (2001), a key player in environmental policy, defines EPR as; "*an approach in which a producer's responsibility for a product extends to the post-consumer stage of its life cycle*" (p. 20). The Directive introduces the *'polluter pays'* principle, and EPR into the European legal framework. These principles were formulated in the 1992 United Nations Rio Declaration on the Environment and Development, specifically in principle 16 of the Declaration. According to these principles, producers and importers are legally, physically, or socio-economically responsible for the environmental impacts arising from their products, and packaging. The OECD, with its significant influence, has also strongly promoted the polluter pay principle, and EPR (OECD, 2001).

Lifset (1993) identified four key motivations for the development of EPR: (1) to achieve specific outcomes, particularly high levels of reuse, recycling, and other forms of recovery; (2) to influence producer behaviour, especially in terms of material usage and product design decisions; (3) to leverage the expertise of producers in areas such as design, manufacturing, marketing, and distribution; and (4) to secure financial resources that would support more ambitious environmental and waste management goals, which might not be possible through public, tax-based funding. In a 1994 report, Vogel (in Lindhqvist, 2000), discussed the rationale behind introducing EPR, specifically referencing the Austrian packaging ordinance of goals for packaging waste. He argued that when manufacturers are financially responsible for recovery, they are motivated to minimise recovery costs. To achieve this, they would explore the possibility of substituting virgin materials with secondary materials. Vogel (1994) also highlighted the unintended consequence of license fees on all packaging used by a company, emphasising how this created an incentive for change. Together, these insights reflect the economic and practical motivations that underpinned the development of EPR. The EPR principle is not a one-size-fits-all approach, but rather, it is implemented through a variety of policy instruments.

2.2 Which products do mandatory EPR systems cover?

EPR adoption is seen as a highly effective approach for improving the sustainable handling of products or certain materials. The EPR-systems initially focused on packaging at the national level in Europe, and the sub-national level in North America (OECD, 2023). In the following decades, the adoption of various EPR systems was driven by EU-level policies on WEEE, batteries, packaging, and vehicles. As of 2023, EPR has been most widely adopted for

electronics, tires, packaging, and vehicle battery product groups, constituting roughly 82% of all EPR schemes (see Figure 1) (OECD, 2023).

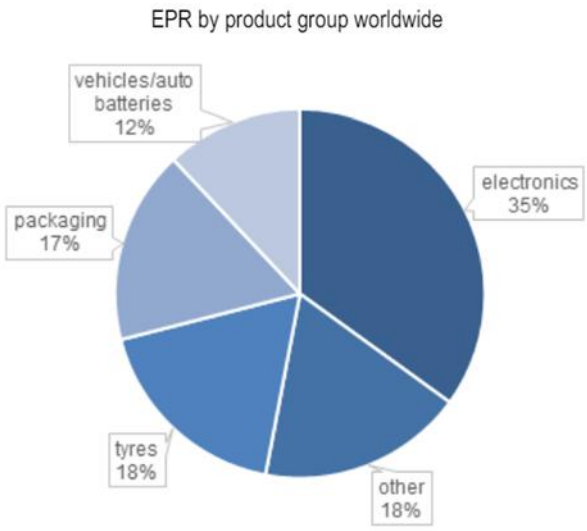

Figure 1. EPR is widely used in several waste streams (Source: OECD, 2023)

The success of EPR in promoting recycling and securing funding for waste management has sparked discussions about expanding its use to more product categories. In the European Union, the extension of EPR to new product sectors is already in progress (see Appendix for more details).

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SEPARATE COLLECTION OF EPR FRACTIONS

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3.1 Financing mechanisms of take-back

The take-back scheme is one of the key concepts of EPR, in which retailers or manufacturers collect the used materials from consumers. Take-back refers to collecting end-of-use or end-of-life products to recover resources and reintegrate materials into production. It is a critical activity for closing the material loop in circular economy strategies (Mallick et al., 2023). The take-back scheme includes the collection of end-of-life (EOL) products, transportation, sorting and disassembly, requalification, and re-engagement of the recovered material, components or products in the forward supply chain. These initiatives are designed to reduce waste, conserve resources, and promote a circular economy by keeping materials in use for as long as possible.

Financing mechanisms for take-back schemes refers to the systems and structures used to fund the collection, recycling, or disposal of products at the end of their life cycle. These mechanisms are designed to ensure that producers, rather than municipalities or consumers, bear the financial responsibility for managing the waste generated by their products. Some key financing mechanisms include, according to OECD (2025):

- **Taxes and charges -** Taxes and charges on goods and services induce behavioural changes by increasing costs. Consequently, they discourage the consumption and production of targeted products or activities. The level of a tax or a charge can be based on the social cost of the activity or physical characteristics (e.g., weight).
- **Subsidies -** Subsidies induce behavioural change by reducing costs for targeted products or increasing benefits for targeted activities. They directly increase the relative cost of polluting products and activities or can increase the use of products or activities that have a positive impact on the environment.
- **Deposit refund systems (DRS) -** A system in which an initial payment (deposit) is made by a customer at the point of purchase which is then refunded if the product or packaging is physically returned by the customer to the collection scheme. DRS set a price for participating in the collection scheme, creating an incentive for customers to participate. DRS correlates with high collection rates, quality of collection, and low littering levels.
- **Advance disposal fees (ADF) -** ADF are charged on products at the point of sale based on the estimated waste management costs. Governments or PROs that collectively fulfill EPR obligations set an ADF that creates a cost/price for EOL collection and recovery services. These help to internalise the costs of these services to the producers and consumers of products that become waste.

According to the OECD (2021), governments employ economic tools like taxes, emissions trading schemes, and subsidies to encourage behavioural change. As countries face growing volumes and complexity in waste management, the OECD offers policy analysis and guidance on EPR, a policy approach that shifts responsibility for products from municipalities and consumers to producers. A key goal of EPR is to promote designs for the environment. However, in collective EPR schemes, the fee structures set by producer responsibility organisations (PROs), are often quite simple, typically differentiating fees by material and weight, which provides only weak incentives for producers to make design changes. Fee modulation, however, adjusts the fees producers pay based on the design features of their products, offering more targeted incentives for design improvements. Policymakers can establish the regulatory framework necessary for implementing fee modulation within EPR systems. A PRO is usually a non-profit group made up of manufacturers, importers, or retailers. They work together to handle their combined EPR obligations, such as collection, recycling, reporting, and compliance, more effectively than they could on their own (Uhrenholt et al., 2022).

3.2 Physical collection networks

According to Lindhqvist (2000), EPR systems are structured in various ways, and understanding the factors that influence collection outcomes requires reviewing experiences from different system implementations. It is also important to consider valuable insights from recycling systems that were established without directly referencing EPR. The review focuses on three main types of systems:

- **Deposit-refund systems**, where consumers receive a refund upon returning a used product. This includes all systems where consumers are financially compensated for returning discarded products, whether or not this compensation matches the initial deposit paid at purchase. Buy-back systems are also included in this category.
- **Kerbside collection systems**, where discarded products are collected near individual homes, similar to regular household waste collection.
- **Bring systems**, where consumers are required to bring discarded products to a container or designated location, typically a short or long distance from their homes. This category includes drop-off centers and recycling stations.

These system types provide valuable insights into the factors influencing collection results in EPR systems.

4

EPR IMPLEMENTED IN THE NPA AREA

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The main goals of EPR schemes in the NPA countries align with those of the rest of the world. Firstly, the aim is to increase the collection, and recycling rates of targeted products, and materials while shifting the financial responsibility from municipalities to producers (European Commission, 2014). The main idea behind shifting this responsibility is to motivate producers to consider environmental factors when designing their products, thus creating products, and packaging that are easier, and less costly to reuse, and recycle. EPR creates an individual obligation for each producer or importer to ensure that their products will be collected and treated at the end of their life cycle. Producers often establish a joint collective structure, a PRO, to fulfil their legal obligations, such as taking back products at the end of their life cycle (OECD, 2021).

The NPA countries have all implemented EPR schemes to varying degrees, encompassing a wide range of products. These schemes exhibit differing structures across individual NPA countries and within each country, resulting in significant variations in the setup of EPR waste markets in the region. The table below (Table 1) provides an overview of the EPR schemes in the NPA countries.

Table 1. Overview of the EPR schemes in the NPA countries

	Packaging	WEEE	BAT	ELV	Tyres	Paper	SUP products	Medical waste	Agricultural films
Finland	X[1]	X	X	X	X	X [2]	X [3]		X (voluntary)
Iceland	X	X	X	X				X	X
Ireland	X	X	X	X	X				X (voluntary)
Norway	X	X	X	X	X				
Sweden	X	X	X	X	X	X	X	X	X

1 Including beverage packages (bottles, and cans)

2 Paper products

3 Empty drinking mugs, and their lids/caps, wet wipes, balloons, tobacco filter products, and tobacco filters

4.1 Finland – Product categories covered by EPR

Finland's EPR system is strongly based on PROs in all product groups. Primarily, producers should join existing PROs or establish a new one with other producers, and only in exceptional cases can a company be granted permission to manage its producer responsibility independently. The producer responsibility obligation also covers distance sellers, who need to have an authorised representative in Finland who takes care of and is responsible for the implementation of EPR on behalf of the company that is located abroad.

The Pirkanmaa ELY Centre supervises, approves producers, and PROs, and maintains a register of PROs in Finland (Waste Act 646/2011). Companies with producer responsibility pay recycling fees to a producer organisation based on the products put on the market, and the funds are used to take care of the collection, recycling of waste, and other statutory duties. PROs have contracts with waste management operators for the actual collection and recycling operations.

4.1.1 Packaging

Packaging is one of the first sections under producer responsibility in Finland. Currently, there are two PROs: Finnish Packaging Producers Ltd, and Sumi Oy. Both are responsible for the collection, and recycling of cartons, and paper, glass, metal, plastic, and wooden packaging in Finland (Government Decree on Packaging, and Packaging Waste 1029/2021). Producer responsibility is taken care of by joining a producer organisation. Companies with producer responsibility pay recycling fees to a producer organisation, which uses the funds to take care of the collection, and recycling of packaging waste, and other statutory duties.

The Rinki is a service company founded and owned by Finnish industry, and retail trade, and handles, on behalf of the producer organisations, tasks such as the collection of packaging data from companies, and the network of eco take-back points for consumers, it also offers advice on sorting and recycling. Compared to other packaging, a special implementation of EPR is used for beverage packaging in Finland. For them, a deposit-based return system is used, and guided by the beverage packaging tax (Government Decree on a return system for beverage containers 1322/2022). A beverage packaging tax is collected for the packages of alcoholic beverages, and soft drinks, but by becoming members of approved, and operational return systems, beverage manufacturers, and importers are exempted from the beverage packaging tax. At the same time, the deposits of the packages encourage consumers to return empty beverage packages for recycling, which prevents packaging from ending up in nature or mixed waste. In practice, most beverage manufacturers, and importers in Finland are members of return systems managed by Suomen Palautuspakkaus Ltd. (Palpa), which manages the recycling systems of deposit beverage packaging for aluminum cans, PET plastic bottles, and glass bottles. In addition to the PALPA system, the international grocery retailer

Lidl, also has its deposit system in Finland, which also accepts PALPA beverage packages, but does not pay PALPA's deposit back upon return.

4.1.2 Waste Electrical & Electronic Equipment (WEEE)

Producer responsibility for collecting Electrical, and electronic equipment (EEE) takes place at fixed collection points and in-store collection. Also, mobile collections are organised once or twice a year in some of the most remote areas in the Baltic Sea archipelago, and Northern Finland. There are currently 5 PROs that implement WEEE producer responsibility in cooperation and under a common brand of WEEE Recycling. Producers are required to set up 400 collection points, and at least 1 point/municipality for consumer WEEE, and organise the collection of other types of WEEE. In addition, distributors, such as shops, must arrange a free reception for small WEEE (all dimensions < 25cm) without purchase obligation, and a 1:1 ratio for larger devices when purchasing a new one (Government Decree on WEEE 519/2014). Private users can bring their old products to these collection points for free, while non-private users need individual transportation contracts with waste management operators. In 2024, there will be approximately 50 B2B WEEE reception points nationwide. Most of them are located on the premises of private recycling companies, which also serve as pre-treatment stations for WEEE collected from households. In the pre-treatment stations, WEEE is sorted based on its types and pretreated before being directed to actual treatment facilities.

4.1.3 Batteries and accumulators

Producer responsibility for batteries, and accumulators is carried out in Finland through fixed collection points, and store collection, depending on the battery type. Battery and accumulator producers have established four PROs focused on different types of products. There are two PROs for small portable batteries, and batteries, while one PRO focuses only on lead-acid accumulators, and another on large professional accumulators used in the Finnish industry. Collection is free for end-users of all portable batteries and accumulators, handheld industrial batteries, and portable lithium vehicle batteries, but in the case of large industrial accumulators, recycling fees are collected when accumulators are returned for recycling.

PROs take care of all collection, treatment, and EPR administrative activities, and costs are covered by producers' membership fees. The costs consist of a one-time registration fee, and annual recycling fees, which depend on the battery type. Currently, batteries and accumulators are divided into three categories with different financing practices: 1) For portable batteries and handheld accumulators, annual recycling fees are determined by quantities placed on the market (POM), and vary according to recyclability; 2) For lead-acid batteries, recycling fees are also charged annually for all vehicle and industrial batteries placed on the market on a ton basis, and 3) For large industrial (non-Pb) accumulators, a fixed administration fee is charged from producers annually, but no recycling fees are collected based on POM. Instead, the recycling fees are collected from the producer or, if separately agreed, the end user when accumulators are returned for recycling.

4.1.4 End-of-Life Vehicles (ELV)

Producer responsibility for ELV came into force in Finland in 2004. It requires that at least 85% of the components and/or materials are reused or recycled, and 95% are utilised. In addition, a maximum of 5% can be disposed of in landfills. There is one PRO in Finland, Finnish Car Recycling Ltd, that is responsible for achieving these goals. It has a combined network of fixed collection points, and in-store take-back of scrap vehicles, where the last owner of the vehicle can return the ELV without a handling fee. When returning the car to an authorised return point, the owner also receives a decommissioning certificate that stops the tax payment. Many of these reception points are the same actors that operate ELV later in their recycling phase.

4.1.5 Tires

Finland has introduced EPR for vehicle tires as well. Finnish Tyre Recycling acts as a PRO of tyre producers, and is responsible for the collection, and recycling of end-of-life tires in Finland. The collection of EOL tires is organised as a reception at fixed points, and stores at approx. 3,400 collection points nationwide. The tires collected are then delivered to the regional terminals, where the tires are sorted into reusable, refurbished, and recycled ones. Most tires are recycled as material, and for that, PRO has its own mechanical tyre recycling plant in Southern Finland, where it produces rubber crumbs as a raw material for industry. Tyre recycling is financed with a recycling fee charged when buying new tires, which is determined by size. Since the recycling fee has already been paid at the time of purchase, the return of used tires for collection is free for the end user.

4.1.6 Paper

In Finland, EPR for paper has been in force since the 1990s. It applies to manufacturers, and importers of paper, and paper products, and covers newsprint, magazine papers, office papers, and products, commercial catalogues, and other paper products. As a rule, the collection requirement includes all paper, and similar products that go through the post. Currently, there are two producer associations in Finland: Finnish Wastepaper Producer Organization Ltd, and Suomen Keräystuote Oy. Legislation (Government Decree on the Separate Collection, and Recycling of Wastepaper 270/2023) requires that producers organise a national collection network so that the consumer can return the paper to the system easily, and free of charge. In practice, paper collection is carried out directly from housing association properties or through a regional collection network. The regional collection network is intended for residents of single-family houses in urban areas, and residents of sparsely populated areas.

4.1.7 Single-use plastic (SUP) products

For certain single-use plastic (SUP) products, EPR obliges producers to bear the cost of cleaning. In this case, the producers pay a share of the cleaning costs incurred by the municipalities based on the production volume of their SUP products. Another set of SUP legislation is the extension of the producer's responsibility to cover fishing gear. For fishing gear waste, the EPR comes into effect as a separate collection obligation. A transition period

is still underway in Finland, so the introduction of EPR and the establishment of the collection network are still in progress. One PRO for fishing gear was established in 2024, and RINKI (e.g. the service provider for the implementation of EPR for packaging) will provide them with services for fishing gear waste collection, and EPR reporting when the collection starts at the beginning of 2025. In the first phase, collection will be carried out through 75 fixed collection points, and later, the number will rise to at least 150. The fixed collection point network might also be supplemented with mobile collection.

4.1.8 Agricultural plastic films

In Finland, EPR for agricultural plastic films has not been implemented by law, but the main actors in the field established in 2023, the voluntary recycling community for agricultural plastics – Suomen Maatalousmuovien Kierrätys Oy (SuMaKi) to collect and recycle the bale films. The collection of bale plastic takes place as a pick-up service directly from the farms. Bale plastics must be clean of impurities, and they must also be sorted according to colour into white, and coloured fractions. The pickup order is placed in SuMaKi's mobile application directly into their electronic system. The pick-up time is agreed on a case-by-case basis, and it is then done by truck from the given location coordinates.

Table 2. Summary table of Finland's EPR system by product groups.

Product Type	Take-back requirements	Operators	Financing	Collection methods	Extent of collection
Packaging	Collection: 90 w-% of POM annually Recycling: Minimum requirements from 1.1.2025 onwards 50 w-% for plastic packaging 25 w-% for wooden packaging 70 w-% for ferrous metal packaging 70 w-% for aluminum packaging 70 w-% for glass packaging 75 w-% for paper and board packaging	2 PROs: Finnish Packaging Producers Ltd Sumi Ltd. Rinki, as a service company, provides services for PROs. Municipalities hold tenders and take care of the collection for households on a property-by-property basis, while producers pay the costs (min. 80%) for them. Companies are responsible for sorting of packaging waste and organizing its transport from their properties to the terminals. Transportation can be arranged with a waste transport company, but the transportation costs remain with the company produ-cing the waste. Terminals accept	For consumers, invisible fees are included in product prices. Producers pay a recycling fee to the PRO based on the products put on the market. Beverage packaging manufacturers and importers pay a membership fee and package-specific recycling fees for belonging to the deposit-refund system. Payments received from members of PROs are used to cover the costs of the return systems.	Property-specific collection from residential properties with 5+ apartments in the urban areas of 10,000 residents or more Regional RINKI collection point network for households, especially for single-family house residents In the deposit-refund system, return machines are in retail stores. In addition, everyone who sells beverage packages to consumers is obliged to accept them back Fixed reception network of terminals for packaging wastes from households and companies	Property-specific collection: ~90,000 housing associations Regional collection network: ~1500 reception points for metal, glass, and fibre packaging, and ~1100 for plastic packaging. Deposit-refund systems: PALPA ~4,000 return machines; LIDL ~200 retails stores with a return machine. Reception terminals: In total, ~200 terminals. Some accept all packaging materials from households and companies, some are source and material-specific ones.

		the materials free of charge.			
Paper	Collection: 85% of POM annually	2 PROs: Suomen Keräyspaperi Tuottaja-yhteisö Oy; Suomen Keräystuote Oy	Collection is free for consumers. PROs collect a recycling fee from their members according to the amount placed on the market each year (e.g. Keräyspaperi Tuottajayhteisö: €1.0/ton of Placed on Market (POM) in 2025)	Property-specific collection from all housing association properties in urban areas Regional collection network for residents of single-family houses in urban areas and residents in sparsely populated areas	Property-specific collection: housing associations have > 152,000 buildings Regional collection network: ~7000 reception points
WEEE	Collection: 65% of POM in preceding 3 years Treatment: 65-85% depending on the category	5 PROs: SELT FLIP ry (only for fluorescent, gas discharge and LED lamps) ICT Producer Co-operative -TY (for consumer electro-nics and information tech-nology equipment) SERTY Ltd EPR Finland SELT, FLIP and ICT Producers Co-operative has established a joint service provider Elker Ltd	For consumers, invisible fees included in products prices. Producers pay a recycling fee to the PROs based on the products put annually on the market. (e.g. Recycling fee in FLIP is €0.05/pcs) The collection network is intended for households and is free of charge. Take-back is also free of charge for companies, but they are responsible at their own expense for organizing the transport EEE waste from their property to B2B reception points or directly to sorting terminals.	Fixed collection network for households, also separate B2B reception points network for larger amounts of WEEE from companies. Mobile collection in sparsely populated and/or otherwise challenging regions In-store collection for s-WEEE and 1:1 basic for other WEEE	Fixed collection network: ~470 reception points, at least 1/municipality. Typically, at municipal waste stations or recycling centres, but also in private WEEE recycling operators and/or service providers' premises In-store reception points: hundreds of shops receive small WEEE. Taking back large WEEE is less common in stores, because new devices are usually transported home for installation, and old ones can be delivered directly to sorting stations by transport services.

Batteries and accumulators	Collection: 45 w-% Treatment: Of the collected batteries, all identifiable ones must be processed	4 PROs: Recser Ltd ERP Finland Akkukierrätys Pb Oy (only for lead-acid batteries) Finnish Car Recycling Ltd (only for driving power batteries for electric and hybrid vehicles)	Collection is free for end-users of all portable batteries and accumulators, handheld industrial batteries and portable lithium vehicle batteries. The collection is financed by annual recycling fees charged by producers based on POM. In the case of large industrial accumulators, recycling fees are collected when accumulators are returned for recycling.	In-store collection for portable batteries and accumulators Fixed collection points and in-store collection for lead acid batteries and batteries for electric and hybrid vehicles	In store reception points for portable batteries and accumulators: Around 10 000 collection bins at stores. All stores selling portable batteries are obligated to take them back Lead acid batteries: ~450 take-back points at e.g. waste stations, hazardous waste collection points, battery sellers, car repair shops, scrap metal recyclers. Batteries for electric and hybrid vehicles: ~300 take-back points utilising the ELV collection network
ELV	Treatment: 85 w-% for reuse or recycling and 95 w-% for recovery, disposal in a landfill < 5%	1 PRO: Finnish Car Recycling Ltd	EOL vehicles can be delivered free of charge to any take-back point. Producers are responsible for all costs related to the collection and treatment of ELVs.	Combined network of fixed collection points and in-store collection	~300 take-back points at service stations, car repair shops and dismantling facilities, scrap metal recyclers, waste centres, etc.
Tyres	Treatment: 95 w-% from annual POM for reuse, recycling or other recovery	1 PRO: Finnish Tire Recycling	Recycling is financed by the recycling fee collected when buying new tires. The fee is determined by the size class of the tires.	Combined network of fixed collection points and in-store collection	~ 3400 reception points at tire shops, car shops and service stations, waste centres, etc.

			Used tires can be returned to the stores for free.		
Fishing gear	Collection: 10 % from annual POM	1 PRO: SUP-producers Ltd Rinki, as a service company, provides services for the PRO.	The collection is free of charge, but companies and entrepreneurs are responsible at their own expense for organizing the transportation of fishing gear waste from their property to the terminals. PRO will treatment organise the collection, transportation and treatment, while costs are covered by recycling fees paid by producers. PRO's estimated collection and processing costs are €800/ton of products POM.	Fixed reception network of terminals where professional fishermen and fish farmers can return waste. Fixed reception points for standing fishing gear intended for recreational and/or small-scale professional fishermen. Can be organized, e.g. in fishing ports or regional waste reception points. Mobile collection in sparsely populated and/or otherwise challenging regions. In-store collection for lure fishing, angling and ice fishing gear. The collection is intended for recreational fishermen and can be implemented seasonally and/or in connection with fishing or maritime events.	Fixed reception points: ~20 terminals close to the biggest players in the fishing and aquaculture industry. nationwide, at least 75 fixed reception points for standing fishing gear in 2025 (Long-term requirement: 150 reception points). Mobile collection: In the transitional phase, mobile collection can partially replace a fixed collection network for standing fishing gear. Mobile collection will be implemented in at least 75 locations in 2025.
Other SUP products		Municipalities take care of the cleaning and receive the compensation paid by	Producers pay cleaning fees to the national EPR authority, which distributes		Municipalities must arrange collection

		the producers through the national EPR authority.	the fees to the municipalities according to the number of inhabitants. Cleaning cost compensation for municipalities in 2024 is €4.79/inhabitant (while the average of actual costs is €7.2/inhabitant). In addition to compensation, municipalities can receive direct financial support for investments in cigarette butts bins and communication to prevent littering.		containers for cigarette butts in public areas. Requirements for the number of bins are gradually getting stricter. - one per 900 inhabitants from 1.1.2024 - one per 600 inhabitants from 1.1.2025 - one per 300 inhabitants from 1.1.2026
Agricultural films	(voluntary EPR)	Agricultural plastics recycling community: Suomen Maatalousmuovien Kierrätys Oy (SuMaKi)	Bale plastic prices include a recycling fee, which covers the collection and recycling of bale films directly from the farms.	Pick-up service of sorted bale plastics directly from farms. The pick-up order is made in SuMaKi's electronic system, and the pick-up time is agreed on a case-by-case basis.	

Notes: POM, placed on the market

4.2 Ireland – Product categories covered by EPR

Ireland implements six EPR schemes under the "polluter pays" principle, where producers are financially accountable for the end-of-life management of their products. This comprehensive approach aligns with EU waste and circular economy directives and has helped Ireland consistently meet, and often surpass, its environmental targets.

4.2.1 Packaging & Single-Use Plastics

Under EU regulations, Ireland must recycle 65% of its packaging by 2025 and 70% by 2030, with a national ambition for all packaging to be reusable or recyclable by 2030. Since 1997, Repak Ltd., the country's only licensed packaging PRO, has coordinated compliance. Producers pay fees based on packaging weight and material, with brandholders and importers paying the most. These funds subsidise licensed operators to collect and process packaging waste. Major producers, defined by significant turnover or packaging output, must join Repak and implement segregated customer take-back, on-site signage, and data reporting. Commercial landfill for packaging is banned. Financing from Repak members is distributed to licensed recyclers (e.g., Panda, Greenstar) to manage commercial kerbside (62%), household kerbside (23%), and civic amenity site (15%) collections. Local authorities handle enforcement and facility permitting, with the EPA supervising recyclers and working closely with Repak to curb unauthorised Green Dot use. Enforcement is thus shared between Local Authorities, which oversee regulations and permitting and the EPA, which license recovery operators. Repak further monitors unauthorised use of its branding. Producers must segregate materials like glass, paper, plastics, steel, wood, and fiberboard on-site and ensure collection by licensed operators. Landfilling such waste is prohibited. Major producers also must provide customer take-back, display signage, and report packaging volumes, while household and commercial consumers adhere to the Waste Management Act.

In 2023, Repak members recycled approximately 16.9 million tons of packaging, about 55% of total packaging, while 632 million euros were contributed by members to fund the system. Many businesses engaged voluntarily in the Plastic Pledge initiative, achieving an average 72% recycling rate at their premises and up to 43% recycled content in packaging. Since January 2023, packaging producers have also funded clean-ups of single-use plastics, and new EPR obligations for wet wipes and balloons are due by December 2024. In 2022, Ireland achieved a packaging recycling rate of 60%, slightly rising from 58% in 2021, with glass, wood, and ferrous metals meeting 2025 targets. However, plastic and aluminium recycling still lag behind targets. New regulations effective January 2023 requires producers to fund litter clean-ups for SUP items such as cups, bottles, wrappers and a deposit-return system for bottles is set to boost plastic and aluminium recycling rates.

4.2.2 Waste Electrical & Electronic Equipment (WEEE)

Ireland's WEEE scheme, governed by EU Directive 2012/19, is administered by two PROs: WEEE Ireland, established in 2004 and covering 96% of batteries and 74% of household EEE, and ERP Ireland, WEEE Ireland was founded by key electronics and appliance associations. ERP Ireland was established in 2002 and operates across 12 European countries, including Ireland. B2C producers must register monthly reports in weight and units and may join a PRO or self-comply. Retailers are required to provide free one-for-one take-back and offer in-store drop-off for small WEEE. Consumers can return WEEE to civic amenity sites, collection events or retailers. WEEE Ireland operates across 17 regions, while ERP covers 10; WEEE Ireland also manages lamp collection nationwide. Collection methods include civic facilities, bulk drop-offs, and services like Recycle IT in Dublin.

Ireland maintains six active EPR schemes grounded in the "polluter pays" principle, which holds producers financially responsible for managing their products' end-of-life in an environmentally sound manner. These schemes support Ireland's shift towards a circular economy, helping the country consistently meet and exceed EUs recycling and recovery targets.

In 2023, Irish consumers returned record volumes of 41,730 t of e-waste (~18.1 million appliances), with over 80% of materials recovered. Despite being able to handle the highest volume ever, take-back rates remain below the EU target of 65%, with actual collection declining to approximately 63,946 t, a drop of 3% from 2022. In contrast, WEEE Ireland's operational recovery rate currently stands at around 97%, with 80% of materials recycled.

4.2.3 End-of-Life Vehicles (ELV)

ELVES, established in 2017, oversees Ireland's ELV scheme. Vehicle owners must deliver end-of-life vehicles to Authorised Treatment Facilities (ATFs), which depollute hazardous substances, issue Certificates of Destruction, and process vehicles through shredding. The program, funded by car importers and producers, covers over 60 ATFs nationally. Local authorities enforce regulations, while ELVES assists ATFs through training, audits, and compliance support. In 2022, Ireland exceeded EU targets, recycling 87.8% of vehicle materials and achieving a 95.7% overall recovery rate, surpassing the required 85% and 95% thresholds.

4.2.4 Batteries & Accumulators

Also overseen by WEEE Ireland and ERP Ireland under the EU Batteries Directive, this scheme requires producers to register monthly battery volumes and either join a PRO or self-comply. Retailers must provide free take-back, while producers ensure collection points at retail and civic locations. Automotive and industrial battery disposal must be arranged directly. In 2022, ERP Ireland achieved 48% battery collection, exceeding the 45% EU target, while WEEE

Ireland's 46% portable battery return rate also aligns with progress toward the EU target of 65% by 2025.

4.2.5 Tires

Since 2017, Circol ELT (a Repak ELT subsidiary) has run the tire EPR scheme. Producers register tires placed on the market; retailers must provide take-back when new tires are sold, charging an Environmental Management Cost (EMC). Civic facilities also accept used tires. EMC revenues fund free collection and recycling managed by Circol ELT. The EPA and Local Authorities oversee regulatory compliance. In 2022, Ireland collected approximately 62,931 t of waste tires and achieved a 95% recovery rate in 2023, significantly above EU targets. From 2025, the scheme will also include truck, bus, agricultural, and industrial tires.

4.2.6 Farm Plastics-Agricultural Films

Ireland was one of the first countries to target agricultural plastics under EPR, with legislation dating back to 2001 and updates in 2017. The Irish Farm Film Producers Group (IFFPG) manages the scheme, which covers silage film, bale wrap, fertilizer bags, twine, and pesticide containers. Producers must register, contribute levies, or operate deposit-refund systems. Farmers return clean and sorted plastics through farmyard pickups, mobile bring centres, civic sites, or authorised collectors. In 2022, IFFPG recovered 36,524 t of wrap (88% return rate), 1,091 t of twine/netting, and 1,087 t of other plastics. Enforcement is managed by the EPA and Local Authorities.

Table 3. The charges for farmers at bring centres, and farmyards in 2022 were:

Service	With Label Code (500 kg)	Without Label Code (500 kg)
Bring-centres	€50	€100
Farmyards	€100	€200

The label code is received by farmers from retailers when they purchase farm film, which has the recycling levy applied and entitles farmers to significantly reduced rates at collections. 500 kg of farmer plastic waste equates to approximately 200-250 wraps. In the case of non-silage plastics (fertilizer & meal bags, drums), farmers are charged €10 per 500 kg bag of material, while netting is charged €10 per bag. It is recommended that old bulk fertilizer bags be used to store, and present non-silage plastics.

Table 4. Summary table of Ireland's EPR system by product groups

Product Type	Take-back requirements	Operators	Financing	Collection methods	Extent of collection
Packaging	Producers: must segregate the packaging waste arising on their premises into specified waste streams and have it collected by authorised operators for recycling. Producers must provide information on the weight of packaging they have supplied to the distributors, and use only authorised recovery operators for the collection and recovery of packaging waste. Major producers: they have responsibilities for the recovery of packaging waste from their customers, meeting prescribed targets, on-site signage, public advertising, data reporting and registration with local authorities. Major producers are now required to become members under the Repak scheme. End users: All users (households and corporate organisations) have responsibilities under the Waste Management Act 1996-2012 and waste collection bye-laws.	Repak	Repak is solely funded by its members and the fees they pay. Repak's members are charged on the type and amount of packaging they produce, i.e. the more packaging they place on the Irish Market, the more they pay. Repak operates a shared responsibility fee system to its Major Producer members	Municipal and packaging wastes are collected for recycling and recovery via three main collection routes, commercial kerbside (62% of packaging waste), household kerbside (23% of packaging waste) and civic amenity sites/bring sites (15% of packaging waste).	Recycling rates: In 2018, Ireland's recycling rate for packaging waste was 64%, and the recovery rate was 91%. Recycling Targets: The recycling targets are at 65% by 2025 and 70% by 2030 for packaging waste.

WEEE	Producers: Business to consumers (B2C) Producers are responsible for collection, recycling and treatment targets. They must register with the WEEE Register Society (National Registration Body) and report to the Blackbox the amounts (units and kg) of EEE placed onto the Irish market on a monthly basis. Distributor/retailers: they must: - Be registered with their local authority or with one of the compliance schemes. - They must accept back WEEE from customers free of charge on a one-to-one basis on the sale of a product of similar type or have performed the same function as the new product purchased. - Ensure that if supplying new EEE from a retail premises with a sales area relating to EEE of at least 400 m2 that provision is made for the in-store collection of very small WEEE (no external dimension more than 25cm) free of charge to end-users and with no obligation to buy WEEE of any type. - Ensure that customers are informed of the WEEE take back facilities available to them. - Ensure that the storage and transport of WEEE collected meets the requirements outlined in the Regulations and that the WEEE is delivered to an approved facility.	2 PROs: WEEE Ireland ERP Ireland	B2C Producers are obliged to finance the take back of WEEE. Business to business (B2B) Producers are obliged to finance the takeback of historic and new B2B WEEE.	The collection method is done through retail sites, Civic Amenity Sites and other special collection points (lamp collection points, community collection, door to door collection, etc). In Dublin WEEE Ireland partner with Recycle IT to help serve city locations, schools, charities and community groups including residents' associations so they all can avail of safe electrical recycling opportunities.	An average of 97% of material across the WEEE categories was recovered for use again in manufacturing or final energy recovery. In 2022 WEEE Ireland achieved 54% takeback collection rate based on standard three-year average POM comparison methodology

	Final users: All users (households and corporate organisations) have responsibilities under the Waste Management Act 1996 -2012 and waste collections bye-laws. Private householders or consumers can bring their WEEE to Local Authority Civic Amenity Sites (CASs), special collection days organised by Local Authorities and PROs and to retail outlets for one for one take take-back.				
Batteries and accumulators	The following provide free take-back: Retailers Producers must facilitate take-back points at retail locations and civic amenity sites Local Authorities must provide collection points for all types of batteries (including automotive & industrial) at Civic Amenity Sites. Producers of Automotive & industrial batteries must also arrange the collection of these types of batteries directly from end users.	2 x PROs WEEE Ireland ERP Ireland	The producers are obliged to finance the take-back scheme and cover the costs of collecting, transporting, treating, and recycling waste batteries. Producers must either join a compliance scheme or prove they are self-compliant.	Store collection Civic amenity Sites Special Collection Automotive & industrial	In 2022, WEEE Ireland achieved a 46% waste portable battery collection rate on behalf of Members.
ELV	When a vehicle has reached an "end-of-life" status the registered owner is legally obliged to deliver the vehicle to an Authorised Treatment Facility (ATF). Following this, the registered owner is issued with a Certificate of Destruction (COD). The ATF is obliged to depollute the ELV of hazardous components and remove parts for recycling and recovery.	ELVES	ELVES is funded by its Producer members, new and used vehicle importers.	The ELVES Network of recycling facilities consists of over 60 Authorised Treatment Facilities (ATFs) all around the country. These permitted scrapyards will take back old car or small van for free or with a economic compensation. They will issue a Certificate	ELV targets are of 85% and 95% set in 2017, which have to be met by its Network and the country as a whole. In 2021, Ireland, supported by ELVES, achieved a reuse and recycling rate of 87.8% and an overall

				of Destruction to the end consumers.	combined reuse and recovery rate of 95.7%.
Tyres	Tyre retailers, garages and tyre fitting services are legally obliged to offer a take back service for old tyres when new ones are purchased.	Circol ELT (www.circolelt.ie) are a subsidiary of Repak ELT and are the PRO tasked with sustainable recycling within the tyre industry.	The compliance scheme is funded by an Environmental Management Cost (EMC) paid by the producers to Circol ELT. All imported used car and motorcycles placed onto the Irish market for the first time incur a charge to cover the Environmental Management Cost (EMC) on tyres associated with the vehicle (including any spare tyres). Retailers charge the customer the correct EMC upon sale of tyres. Retailers then can take back old tyres and Circol ELT will collect for free. The EMC pays for the collection and recycling of the waste tyres. Some take back points may charge a fee for disposal around certain conditions.	Tyre retailers collect used tyres when consumers purchase new ones. Local Civic Amenity Sites offer drop off. Businesses who use large amounts of tyres can arrange specific collections.	In 2023, 95% of tyres placed on the market in Ireland were collected for recycling or reuse, far exceeding the minimum EU requirement.

Agricultural Films	Producers (manufacturers, importers, and distributors) of agricultural plastics, such as silage wrap, bale wrap, pesticide containers, and feed bags, are required to take responsibility for the management of their products once they become waste. These producers must join an approved PRO, in this case – IFFPG to ensure proper collection, recycling, and disposal of agricultural plastics.	The assigned PRO is The Irish Farmers Film Producers Group (IFFPG).	The IFFPG scheme is funded through a producer recycling contribution (levy) as well as a weight-based collection charge to farmers.	Farmers can avail of a number of ways to have their waste collected: Arrange collection at their farmyard Deliver the waste to mobile bring centres arranged by the IFFPG Deliver the waste directly to a waste facility Arrange collection at the farmyard by an authorised waste collector.	In 2022, 36,524 tonnes of wrap and sheeting waste was collected equating to 88% collection rate. In addition, the scheme collected 1091 tonnes of netting and twine waste, as well as 1087 tonnes of farm plastics packaging wastes e.g. Fertilizer bags and drums.
Other SUP products	Since 5 January 2023, producers of packaging have been required to cover the costs of litter clean up, in addition to their pre-existing EPR obligations associated with the following SUP items: - Food containers - Beverage containers and cups - Packets and wrappers Light weight carrier bags	n.a.	n.a.	n.a.	n.a.

Notes: POM, placed on market; n.a.: not applicable

4.3 Iceland – Product categories covered by EPR

The Icelandic Recycling Fund (IRF) executes the EPR for certain goods in Iceland. It administers and distributes recycling fees in accordance with the Act on Recycling Fees. The IRF plays a significant role in promoting the circular economy, sustainable resource utilisation, reducing waste generation, and increasing recycling. The IRF negotiates with waste management companies on the processing of waste based on tenders or contracts. EPR in Iceland is legislated under the Act on Waste Management (Lög um úrgangsmál) and sector-specific regulations. The system relies on PROs, government oversight, and public participation to manage waste streams effectively. According to Umhverfis og orkustofun (2023) the categories covered include:

- Packaging
- WEEE
- Batteries
- ELVs
- Textiles

Terra and Íslenska gámafélagid ehf are leading waste and recycling companies that play a significant role in implementing EPR. The companies work in sorting and collecting recyclable materials and work with companies, municipalities, and individuals in recycling and environmentally friendly waste management, emphasising bringing all materials that fall into the appropriate channels back into the circular economy. Terra and Íslenska gámafélagid ehf collaborate with municipalities, producers and businesses all around Iceland to ensure compliance with waste management regulations and EPR frameworks.

The companies collect various recyclable materials, focusing on efficient sorting and recycling practices. The following materials are collected:

- **Paper and Cardboard:** Includes newspapers, magazines, office paper, flat cardboard, and cartons.
- **Plastics:** Consumer and industrial plastics are sorted based on material type.
- **Metal:** Aluminium cans and other recyclable metals.
- **Municipal Waste Streams:** Terra works with municipalities to handle waste in a way that ensures proper recycling or recovery.

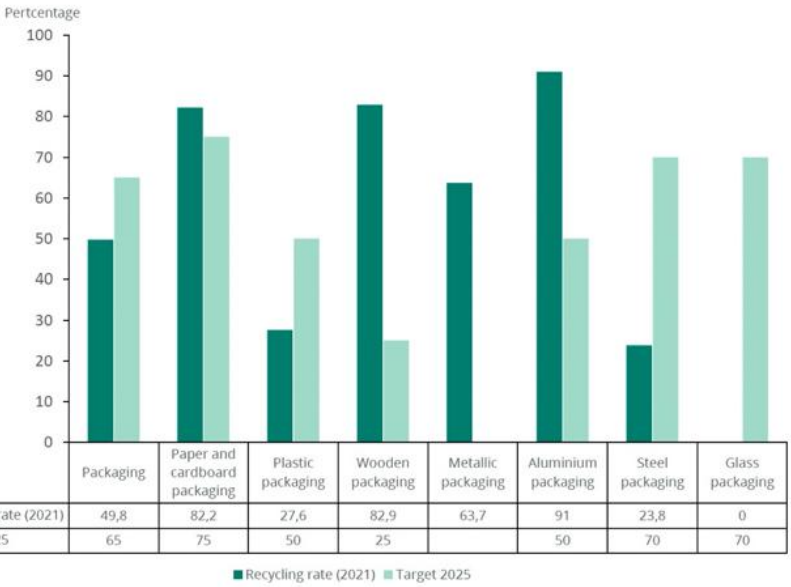
Hringrás recycling company is a leader in scrap metal recycling in Iceland. They accept cars for disposal, scrap metal, metals and hazardous materials. The company also has reception facilities across the country. Hringrás' mobile recycling plants play a key role in serving rural municipalities, enabling the company to efficiently handle a variety of general projects on behalf of smaller municipalities, as well as special demolition projects that may arise.

4.3.1 Packaging and SUP

In Iceland there is an EPR system in place for packaging materials from both household and non-household sources. The majority of packaging used in Iceland is imported and subject to customs procedures. A recycling fee is levied by Iceland Revenue and Customs and collected by the Financial Management Authority, independent of whether the packaging is imported or locally produced. Collection through customs and by official entities makes free-riding difficult or near impossible (Ministry of the Environment, Energy and Climate (Iceland), 2023a). The recycling fee differs per type of material and is earmarked to be used for the recycling of that specific material. For single-use beverage PET packaging, there is advanced fee modulation in use for both household and non-household packaging. The system takes into account both recyclability and recycled content. The fee differs, depending on whether the PET is transparent, coloured or recycled PET. In Iceland, EPR is a cornerstone of the waste management strategy, aligning with the EU directives through the EEA agreement. On the 1st of January 2023, a "new law on waste" often known as “the circular law”, came into effect. The new law introduces positive changes in the way we treat waste by promoting increased thrift, reuse and recycling with the goal of supporting the formation a circular economy in Iceland and decreasing the emission of greenhouse gases. (European Environment Agency, 2022).

Producers and importers of packaging materials must ensure the collection, recycling, or recovery of their products. The system primarily focuses on reducing waste from consumer packaging and there is high public participation in the deposit-refund system and effective collaboration between municipalities and PROs. Producers and importers of packaging materials must ensure that these are collected and recycled. They collaborate with recycling companies such as Terra and Íslenska gámafélagið. In order for packaging/paper to be recyclable, it must be clean and sorted when delivered to collection stations. Recycling companies sort it further at the sorting stations. What can go into the paper bin includes flat cardboard and cartons, newspapers and magazines office paper and also corrugated cardboard (European Environment Agency, 2022).

With regards to implementation there is a deposit-refund system for beverage containers. Municipal waste management systems include separate collection bins for paper, plastics, and metals._Recycling companies sort paper, packaging and SUP at sorting stations, accepting items such as flat cardboard, cartons, newspapers, magazines, office paper and plastic from households. See below (Figure 2) packaging recycling rates and targets for Iceland according to Eurostat.



	Packaging	Paper and cardboard packaging	Plastic packaging	Wooden packaging	Metallic packaging	Aluminium packaging	Steel packaging	Glass packaging
Recycling rate (2021)	49,8	82,2	27,6	82,9	63,7	91	23,8	0
Target 2025	65	75	50	25		50	70	70

Source: Eurostat (2023d), EU (2018)

Figure 2. Packaging recycling rates for Iceland in 2021, percentages

This draft assessment was prepared by the ETC/CE under guidance of the European Environment Agency. It builds to a large extent on the answers provided by the Icelandic Ministry of the Environment, Energy and Climate in August 2023. Specific recovery rates for single-use plastics (SUP) and textiles in Iceland are not readily available. There is a reported recycling rate of 82.2% for paper and cardboard packaging. With new calculation rules, estimated at 74%, just below the 2025 target. With regard to plastic packaging the recycling rate decreased from 27.6% in 2021 to 21.5% in 2022, indicating a downward trend. (European Environment Agency, 2022).

The estimated quantity of packaging waste in 2019 was 53,742 tons, which equates 151 kilograms per capita. In the same year, 25,406 tons of packaging waste were recycled or reused, which translates to a 47.27% rate of recycling. This rate of recycling is somewhat lower than it was in 2018 (51%), but on par with other years, where the average was 45%. Of the recycled material, only 528 tons were recycled or reused within Iceland. The remainder was exported. Recycling and reuse within Iceland have been steadily shrinking in the past few years.

4.3.2 Waste Electrical and Electronic Equipment (WEEE)

Producers of EEE are required to organise the collection and recycling of WEEE to prevent hazardous substances from polluting the environment. When it comes to implementation, municipal drop-off points for e-waste are widely available. Retailers participate in take-back programs when consumers purchase new items and local recycling facilities handle basic sorting and material recovery, while much WEEE is exported to European facilities for

advanced recycling. There are some challenges in that there are high costs associated with exporting e-waste for advanced processing and in ensuring compliance from all producers and retailers.

4.3.3 Batteries

The EPR system for batteries aims to prevent environmental contamination by ensuring proper collection and recycling. Collection bins for batteries are available at retail stores, municipal centers, and schools. Hazardous materials are extracted and processed according to EU standards. A challenge is that there are low collection rates for small batteries since they are often discarded in general waste.

4.3.4 End-of-Life Vehicles (ELVs)

Producers and importers are responsible for the collection and recycling of ELVs, ensuring the recovery of materials like steel, aluminum, and plastics. There are licensed facilities that de-pollute and dismantle ELVs. Usable parts are salvaged, and the remaining materials are shredded and exported for recycling. Geographic isolation increases costs for exporting materials. Public awareness about proper disposal methods needs to be improved, but active second-hand markets are for salvaged vehicle parts. The recovery rate for ELVs in Iceland exceeds 85%, meeting EU targets. This is achieved through effective dismantling processes, material separation, and the reuse of components.

4.3.5 Textiles

Starting January 2023, Iceland introduced requirements for the separate collection of textiles under Act No. 103/2021, aimed at implementing a circular economy. Municipalities must provide collection facilities close to residents and ensure textiles are reused or recycled (European Environment Agency, 2022). There are several challenges to textile recycling; limited infrastructure for large-scale textile recycling, ensuring proper sorting and reuse and promoting repair and second-hand markets for textiles. In addition, Iceland’s small population and remote location make it costly to process waste domestically, leading to reliance on exports. The high volume of tourists generates additional waste, particularly in packaging and single-use products. Continued efforts are needed to educate consumers about their role in the EPR system, but EPR can be expanded to support circular economy initiatives, such as repair, reuse, and eco-design. Investments in domestic recycling facilities could reduce reliance on exports and create green jobs. Low energy cost in Iceland should encourage setting up a recycling infrastructure in Iceland and using digital platforms to track and manage waste streams can improve efficiency.

In 2020, Iceland's total packaging waste generation was approximately 60,000 tons, with a recycling rate of 45.6%. For plastic packaging waste, the recycling rate was 21.5% in 2022, down from 27.6% in 2021. The majority of plastic packaging waste collection occurred in the

capital area, accounting for nearly 70% of the total collected, including deposit bottles but excluding silage films.

4.4 Norway – Product categories covered by EPR

Norway has implemented a comprehensive EPR system to ensure producers contribute to the environmental management of their products across multiple waste streams (OECD, 2024). Packaging, EEE, batteries, end-of-life vehicles, and soon textiles, are all covered under Norway's EPR framework, largely enforced through the Waste Regulations and managed by a range of compliance organisations. From January 2025, it is compulsory to collect, sort and recycle textiles in Norway (URL 27). However, the full implementation of EPR for textiles is not in place yet, and no PROs are currently established. There will be a hearing on implementing EPR for textiles sometime this year (Østrem, 2025).

4.4.1 Packaging Waste

Norway regulates packaging waste under Chapter 7 of the Waste Regulations, requiring all companies that place more than 1,000 kg of packaging on the market to join a compliance scheme. The two main compliance organisations are Grønt Punkt Norge AS and Norsirk AS. Producers pay fees per kg or per unit, which vary by material type and support the collection, sorting, and recycling infrastructure, primarily operated at municipal kerbside and recycling stations. In some cases, producers collect waste directly from transition points. Although Norway has an advanced system, the recycling rate for plastic packaging was only 28% in 2021, with goals to reach 50% by 2025 and 55% by 2030. Beverage packaging is managed separately through a high-performing deposit system run by Infinitum.

4.4.2 Electrical and Electronic Equipment (EEE)

Under Chapter 1 of the Waste Regulations, Norway enforces strict EPR obligations on producers and importers of EEE. They are required to finance the collection and recycling of e-waste and recover valuable materials. Retailers must accept small electronic items for free return. Key organisations managing the system include Elretur AS, Elsirk AS, ERP Norway AS, Recipo AS, and Renas AS. Financing is covered by producer fees paid through compliance schemes. Collection occurs through municipal recycling centers, retail drop-off locations, and mobile collection services. Norway maintains nationwide coverage and is known for high e-waste recovery rates.

4.4.3 Batteries

The EPR scheme for batteries mandates that producers and importers organise and fund the collection and recycling of all battery types, with increased focus on lithium-ion batteries due to safety and environmental concerns. Disposal of household waste is illegal, and dedicated collection points must be provided. Primary operators include Norsirk AS, ERP Norway, Batteriretur, Renas, and Serva AS. Financing is covered through producer-funded fees.

Consumers can return used batteries to in-store collection bins ("batteri holkar") and municipal centers. Companies like Hydrovolt lead the recycling efforts and currently recover around 95% of materials from electric vehicle (EV) batteries.

4.4.4 End-of-Life Vehicles (ELVs)

Norwegian EPR obligations for ELVs require owners to dispose of vehicles at Authorised Treatment Facilities (ATFs), where hazardous components are safely removed, and a certificate of destruction is issued. Producers and importers fund the system through fees paid to Autoretur AS, which oversees national compliance. Consumers are incentivised through a monetary refund system (e.g. vrakpant) typically 3,000 NOK per car and 500 NOK for motorcycles. Norway maintains high compliance, meeting the EU requirement that at least 95% of each vehicle is recycled or recovered, and increasingly focuses on EV battery recycling as part of ELV processing.

4.4.5 Textiles

Norway is in the process of implementing an EPR scheme for textiles (expected by 2025). Producers and importers will be required to finance the collection, sorting, and recycling of textile waste and join designated PROs. Fees will be eco-modulated higher for synthetic fibers to encourage sustainable materials. Current textile management is supported by Fretex and UFF Norge, who collect discarded clothing through municipal points, retail drop-offs, and dedicated bins. In 2022, Norway placed 106,000 tons of textiles on the market (19.3 kg/person), but only ~23% was collected, and over 50,000 tons were discarded as mixed waste. Much of the collected clothing is sent abroad (e.g. to Poland) for further sorting, with non-reusable items sent to Norway's only textile recycling facility in Sandefjord. The goal is 80% collection by 2025, with a strong emphasis on reuse and circular fashion.

Table 5. Summary table of Norway's EPR system by product groups.

Product type	Take-back requirements	Operators	Financing	Collection methods	Extent of collection / Recovery
Packaging	Producers/importers of ≥ 1,000 kg of packaging must join a scheme; cover collection, sorting, and recycling costs	Grønt Punkt Norge AS, Norsirk AS	Fees per kg/unit, based on material type; contributions fund municipal recycling services	Municipal kerbside and recycling stations; producers collect from municipal transition points	2021: ~28% plastic packaging recycled; target 50% by 2025, 55% by 2030
WEEE	Producers must finance collection/recycling; retailers take back for free; municipalities provide drop-off	Elretur AS, Elsirk AS, ERP Norway AS, Recipo AS, Renas AS	Producer fees via compliance schemes	Municipal recycling centers; retail drop-off, mobile collection	Nationwide collection per quotas; high material recovery
Batteries	Producers/importers must finance take-back; retailers' in-store collection, municipal acceptance	Norsirk AS, ERP Norway, Batteriretur, Renas, Serva AS	Fees funded by producers	In-store/drop-off bins ("battery holkar"), municipal centers	Hydrovolt recovers ~95% material from EV batteries
End-of-Life Vehicles	ELV owners must deliver to ATFs; hazardous material depollution, and a certificate issued	Autoretur AS	Producer/importer fees via Autoretur	Authorized Treatment Facilities nationwide	High compliance: ELV recycling obligations met
Textiles	Producers/importers must finance collection, sorting, and recycling; mandatory participation in a PRO	PROs to be designated; currently under development	Eco-modulated fees per item, higher for synthetic fibers; fees fund collection and recycling infrastructure	Municipal collection points, retail drop-off, and dedicated textile bins	Target: 80% collection rate by 2025; current rate ~23%; emphasis on reuse and recycling to reduce environmental impact

Source: Deloitte (2020), Systemiq et al. (2021) and WWF (2023)

4.5 Sweden – Product categories covered by EPR

Sweden's EPR system is strongly based on PROs in all product groups. Primarily, producers should join existing PROs or establish a new one with other producers. The Swedish Environmental Protection Agency (Naturvårdsverket) supervises and approves producers and PROs and maintains a register of PROs in Sweden. Companies with producer responsibility pay recycling fees to a PRO based on the products put on the market, and the funds are used to finance the collection and recycling of waste and other statutory duties. PROs have contracts with waste management operators for the actual collection and recycling operations.

4.5.1 Packaging

The producer responsibility for packaging was set up in 1994. Currently, there are two PROs: NPA and TMR. Both are responsible for the collection and recycling of packaging of: paper, coloured and non-coloured glass, metal, plastic wood and other materials (porcelain). Producer responsibility is taken care of by joining a producer organisation. Companies with producer responsibility pay recycling fees to a producer organisation, which uses the funds to finance the collection and recycling of packaging waste and other statutory duties. The NPA (National Producer Responsibility) is a service company founded and owned by the producer organisations. A new legislation was implemented in 2020 removing the producer's responsibility for newspapers and making the municipalities responsible for the collection and recycling of newspapers and paper from households and businesses. In 2022 the packaging responsibility ordinance was adjusted to remove the responsibility of collection from the producers, through collection points, to the municipalities through kerbside collection. The kerbside collection should cover 100% of all properties and should be implemented from 2024-2027. The municipalities collect and deliver to transition points where the producers collect and take it to recycling. Municipalities are reimbursed for their collection according to an agreed financial model.

Compared to other packaging, a special implementation of a voluntary EPR is used for PET and ALU bottles and cans. A deposit-based return system is used and guided by the beverage packaging fee paid by the consumers. The return systems are managed by Returpack (Pantamera) which manages the recycling systems of deposit beverage packaging for aluminium cans and PET plastic bottles. Owned and operated by the retail trade and beverage industry. For paper, the producer responsibility was abandoned in 2020. It is now the responsibility of the municipalities to collect, and material recycle.

4.5.2 Waste electrical and electronic equipment (WEEE)

The collection of this type of waste is done through permanent collection points at the municipal recycling centres and in-store collection. Also, mobile collections are organised by many municipalities as well as collections in malls etc. Producers and municipalities cooperate in the collection. In addition, distributors, such as shops, must arrange a free reception for

small WEEE without purchase obligation and a 1:1 ratio for larger devices when purchasing a new one. Private users can bring their old products to these collection points for free, while non-private users need individual contracts with waste management operators. There are two PROs: ElKretsen and Recipio.

4.5.3 Batteries

Producers are organised through the same actors as WEEE. Collection is carried out similarly but also through 5000 battery-boxes around the country.

4.5.4 Agricultural films

A voluntary producer responsibility for the collection and recycling of agricultural films through the organisation Svepretur (Svensk Ensilageplast Retur AB).

4.5.5 End-of-life Vehicles (ELV)

Cars can be submitted free of charge to a scrap yard within a distance of 50 km or within the municipality.

4.5.6 Tires

Tires can be taken to any place that sells tires. If the tires are still on the rims, the workshop is allowed to charge a small fee for removing them. Some municipalities accept tires or other car parts at the recycling centre.

Table 6. Summary table of the EPR system in Sweden by product groups.

Product type	Take-back requirements	Operators	Financing	Collection methods	Extent of collection
Packaging	Levels according to the WfD. Generally, 70% recycling rate for all packaging by 2030. 60% 2025.	2 PROs, NPA and TMR. NPA has 90% of the market on average. Municipalities are responsible for collecting from households to a transition point within each municipality. Producers collect the material at the transition point and are responsible for material recycling. Following the new packaging ordinance, collection should be 100% property-by-property fully completed by 2027. The producers cover the municipality's cost for collection according to a financial model. Companies are responsible for sorting of packaging waste and organizing its transport from the property to the terminals.	For consumers, invisible fees are included in product prices. Producers pay a recycling fee to the PRO based on the products put on the market. The new packaging ordinance contains a financial model agreed by the producers and municipalities and controlled by the Swedish EPA. Beverage packaging of PET and ALU use a deposit system owned and operated by the beverage and grocery industry.	Property-specific collection from residential properties, both apartment buildings and single houses. Recycling stations (the old bring system) until 2027 for all packaging. Thereafter, only for bulky paper and plastic packaging. Packaging collection at the municipal recycling centers. In the deposit-refund system, return machines are in retail stores. In addition, everyone who sells beverage packages to consumers is obliged to accept them.	Property-specific collection: Currently, 60% of apartments. 30% for single houses. (100% in 2027). Deposit-refund systems: PALPA ~3,000 return machines. 90% collection rate.
WEEE	Collection: 75%-85% material recycling and reuse	2 PROs, ElKretsen and Recipio. ElKretsen is the largest PRO and collect WEEE from the Recycling Centers in	The producers reimburse municipalities for collection at the	Permanent collection network at recycling centers Mobile collection in many municipalities	600 recycling centers and many in-store

	depending on product category	cooperation with all Swedish Municipalities. Recipio collects from certain electronic stores.	municipal recycling centers. Producers are responsible for material recycling.	In-store collection for s-WEEE and 1:1 basic for other WEEE	collection points.
Batteries and accumulators	Collection and treatment	2 PROs, ElKretsen and Recipio.	Producer fees	Recycling centers. In-store collection 5000 Batterybins “Batteriholkar”	
Cars			Producer fees	Cars can be submitted free of charge to a scrap yard within a distance of 50 km or the municipality.	
Tyres		Svensk Däckåtervinning	Producer fees	Tires can be taken to any place that sells tires. If the tires are still on the rims, the workshop is allowed to charge a small fee for removing them. Some municipalities accept tires or other car parts at the recycling centers.	
Medicines				Free drop-off at all pharmacies, except for medicine considered hazardous waste.	
Tobacco products and filters (SUP)	50% reduction in littering in 2030 compared to 2023.		Producer fees		
Wet Wipes (SUP)	“Negligible” littering by 2030.		Producer fees		
Balloons (SUP)	“Negligible” littering by 2030.		Producer fees		

Source: Vattenbruk 2021

5

THE LEGAL FRAMEWORK FOR EPR

5 THE LEGAL FRAMEWORK FOR EPR

The legal framework for EPR in Sweden, Norway, Finland, and Iceland closely aligns with EU law. The EU Waste Framework Directive provides the overall framework for waste management in the EU. Additionally, three other directives specify collection, and recycling targets for specific industries, including batteries, ELVs, and WEEE. While the Packaging, and Packaging Waste Directive (94/62/EC) does not mandate the EPR approach, it encourages and sometimes requires implementing EPR measures for waste prevention, recycling, and recovery. For example, the WEEE Directive aims to reduce waste disposal by limiting the amount of EEE waste that is not recycled, reused, or processed. It also sets minimum collection rates to be achieved by individual member states. Other European instruments, such as the EU Eco-design Directive, have been expanded to cover all product design. The new amended directive not only covers the design of energy-related products, but it will be applied to product design more broadly, and more generally, to design for sustainable products. The national legal framework is primarily based on EU law, but the implementation of national legislation in this area varies. National EPR schemes may include additional products, such as used tires. A study by the European Commission revealed that EPR policies have been designed and implemented in diverse ways across Europe.

5.1 Municipalities

The main goal of EPR is to transfer the responsibility for managing products and packaging after they have been used by consumers from municipalities to producers. However, in most EPR schemes, municipalities may still play a crucial role, particularly in the NPA countries, except Finland, where municipalities participate in the collection of EPR wastes only for packaging. For instance, in Norway, municipalities collect, sort, and recycle packaging waste from households. In NPA countries, municipalities share partial responsibility for packaging waste with producers. In Finland, the municipalities tender, and organise the actual packaging waste collection from household properties (more than 5 households) in the urban area, but the costs are paid back to municipalities by packaging producers. For single-family residents, and all residents living in sparsely populated areas, regional reception points for EPR waste are organised, and maintained by PROs, and industrial actors in Finland have to take care of their waste management, and have contracts with PROs, and private services. In the Danish WEEE scheme, municipalities are obliged to set up collection points, and hand over the collected WEEE to the producers for treatment. This shared responsibility often stems from municipalities' general responsibility for collecting and sorting household waste. In some cases, municipalities also ensure that the waste is properly handed over to a collective scheme. For example, in Norway, municipalities must ensure sufficient facilities for collecting WEEE, while the producers are responsible for further waste management through a PRO.

5.2 Two in-depth case studies of EPR schemes

To better understand how EPR is implemented in practice, this section presents two in-depth case studies on packaging waste and WEEE. These two segments have been selected because:

- They are among the most established EPR systems in the NPA region and offer clear illustrations of how responsibilities are divided, collection is managed, and recycling targets are met.
- They highlight contrasting approaches: Packaging waste management relies heavily on consumer participation and sorting at the source, whereas WEEE involves more complex logistics and specialised treatment.
- They provide relevant lessons for designing EPR schemes for other sectors, such as fishing gear, particularly regarding the roles of municipalities, producers, and consumers.

5.2.1 EPR schemes for packaging waste

The countries of Ireland, Sweden, Norway, and Finland each have their own EPR schemes for handling packaging waste. For example, Ireland must achieve EU recycling targets for the following packaging types: glass, plastic, paper, board, metals, and wood. In Iceland, the packaging waste is managed as part of the same EPR scheme that covers WEEE, and other products like vehicles, and batteries. The process for managing packaging waste is similar across the NPA countries:

1. Waste is generated in households or businesses and then taken to collection points (recycling stations) or by authorised collection systems or municipalities through kerbside collection.

2. At the collection points (recycling stations), the packaging waste is sorted into different fractions, such as paper, plastic, metal, glass, and newspaper. The waste is then transported to sorting stations for further sorting. Kerbside collection is another system where waste is sorted at the source using colour-tagged waste bags or containers. In both Finland and Norway, households are responsible for sorting packaging waste in their own homes and returning only sorted waste fractions to collection points. Similarly, businesses are also required to separate recycling materials. If waste is not separated, it is transported for incineration, as there are no large-scale "intermediate sorting activities" between the collection and treatment facilities for recyclables

3. After further sorting, the packaging waste is transported to various treatment facilities, where it undergoes further refinement before being reintroduced into production.

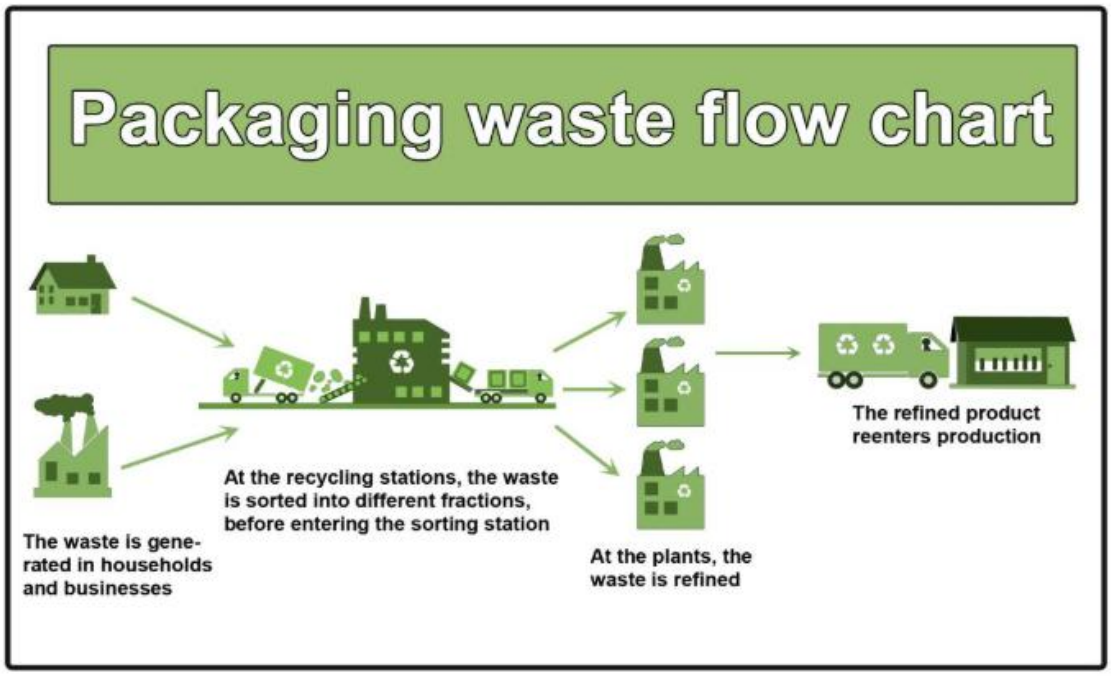


Figure 3. General flow chart for packaging waste (source: Nordic Report, 2016)

In the NPA countries, the management of packaging waste displays variances; however, there are underlying similarities. The table below delineates key aspects of the packaging waste management systems in the NPA countries:

Table 7. The main features of the packaging system

	Main actors	Collection systems	Kerbside collection	Recycling and sorting stations
Finland	Municipalities Finnish Packaging Producers Ltd (FPP) (Suomen Pakkaustuottajat Oy (SPT)) and SUMI Ltd., both fulfill their collection responsibility through the service company RINKI (Finnish Packaging Recycling RINKI Ltd.) Suomen palautuspakkaus Ltd (PALPA) manages the recycling systems of deposit beverage packaging	Collections for residents of single-family houses and residents of sparsely populated areas is organized through regional collection points maintained by RINKI. Companies are not allowed to use Rinki collection network, but they are responsible for sorting their packaging waste and organize transportation with private service providers to regional material terminals that have waste treatment contracts with PROs.	The kerbside collection is organized by municipalities, but they are mainly paid for by PROs (responsible for at least 80 % of the total costs per packaging material). The packaging waste must be collected from households' properties in urban areas, if the property has 5 or more apartments. All such housing companies must have containers for packaging waste (own containers for cardboard, glass, metal and plastic). In 2024, there are more than 75,000 properties with at least five apartments in Finland, and more than half of Finns live in them.	Private operators in contract with PROs, i.e. both PROs (SPP and Sumi), are responsible for recycling the packaging materials they collect and making contracts with private companies and processing plants. Their service company RINKI is responsible for maintaining the regional collection network collecting information, and reporting to the authorities. It also offers advice to PROs on sorting and recycling.
Iceland	IRF: The Icelandic Recycling Fund SORPA bs. Gámaþjónustan hf. Íslenska gámafélagið ehf.	The IRF system does not mandate the collection of EPR waste. Municipalities have the exclusive right to collect waste from households, similar to other wastes.	Collection services are typically managed by private entities, except Reykjavík, where an in-house department oversees this function. The costs associated with collection are primarily covered by the waste holder, whether it be a household or a commercial entity.	Either owned by municipalities or private waste management companies. The IRF system does not directly finance recycling stations. However, it pays a recycling incentive fee to public and private waste management companies handling EPR waste.
Norway	Norsk Resy AS (Corrugated cardboard) Norsk Returkartong AS (Cardboard)	Recycling stations or kerbside collection	Some municipalities may offer separate kerbside collections of plastic and paper/cardboard, but this varies between them.	Financed through an environmental fee imposed on new products.

	Norsk Glassgjenvinning AS (Glass and metal) Plastretur AS (Plastics) Tomt & Tørt (Packaging that has contained hazardous waste, e.g. paint.)			
Sweden	Förpacknings- och Tidningsinsamlingen AB (FTI)(PRO) TM Responsibility AB (TMR)(PRO)	Recycling stations are considered the primary collection system.	Complementary to the recycling stations, kerbside collection is primarily offered to apartment blocks.	Owned by the FTI, TMR is granted access to the stations through an agreement with FTI. It is primarily financed by producers through producer fees to FTI, as well as from income generated from the sale of secondary raw materials.
Ireland	Repak (Packaging PRO) Re-turn/DRSI (Deposit-Return Scheme operator)	Household packaging waste is collected via local authority or private waste contractors, funded in part through producer fees paid to Repak. Deposit beverage containers are collected through reverse vending machines and participating in retail take-back points under the DRS.	Managed at the municipal level or by licensed private waste companies. Households place clean, dry, loose recyclable packaging into dedicated bins for regular pickup. Funded through a combination of Repak Member fees and household waste charges.	Nationwide network of bottle banks and civic amenity sites funded and supported by Repak. Sorting and processing are carried out by contracted waste management companies. DRS collection points and reverse vending machines feed material into specialized recycling streams for PET and aluminum.

Ireland

In the Waste Action Plan for a Circular Economy in Ireland, the government has pledged to ensure that all packaging on the Irish market is reusable or recyclable in an economically feasible manner by 2030. REPAK Ltd. is at the forefront of the waste packaging compliance initiative in Ireland, striving to assist businesses in meeting their obligations to attain higher recycling targets outlined by the EU for 2025, and 2030. As part of the EU Circular Economy strategy on plastics, it is mandated that Ireland recycle 50% of all plastics on its market and achieve a 55% recycling rate for all plastics by 2030. To this end, REPAK collaborates with businesses to diminish superfluous plastic packaging, and enhance the recyclability of plastic packaging utilised.

Finland

Packaging is one of the first sections under producer responsibility in Finland. National, partial producer responsibility for packaging came into force in 1997. At that time, municipalities were responsible for collecting packaging waste, but the responsibility for utilisation was transferred to producers. As a result of changes in the EU EPR legislation, full producer responsibility for packaging came into force in Finland in 2014, and the responsibility for packaging collection was transferred from municipalities to producers in 2016. It also meant that producers were required to build a nationwide collection network for different packaging materials. In addition, a producer community was established for each different type of packaging material.

With the latest legislative reform in 2021, the packaging producer community must cover all different packaging materials, so the number of packaging PROs has decreased, and EPR practices have become clearer for producers. Currently, legislation again requires municipalities to collect packaging waste in cooperation with PROs. In practice, this means that municipalities organise collection from households, but producers pay at least 80% of the collection costs per material (Waste Act 2011/646). In addition to organising the separate collection of packaging waste from residential properties, the legislation requires PROs to build a regional collection network of at least 1,000 reception points for glass, metal, plastic, paper, and cardboard packaging waste called ’Rinki eco take-back points’ (Government Decree on packaging, and waste 1029/2021). Packaging waste is transported from properties, and Rinki points to regional material terminals or warehouses, that have waste treatment contracts with PROs. Regional warehouses/terminals are located nationwide, and there are 20-50 of them, depending on the material fraction. There, wastes are sorted, baled or simply stored, before being transported into larger batches for processing at recycling facilities.

The Rinki network is mainly intended for households, so trade and industrial companies are only allowed to use it to a very limited extent for certain fractions. In terms of packaging, companies are responsible for sorting their wastes and organising their transport to the same regional material terminals that have contracts with PROs. The transport can be agreed upon with the private service providers. Terminals accept waste for free, but fees charged for the transport remain an expense for the company.

In addition to organizing practical collection, and treatment, PROs report annually to the national EPR supervisory authority (Pirkanmaa ELY Centre) the quantities of products placed on the market, the collected waste by material, and the methods, and quantities of their processing on behalf of their member companies.

Compared to other packaging, a special implementation of EPR is used for beverage packaging in Finland. For them, a deposit-based return system is used, and guided by the beverage packaging tax. A beverage packaging tax is collected for the packages of alcoholic beverages, and soft drinks, but by becoming members of approved and operational return systems, beverage manufacturers, and importers are exempted from the beverage packaging tax. At the same time, the deposits of the packages encourage consumers to return empty beverage packages for recycling, which prevents packaging from ending up in nature or mixed waste. In practice, most of the beverage manufacturers, and importers in Finland are members of return systems managed by Suomen Palautuspakkaus Ltd. (Palpa), which manages the recycling systems of deposit beverage packaging for aluminium cans, PET plastic bottles, and glass bottles.

Iceland

In Iceland, the packaging waste scheme is part of the same EPR scheme that covers WEEE, and several other products. The Icelandic Recycling Fund (IRF) manages the scheme, a state-owned authority responsible for creating economic conditions promoting reuse, and recovery. Its objectives include reducing the volume of waste sent for final disposal and ensuring the proper disposal of hazardous substances.

The IRF is not currently involved in the waste management market, but it provides monetary incentives to waste management providers (both public and private) who have been validated by the IRF. These incentives are given for properly reusing, recycling, or disposing of waste. The validated IRF service providers ensure that the waste is treated correctly, using validated recyclers for recycling, and approved disposal facilities for hazardous waste. Once the waste/material is accepted by the IRF-validated recycler, they send a receipt to the IRF service provider, who then forwards it to the IRF. After fulfilling their reporting responsibilities, the IRF pays a recycling incentive fee to the IRF service provider. If the market value of certain materials changes, the IRF adjusts its incentive fee accordingly. If the market value becomes positive (exceeding the cost of collection, sorting, and shipping), the IRF does not pay for the material. The waste streams covered by the IRF include various packaging materials, WEEE, hazardous materials, and ELVs. Products covered by the Act on Recycling Fees are categorized into several groups: paper, cardboard, plastics, tires, paint, and car batteries. The recycling fee collected within each product category is intended to cover the expenses of handling waste from that category, preventing the transfer of costs from one product category to another. SORPA, the inter-municipal undertaking of the municipalities in the capital area, along with Gámaþjónustan hf., and Íslenska gámafélagið ehf., two major private waste management undertakings in Iceland, are the main actors in the collection, sorting, and sale

of packaging materials. Other players in the market operate on a smaller scale. SORPA mainly handles packaging waste from households, while private undertakings collect significant amounts of packaging waste from commercial operators.

Norway

Waste packaging in Norway is collected and sent for recycling through various collection schemes. These schemes are established through agreements between the Norwegian Government, and the packaging industry. The industry has set up recycling companies to handle the recycling process and report their activities to the Environment Agency. For example, Grønt Punkt Norge, established in 1997, is responsible for developing, and managing recycling schemes for packaging waste. Currently, Grønt Punkt Norge oversees recycling schemes for Plastretur AS, and Norsk Returkartong AS, while other companies like Norsk Glassgjenvinning AS, Norsk Resy AS, and Norsk Metallgjenvinning AS manage their recycling schemes.

Sweden

Producers must either establish a collection scheme or ensure that someone authorised to operate a joint collection scheme agrees to manage their products when they become waste. Running a collection scheme requires authorisation from the Environmental Protection Agency, but there are exemptions. The collection of packaging waste by municipalities and/or the collection of waste generated in connection with business activities does not require authorisation.

To be authorised, collection schemes must have nationwide coverage and be considered "adequate". A collection scheme is considered adequate if it is non-discriminatory, easily accessible, free of charge, accepts waste collected by municipalities, and accepts waste generated by business activities at no cost. A collection scheme is considered nationwide if it includes collection points in all municipalities with a reasonable geographical distribution, considering population density, and other factors. Before a new collection scheme is established, the municipality and operators of existing collection schemes must be consulted to coordinate with municipal waste collection and find efficiencies within existing collection schemes. To comply with EPR, producers have formed sector-specific trade organizations. Each sector has its own company, and these companies collectively own Förpacknings- och Tidningsinsamlingen AB (FTI), a joint collection scheme consisting of approximately 6,000 recycling stations nationwide. The recycling stations are operated by companies hired by FTI, and the treatment and recycling of materials are also conducted by companies hired by FTI, which can be private or municipal. The recycling stations are the primary collection scheme, and the kerbside collection is complementary. Producers do not offer kerbside collection as a service through FTI but co-finance the cost of kerbside collection of packages, whether performed by municipalities or private companies, provided the waste is handed over to FTI. TM Responsibility AB (TMR), which competes with FTI, has an agreement with FTI regarding access to FTI’s collection scheme to fulfil the requirement for nationwide coverage. The two

PROs share the costs for the collection scheme in proportion to their respective market shares. TMR offers kerbside collection in partnership with private, and municipal waste management companies. TMR's business model involves waiving their rights to the waste collected and transferring those rights to the waste management company performing the collection, provided all statistics are reported to TMR.

The waste collection companies are free to manage, and benefit from the waste they collect, and can charge households for their collection services. Municipalities have a significant role in handling packaging waste. They are responsible for ensuring that the collection systems are sufficient and meet the required consultation standards. The municipal waste management plan must contain a specific section on packaging waste, including the locations of collection points. Municipalities must also inform households about their responsibility to separate packaging waste from other waste, and the available collection systems.

5.2.2 EPR Schemes for WEEE

Sweden, Norway, Finland, and Ireland have EPR schemes specifically for WEEE, while Iceland's scheme is part of the same EPR program that covers packaging waste and other products. However, the waste management process is similar across the NPA countries:

1. Waste is generated in households or businesses and then taken to collection points (recycling stations), stores selling electrical products, or collected by authorised systems or municipalities.

2. The WEEE is sorted and partially dismantled into different fractions at the collection points.

3. After further sorting, the waste is transported to various treatment facilities, where it is refined before being used in production again.

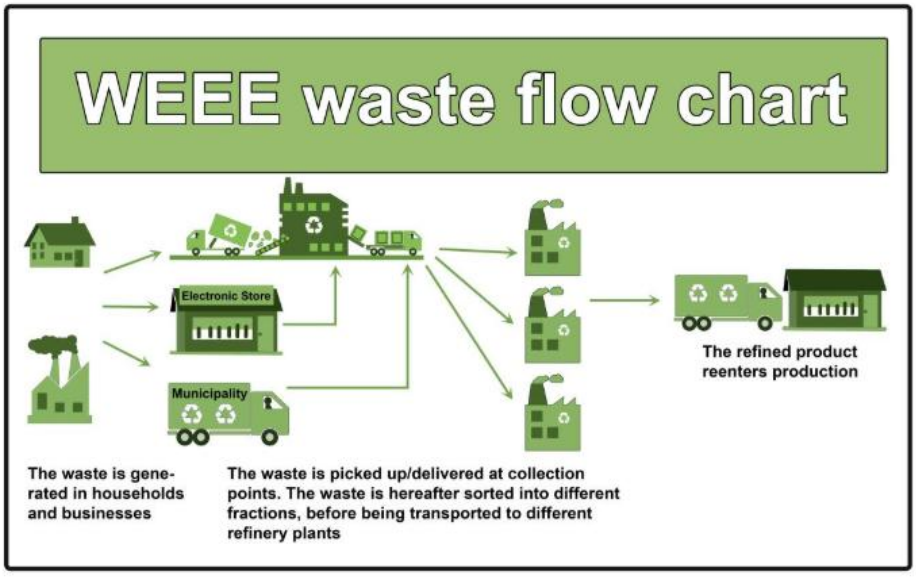


Figure 4. General flow chart for the EEE waste stream (source: Nordic report, 2016)

Table 8. Main features of the EPR schemes for WEEE

	Main actors	Collection systems	Kerbside collection	Recycling and sorting stations
Finland	The Association of EEE Manufacturers and Importers (SER-tuottajayhteisö ry, SERTY) The European Recycling Platform Finland (ERP Finland) EEE Producers' Association (SELT ry) FLIP producer association for producers of fluorescent, gas discharge and LED lamps (FLIP ry) The ICT-Producer Co-operative (ICT-tuottajaosuuskunta-TY) SELT, FLIP and ICT-producer Co-operative have a service company Elker Ltd., which provides expert services, organizes the collection and recycling of WEEE and takes also care of the implementation of other EPR obligations in practice.	In-store collection - free for small WEEE without obligation to buy new, for other devices on a 1:1 basis. Regional collection with permanent reception points, nationwide collection network at the minimum of ~400 points (at least 1 point/municipality). Typically located in municipal waste centers/reception points, WEEE sorting stations or in the premises of private recycling companies. Mobile collection by trucks once or twice a year in the least populated areas (often together with hazardous waste collection)	No kerbside collection for WEEE. Households can return EOL devices to stores when buying new ones, or they can return them to regional collection points free of charge. Industry, companies and public institutions only have a limited right to use a permanent collection network and usually have to have their own contracts with private service providers for transport and treatment of WEEE.	Private operators in contract with PROs. Pre-sorting can also be done by municipal and/or third-party social companies. PROs are responsible for collection and recycling. PROs make contracts for transportation and treatment with private companies and processing facilities and take care of reporting to the authorities.
Iceland	The Icelandic Recycling Fund (IRF). The system is relatively new, so the main actors are as yet unknown, although they will	IRF does not handle WEEE collection. WEEE is typically returned by private citizens to local collection stations, usually operated	WEEE is not typically collected from households or businesses. Each waste holder is responsible for	Municipal and privately run. The IRF system does not finance recycling stations directly. However, the IRF

	probably be the same as those involved with packaging waste	by municipalities. It is important to note that WEEE cannot be disposed of with mixed household or commercial waste.	transporting the waste to a private or public waste management facility. Individuals generally do not have to pay to dispose of WEEE.	pays a recycling incentive fee to private and public waste management undertakings that perform EPR waste management services.
Norway	Elretur AS Elsirk AS ERP Norway AS Eurovironment AS RENAS AS	Households must ensure that WEEE is transported to designated sorting facilities or retailers that sell similar products to the discarded EEE. Commercial waste holders can arrange on-site collection or transport the waste to sorting facilities.	Only if contracted by commercial waste holders.	Households can dispose of WEEE at municipal sorting facilities. Most municipal waste facilities also accept commercial WEEE for a fee.
Sweden	El-kretsen i Sverige AB (ElKretsen) (PRO) Elektronikåtervinningsföre-ningen (EÅF) (PRO) WEEE Clearing in Sweden nonprofit organisation (WEEE Clearing) Municipalities	Elretur is the primary recycling collection system in Sweden. It includes municipal recycling centers and collaborates with El-Kretsen and Swedish municipalities. EÅF primarily organizes collection through collection points at its members' shops. El-Kretsen also provides services to individual companies.	El-Kretsen collaborates with local municipalities in certain areas to provide kerbside collection services for apartment blocks through individual recycling companies. This creates a separate collection system outside the two PRO systems, as there is no requirement to hand over the collected waste to the PROs.	El-kretsen and EÅF provide services for recycling. Some municipalities have made investments in recycling facilities.
Ireland	PROs, European Recycling Platform (ERP), Producer Register Limited (PRL) (National registration body), Environmental Protection Agency (EPA) (Regulatory authority), Local Authorities (Operate civic amenity	In-store collection where retailers must accept WEEE free of charge on a one-for-one basis when a new item is purchased, and small WEEE items without purchase. Civic amenity sites operated by local authorities accept WEEE free of charge from the public. Moreover,	No nationwide kerbside collection for WEEE, thus consumers are mostly responsible for transporting WEEE to collection points.	Sorting and pre-treatment are conducted at authorized facilities before recycling and sent to Private Recycling Operators, which are contracted by PROs for treatment and recycling.

	sites), Retailers (Obligated to accept WEEE)	public collection events are organized periodically for community WEEE collection.		

The competition supervision in the Nordic countries has gathered information on WEEE's performance. The table below shows the total WEEE collected, and the overall recovery rates.

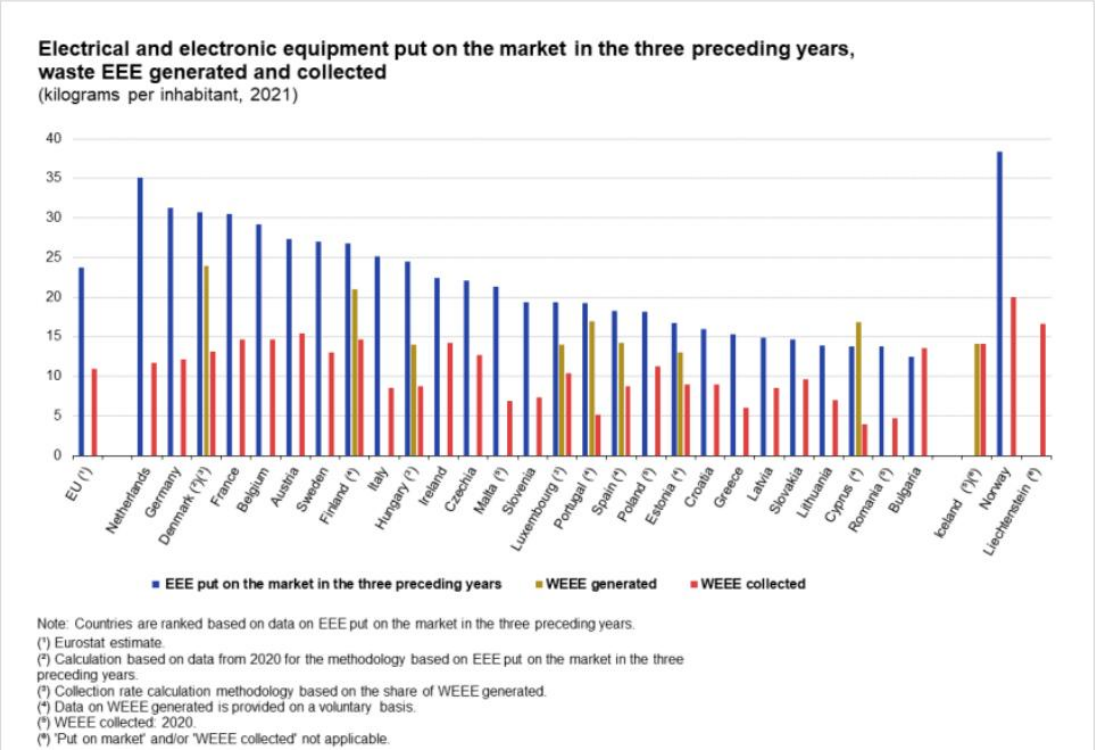


Figure 5. EEE put on the market in the three preceding years, waste EEE generated, and collected, 2021

Figure 5 shows the amount of WEEE collected in 2021, in comparison with the EEE put on the market in the three preceding years (2018-2020), and the WEEE generated in 2021, respectively. These are all expressed in kilograms per inhabitant (based on the average number of inhabitants in 2021). In the EU, the WEEE collected in 2021 was estimated at 11. 0 kilograms per inhabitant, while the average EEE put on the market over the period 2018-2020 was estimated at 23.7 kilograms per inhabitant. Due to the transition from the previous methodology that used 10 product categories for EEE to the new methodology using 6 product categories, taking effect from the reference year 2020, countries have calculated the collection rate based on the average weight of EEE placed on the market in the three preceding years by estimating the amounts for 2018-2020 according to the new methodology. The average of the three preceding years, according to the 6 categories methodology, has been calculated as WEEE collected divided by WEEE collection rate.

Ireland

The EU WEEE Directive sets targets for Member States, including Ireland. It stipulates measures for the collection, treatment, and recycling of EEE, enabling consumers to dispose of their WEEE free of charge. It is common for waste from electrical and electronic equipment to contain hazardous materials, and mismanagement of these materials at the end of life can

lead to environmental, and human health issues. Consequently, the EU has imposed restrictions on the use of hazardous substances in EEE through the RoHS Directive, necessitating the replacement of heavy metals, and flame retardants with safer alternatives. Ireland has established compliance schemes for batteries, and EEE waste, known as WEEE Ireland, and ERP Ireland, respectively.

Finland

In Finland, manufacturers, importers, and sellers of EEE are responsible for managing the disposal and recycling of their products. They can do this by joining an existing PRO or by establishing a new PRO with other producers. They must ensure free take-back, reuse, and recycling of WEEE waste. WEEE collection is done through permanent collection points or in-store collection. Also, mobile collections are organised once or twice a year in some of the most remote areas in the Baltic Sea archipelago, and Northern Finland. Producers are required to set up 400 collection points, and at least 1 point/municipality for consumer WEEE, and organise the collection of other types of WEEE. In addition, distributors, such as shops, must arrange a free reception for small WEEE without purchase obligation, and a 1:1 ratio for larger devices when purchasing a new one (Government Decree on WEEE 519/2014). Private users can bring their old products to these collection points for free, while non-private users need individual contracts with waste management operators. In 2024, there will be approximately 50 B2B WEEE reception points nationwide. Most of them are located on the premises of private recycling companies, which also serve as pre-treatment stations for WEEE collected from households. In the pre-treatment stations, WEEE is sorted based on their types, and pretreated before being directed to actual treatment facilities (SERTY). The Pirkanmaa ELY Centre supervises, and approves producers, and PROs, and maintains a register of PROs. PROs have contracts with waste management operators for the actual recycling operations.

Iceland

Before January 2015, Iceland implemented a specialised EPR program for WEEE, similar to the scheme in Norway. In 2008, an EPR scheme for EEE waste was established, intended to be solely managed by the producers. Each scheme was expected to collect waste based on its members' market shares, with provisions for a fee to be paid by a non-compliant PRO to other PROs for collection, and management. The legislation mandated that each PRO collect waste from all municipalities in Iceland and only one PRO could have a collection agreement with recycling stations for each municipality. Initially, a single PRO operated, but the establishment of a competing PRO by some producers aimed to introduce market competition. The requirement for nationwide waste collection by each PRO was found to be impractical and limitations on municipal collection stations' contracts with multiple PROs, made it challenging for more than one PRO to meet its obligations. The settlement system between PROs also proved ineffective in practice. Subsequently, the original scheme for packaging waste has been integrated into the IRF scheme. The WEEE scheme within the IRF aligns with other waste streams. Although the amended Act permits producers and importers to operate their own EPR scheme for WEEE, and receive a refund from the IRF, practical and cost considerations suggest it is unlikely to be pursued.

Norway

In 1999, the importers, and distributors of EEE products in Norway entered into agreements with the Norwegian Environment Agency to assume responsibility for collecting, and recycling WEEE, encompassing both commercial, and household waste. Subsequently, they established recycling schemes to facilitate compliance with this obligation. At present, the collection of WEEE is subject to regulation under waste management directives, rendering the agreements redundant. The regulatory framework governing WEEE is presently being reviewed in Norway.

Distributors are required to accept the return of EEE from households free of charge at their respective premises. Furthermore, municipalities are entrusted with the responsibility of ensuring the availability of adequate provisions for the reception of WEEE. Producers and importers are enjoined in ensuring the proper sorting, storage, and onward transmission of WEEE. The Environment Agency establishes quotas for WEEE collection.
Notably, there are five recycling schemes for WEEE in Norway: Elretur AS, Elsirk AS, ERP Norway AS, Eurovironment AS and RENAS AS. However, given that Eurovironment AS and Elretur AS share the same owner, only four recycling schemes effectively compete.

Sweden

WEEE generated from households is distinguishable from other categories of WEEE. Nevertheless, WEEE from households encompasses WEEE from commercial, industrial, institutional, and other sources that bear a similar nature, and volume to that of private households. Producers are mandated to establish a collection scheme or ensure that an authorised party manages the disposal of the producer's products when they become waste. Collection systems must possess nationwide coverage, meet adequacy requirements, and undergo consultation with municipalities and existing authorised collection systems. Retailers of electrical products are mandated to accept EEE waste from consumers. El-kretsen in Sweden offers a system with approximately 1000 collection points, typically at municipal recycling centers. The municipalities provide and finance manned collection sites, while El-kretsen organises and covers the transport and treatment of the collected WEEE. Additionally, El-kretsen extends its services to individual companies and, in certain areas, facilitates kerbside collection in collaboration with municipalities. Another organisation, Elektronikåtervinning i Sverige Ekonomisk förening (EÅF), primarily offers producers a collection scheme through collection points at select member shops. El-Kretsen and EÅF have established WEEE Clearing in Sweden, a non-profit entity that administers a financial clearing system to ensure that each collection system bears the costs of collecting and recycling its share of discarded products. The treatment and recycling of the EEE waste are directed through their respective collection systems and take place at treatment facilities or recycling plants. The waste products are sorted, and dismantled to remove hazardous materials, and segregated into materials such as metals, and plastics for effective recycling. The reclaimed secondary raw materials, such as metals, are subsequently marketed, while materials like glass are subjected to crushing, washing, melting, and reuse.

6

CONCLUSIONS

6 CONCLUSIONS

Effective EPR schemes vary in their effectiveness based on the type of product waste. By looking at practices from other sectors, we can find out which combinations of tools, such as regulatory, economic, and voluntary ones, work best for fishing gear and why some tools might not fit well for this product category.

6.1 Regulative instruments

6.1.1 Compulsory Take-Back Programs

Mandated take-back programs have succeeded in the WEEE and packaging sectors by requiring producers to collect and recycle a set percentage of end-of-life products. In the WEEE sector, this approach helped change product design to favour recyclability. Using this model for fishing gear would hold producers responsible for managing their products at the end of their lifecycle. However, the diverse materials and complexities of fishing gear may need customised solutions and strong coordination through PROs.

6.1.2 Producer Responsibility Organisations (PROs)

PROs distribute accountability among producers, helping with collection and recycling through shared infrastructure. Norway's Nofir system is a good example in the fishing gear sector, demonstrating how coordinated efforts among producers and municipalities can improve compliance and operational efficiency.

6.1.3 Dedicated Waste Collection Systems

Fishing gear needs special waste handling systems because of its size, weight, and contamination. Convenient collection points at harbours, gear shops, and seasonal events can boost collection rates. Regulations can help ensure these systems are consistently implemented across regions while working with municipalities to develop and maintain infrastructure.

6.2 Economic instruments

6.2.1 Advanced Recycling Fees (ARFs)

ARFs, used in electronics and construction, are upfront fees that fund collection and recycling efforts. These fees work best for predictable and high-volume waste streams. In fishing gear, ARFs can cover the logistics of recycling, especially for smaller items like lines and accessories. They also serve as a pricing signal that promotes better design by factoring in environmental costs.

6.2.2 Deposit-Refund Systems (DRS)

While DRS has worked well for beverage containers due to their single-material design, short lifespan, and high return rates, this model is not as effective for fishing gear. Fishing gear is often used for many years, and inflation reduces the perceived value of the initial deposit. Additionally, the mixed materials of the gear make recycling difficult, lowering the effectiveness of DRS for this sector.

6.2.3 Economic Tools and Subsidies

Subsidies can promote innovation in gear design and support the use of recycled materials. Financial help can also make it easier for fishers to take part in EPR schemes, improving compliance. These tools have been useful in other sectors and could help kickstart sustainable production models in fishing gear.

6.3 Voluntary instruments

6.3.1 Sustainable and Recyclable Design

Voluntary eco-design initiatives have made progress in the WEEE sector, where producers have focused on recyclability when developing products. For fishing gear, encouraging single-material construction or biodegradable components can improve recyclability and safety for the environment, especially with support from recognition programs or tax breaks.

6.3.2 Partnerships with Local Governments and Fishers

Working with local governments and fishing communities builds trust and makes EPR schemes more relevant. Joint efforts like drop-off points at harbours and awareness programs can encourage voluntary compliance, particularly when paired with regulatory support.

Awareness and Education Campaigns: Changing behaviour is vital for EPR to succeed. Educational campaigns, similar to those in food and construction, should emphasise the environmental risks of ghost gear and the importance of responsible disposal. Well-executed campaigns can increase participation and support the adoption of both voluntary and mandatory measures.

In conclusion, mandatory EPR frameworks, alongside balanced economic and voluntary tools, are crucial for sustainability in managing fishing gear waste. By learning from sectors such as WEEE, packaging, and construction, the fishing gear sector can move toward a circular economy model by using proven strategies tailored to its unique challenges.

7

REFERENCES

7 REFERENCES

Avfall Norge (2018). Kostnader ved utsortering av husholdningsavfall

Damayanti, D. et al. (2021), Possibility routes for textile recycling technology, MDPI.

Deloitte (2019). Sirkulær plastemballasje i Norge: Kartlegging av verdikjeden for plastemballasje; Infinitum, The Deposit System https://infinitum.no/english/the-deposit-system

Deloitte (2020). Reducing Plastic Pollution, and Creating a True Circular Economy for Plastics through Extended Producer Responsibility Analysis of the status, and potential of EPR for plastics in Norway for WWF

Deutsche Gesellschaft für Internationale Zusammenarbeit (2022). Assessing the role and impact of EPR in the prevention of marine Plastic Packaging Litter. Deutsche Gesellschaft für

Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from: http://www.giz.de/en/worldwide/93799.html

Drinkwater, A., & Moy, F. (2017), Wipes in sewer blockages study, Water UK.

European Commission (2014), Development of Guidance on Extended Producer Responsibility.

European Commission (2023), Circular economy for textiles: taking responsibility to reduce, reuse, and recycle textile waste, and boosting markets for used textiles European Environment. https://ec.europa.eu/commission/presscorner/detail/en/IP_23_3635

European Environment Agency (2022), Managing non-packaging plastics in European waste streams, (accessed on 25 August 2024).

EU Lex (2019), Directive (EU) 2019/904 of the European Parliament, and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment,

European Environment Agency (2021), Progressing towards waste prevention in Europe – the case of textile waste prevention

European Commission (2020), Circular economy action plan -, Publications Office of the EU, (accessed on 15 August 2024)

European Parliament, and Council of the European Union (2018), Directive (EU) 2018/851 of the European Parliament, and of the Council of 30 May 2018 amending Directive 2008/98/EC

on waste (Text with EEA relevance), https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=celex:32018L0851

European Commission (2023), Circular economy for textiles: taking responsibility to reduce, reuse, and recycle textile waste, and boosting markets for used textiles, https://ec.europa.eu/commission/presscorner/detail/en/IP_23_3635

European Commission (2014), Development of Guidance on Extended Producer Responsibility.

European Commission DG Environment (2014). Development of Guidance on Extended Producer Responsibility (EPR) Final Report

EU Lex (2019), Directive (EU) 2019/904 of the European Parliament, and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment

French Ministry of the Ecological Transition (2021), Biodéchets.

Fisheries Iceland (2017), Resource Utilisation, and Environmental Footprint, https://sfs.is/wpcontent/uploads/2018/09/Environmental_report_2017.pdf (accessed on 16 March 2021).

Government Degree 1319/2022, (accessed on 11 December 2024)

Government Degree on WEEE 519/2014. (accessed on 11 December 2024)

Gui, M., K. Lee, and S. Bhatia (2008), “Feasibility of edible oil vs. non-edible oil vs. waste edible oil as biodiesel feedstock”, Energy, Vol. 33/11, pp. 1646-1653

Hosseinzadeh-Bandbafha, H. et al. (2022), “Managing the hazardous waste cooking oil by conversion into bioenergy through the application of waste-derived green catalysts: A review”, Journal of Hazardous Materials, Vol. 424, p. 127636.

Ibanez, J. et al. (2020), “European Union Legislation Overview about Used Vegetable Oils Recycling: The Spanish, and Italian Case Studies”, Processes, Vol. 8/7, p. 798.

Institut National de l’economie circulaire (n.d.), La REP, quésaco ? La responsabilité élargie du producteur et la loi AGEC LA REP QUÉSACO ? LA RESPONSABILITÉ ÉLARGIE DU PRODUCTEUR (REP) ET LA LOI AGEC 2.

Jauke van Nijen (2021), How to come to a more circular (management) system of fishing gear in the OSPAR-region, Rijkswaterstaat WVL/BN REM

Joly, F. & M. Coulis (2018), “Comparison of cellulose vs. plastic cigarette filter decomposition under distinct disposal environments”, Waste Management, Vol. 72, pp. 349-353.

Kalimo & Harri (2015), What Roles for Which Stakeholders under Extended Producer Responsibility?, Review of European Comparative & International Environmental Law, 24 (1), pp. 52–53.

Landbell group (n.d.), Another country introduces EPR for fishing gear - Landbell Group, https://landbell-group.com/news/another-country-introduces-epr-for-fishing-gear/ (accessed on 3 May 2024).

Lifset, Reid. (1993). Take it Back: Extended Producer Responsibility as a Form of Incentive-based Environmental Policy. The Journal of Resource Management and Technology, 21, p. 166.

Lindhqvist, T. (2000) Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems. Lund University, The International Institute for Industrial Environmental Economics Dissertations, https://www.iiiee.lu.se/thomas-lindhqvist/publication/e43c538b-edb3-4912-9f7a-0b241e84262f

Lund, L. (2025), interview with ESG manager at Mørenot (Hampidjan) Liv Lund on May 8th.

Lusher, A., Hollman, P. & Mandoza-Hill, J. (2017), Microplastics in fisheries, and aquaculture.

Mallick. P.K., Salling K.B., Pigosso D.C.A. & McAloone. T.C. (2023), Closing the loop: establishing reverse logistics for a circular economy, a systematic review, J. Environ. Manag., Article 117017, 10.1016/j.jenvman.2022.117017

Markl, A. & Charles, D. (2022), The price of plastic pollution: Social costs, and corporate liabilities, Minderoo Foundation, https://www.minderoo.org/no-plastic-waste/reports/the-priceof-plastic-pollution/ (accessed on 17 January 2023).

Marinello, S. et al. (2020), A second life for cigarette butts? A review of recycling solutions.
NMoE. (1996a). Innsamling og Behandling av Avfall fra Elektriske og Elektroniske Produkter. [Collection, and Treatment of Waste from Electrical, and Electronic Products] Report no. MD-T-1135.

Nogueira, L. et al. (2022), “What would it take to establish a take-back scheme for fishing gear? Insights from a comparative analysis of fishing gear, and beverage containers”, Journal of Industrial Ecology.

Nordic Report (2016). https://konkurransetilsynet.no/wp-content/uploads/2018/08/Nordic-Report-2016-Waste-Management-Sector.pdf

OECD (2001). Extended Producer Responsibility: A Guidance Manual for Governments, OECD Publishing, Paris.

OECD (2016). Extended Producer Responsibility. Updated Guidance for Efficient Waste Management. Retrieved from: https://doi.org/10.1787/9789264256385-en

OECD (2021). Policies to Reduce Microplastics Pollution in Water: Focus on Textiles, and tyres, OECD Publishing, Paris.

OECD (2023). New Aspects of EPR: Extending producer responsibility to additional product groups, and challenges throughout the product lifecycle,

OECD (2024) Extended Producer Responsibility: Basic facts and key principles, https://www.oecd.org/en/publications/extended-producer-responsibility_67587b0b-en.html

OSPAR Commission (2020), OSPAR scoping study on best practices for the design, and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic, https://www.ospar.org/documents?v=42718 (accessed on 7 May 2024).

OSPAR Commission (2020), OSPAR scoping study on best practices for the design, and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic.

Ortner, M. et al. (2016), “Environmental assessment of three different utilization paths of waste cooking oil from households”, Resources, Conservation, and Recycling, Vol. 106, pp. 59-67.

Patel, V., Thomson, G. & Wilson, N. (2012), “Cigarette butt littering in city streets: a new methodology for studying, and results: Table 1”, Tobacco Control, Vol. 22/1, pp. 59-62.

Personal notification 29.4.2024 from Taneli Lumiaro, Contract Agent, Finnish Packaging Recycling RINKI Ltd. (accessed on 31 May 2024)

Płotka-Wasylka, J. et al. (2022), “End-of-life management of single-use baby diapers: Analysis of technical, health, and environment aspects”, Science of The Total Environment, Vol. 836, 155339.

Rath, J. et al. (2012), “Cigarette litter: Smokers attitudes, and behaviors”, International Journal of Environmental Research, and Public Health, Vol. 9/6.

Richardson, K., Hardesty. B. & Wilcox, C. (2019). “Estimates of fishing gear loss rates at a global scale: A literature review, and meta-analysis”, Fish, and Fisheries, Vol. 20/6, .

Ribul, M. et al. (2021), “Mechanical, chemical, biological: Moving towards closed-loop bio-based recycling in a circular economy of sustainable textiles”, Journal of Cleaner Production, Vol. 326.

Schneider, J. et al. (2020), “Online Simulation Model to Estimate the Total Costs of Tobacco Product Waste in Large U.S. Cities”, International Journal of Environmental Research, and Public Health, Vol. 17/13, p. 4705.

Staatscourant (2022), Voorpublicatie ontwerpbesluit uitgebreide producentenverantwoordelijkheid textiel. (accessed on 31 May 2024).

Systemiq, Handelens Miljøfond, & Mepex. (2021). *Achieving Circularity for Durable Plastics: A Low-Emissions Circular Plastic Economy in Norway*.

The Kingdom of Norway (2016), Failure by an EFTA State to fulfil its obligations – Directive 2000/59/EC on port reception facilities for ship-generated waste, and cargo residues), https://eftacourt.int/download/35-15-judgment/?wpdmdl=1559 (accessed on 31 May 2024).

TAUW (2021), Verkenning van knelpunten en oplossingen voor het sluiten van de keten voor luiers en incontinentiemateriaal.

Transition, F. (2020), Textiles usagés.

Tojo, N. (2001). Effectiveness of EPR Programme in Design Change. Study of the Factors that Affect the Swedish, and Japanese EEE, and Automobile Manufacturers. IIIEE Report 2001:19. Lund: IIIEE, Lund University

Umhverfis og orkustofun (2023). https://urgangur.is/a-new-law-on-waste-takes-effect-in-2023-what-will-change/

Viool, V. et al. (2018), Study to support impact assessment for options to reduce the level of ALDFG.

Vandermeersch, G. et al. (2015), “A critical view on microplastic quantification in aquatic organisms”, Environmental Research, Vol. 143.

Watson, D. et al. (2018), Used Textile Collection in European Cities, ECAP, http://www.wrap.org.uk (accessed on 2 September 2024).

WWF Norway. (2023). *Plastic Packaging Tax Effects: Environmental Costs and Benefits of a Norwegian Tax on Plastic Packaging* (p. 14). WWF.

WRAP (2014), Evaluation of the end markets for textile rag, and fibre within the UK.
Østrem, N. (2025), interview of environmental advisor Natalie Ø. at recycler org. Attvin on May 8th.

Additional information:

https://circolelt.ie/waste-tyres/, accessed on 5 December 2024

https://www.epa.ie/our-services/compliance--enforcement/waste/tyres/, accessed on December 5, 2024

https://www.epa.ie/publications/compliance--enforcement/waste/guidance-for-battery-producers.php, accessed on December 5, 2024

https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf, accessed on December 5, 2024

https://farmplastics.ie/faq/, accessed on 5 December 2024

https://www.gov.ie/en/press-release/620e6-extended-producer-responsibility-epr-scheme-to-now-include-all-categories-of-tyres/, accessed on 5 December 2024

https://www.gov.ie/en/publication/63441-extended-producer-responsibility/#tyres, accessed on 5 December 2024

https://www.gov.ie/en/consultation/c778c-consultation-on-removing-the-self-compliance-option-for-battery-producers-and-economic-operators-under-the-eu-batteries-regulation-2023/, accessed on 5 December 2024

https://www.gov.ie/en/publication/63441-extended-producer-responsibility/#packaging , accessed on 5 December 2024

https://www.gov.ie/pdf/?file=https://assets.gov.ie/86647/dcf554a4-0fb7-4d9c-9714-0b1fbe7dbc1a.pdf#page=null , accessed on 5 December 2024

https://socialrecycleit.com/wp-content/uploads/2024/02/weee-ireland-environmental-report-2022.pdf, accessed on 5 December 2024

https://repak.ie/images/uploads/reports/PRI-Review-_-Main-Report-2014.pdf , accessed on 5 December 2024

https://repak.ie/images/uploads/downloads/Plastic_Packaging_Recycling_Strategy_2018-2030.pdf, accessed on 5 December 2024

https://norsus.no/en/publikasjon/2023-kunnskapsstatus-fortekstiler-og-tekstilavfall-i-norge/ accessed February 17th 2025.

https://www.regjeringen.no/no/dokumenter/produsentansvar-for-tekstiler/id2999442/ accessed February 17th 2025.

https://www.bat.com/group/sites/UK__9D9KCY.nsf/vwPagesWebLive/DO9DCKFM, accessed on 9 May 2024

https://Commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en, accessed on 10 August 2024

http: //Ec.europa.eu/eurostat/statisticsexplained/index.php/Waste_statistics_electrical_and_electronic_equipment

https://www.elves.ie/en/news/elves-meets-ireland-s-reuse-recycling-and-recovery-targets-fourth-year-in-a-row (accessed on 31 December 2024)

https://www.elves.ie/en. (accessed on 26 November 2024)

https://ec.europa.eu/eurostat/databrowser/view/env_waseleeos/default/table?lang=en

https://www.eea.europa.eu/publications/progressing-towards-waste-prevention-in (accessed on 25 August 2024)

https://zoek.officielebekendmakingen.nl/stcrt-2021-49806.html (accessed on 29 November 2022).

https://valumat.be/en/faq/what-are-the-environmental-contributions-for (accessed on 15 May 2024).

https://www.re-cig.it/ (accessed on 28 May 2024)

https://www.environmentagency.no/legislation/waste-regulations/chapter7-packaging-waste/(accessed on 28 February 2025)

https://pub.norden.org/temanord2024-506/1-summary.html (accessed on 28 February 2025)

https://www.regjeringen.no/contentassets/ccb7238072134e74a23c9eb3d2f4908a/en/pdf/norwegian-plastics-strategy.pdf

Annexes

Annex A: EPR systems in the process of being implemented in EU

The EU's Single-Use Plastics Directive will mandate member states to establish EPR programs for various plastic products commonly found in litter surveys. Construction, and demolition waste (C&DW), food waste, agricultural plastic, and textiles (including garments, carpets and mattresses) are significant components of solid waste, and currently have low material recovery rates. Some early adopters have introduced voluntary or mandatory initiatives for these waste streams. For example, Italy, and Spain have already implemented mandatory EPR programs for cooking oils, while France has EPR programs for clothing, and furniture.

The European Commission has identified the construction and building sector as a key value chain in the new Circular Economy Action Plan and is working on a strategy for a sustainable built environment (European Commission, 2020). The EU has also mandated member states to start separate collections of bio-waste by 2024, and textiles by 2025 (European Parliament, and Council of the European Union, 2018). Furthermore, the European Commission is suggesting the introduction of mandatory EPR for textiles in its member states by 2023 (European Commission, 2023). These developments will prompt questions about the relevance, and effectiveness of EPR policies for these sectors. The main question is whether EPR is an appropriate policy approach for a product group, and under what conditions, compared to alternative policy approaches. Considering this question, the following sub-chapters will delve into six sectoral case studies: tobacco product filters, construction, and building materials, textiles, plastic, and food waste. Additionally, the subsequent sub-chapters will provide background information on the current issues with end-of-life management, and the initial experiences of programs in European countries. Each case study will conclude with an explanation of the benefits of EPR in the given product sector.

A1 Plastic products (beyond packaging)

Plastic is widely used in modern economies, but its waste can have severe environmental impacts. In 2019, 460 million tons of plastic were produced globally, with only 9% being recycled, and an estimated 22 million tons leaking into the environment (OECD, 2022). The social costs of plastic-related pollution are estimated to be hundreds of billions of dollars annually (Markl, and Charles, 2022). EPR is a promising policy approach to increasing plastic recycling and reducing plastic litter in the environment. While EPR programs for packaging are standard, they are less so for other plastic products. Durable plastics like polyvinyl chloride, polypropylene and polystyrene, are used in non-packaging sectors such as construction, electronics and households/leisure (European Environment Agency, 2022). EPR programs for other plastic-consuming sectors, including textiles, agriculture and construction, are also being discussed. Some governments are implementing EPR for miscellaneous plastic products like

wet wipes, diapers, toys, and sports equipment to improve recovery, and recycling rates. In order to further address plastic leakage, EPR should be applied to product groups that are frequently littered, such as tobacco product filters, and ghost fishing gear, for which the EU SUP Directive will require member states to adopt EPR programs by 2023, and 2025, respectively.

A2 Miscellaneous plastic products (beyond packaging)

Several OECD countries have announced plans to introduce EPR programs to cover products made with plastics outside of the packaging sector. EPR programs typically focus on product categories rather than specific materials. The EU will mandate that its member countries implement measures to reduce the environmental impact of single-use plastics such as balloons, and sanitary wipes. For instance, France has recently started implementing EPR for toys, and sports equipment in 2022. While many of these programs are either in the early stages of implementation or have been announced but not yet implemented, it is too early to determine their effectiveness. Sanitary products, including single-use diapers, have been a focus of several new policies. The EU will also require its members to adopt sanitary wipes. Recycling facilities for diapers are relatively scarce, with annual recycling capacities of 0.36 megatonnes in England, Italy, and the Netherlands. These facilities mainly recycle diapers into lower-value products like construction aggregate, and cat litter (Płotka-Wasylka et al., 2022). Proponents argue that separate collection of this waste stream could facilitate recycling and provide a business case for design changes to improve recovery.

Improper disposal of sanitary products can lead to obstruction of waterways. According to a 2017 survey sample of sewer pipe blockages in the United Kingdom, single-use wipes constituted approximately 93% of the total weight (Drinkwater, and Moy, 2017).

Table 1. Examples of EPR for miscellaneous plastics product (beyond packaging)

Market or country	Description
France (implemented in 2022)	The law requires the introduction of five new EPR programs, including toys, sports and leisure articles, and home improvement and gardening, to promote a circular economy and reduce wastage.
European Union (implemented)	The EU Single-Use Plastics Directive requires member states to implement Extended Producer Responsibility (EPR) for balloons and sanitary wipes.
The Netherlands (intention announced)	The Netherlands plans to implement an Extended Producer Responsibility (EPR) program for diapers in 2023 or 2024. A prior study on recyclability has evaluated various policy options.

Source: OECD, 2023; EU Lex, 2019

A3 Tobacco product filters

The consumption of cigarettes in 2019 resulted in the generation of approximately 880,000 tons of waste in the form of cigarette butts. Studies suggest that 65% to 75% of cigarette butts are littered, causing environmental, and public health concerns. Cigarette filters, made primarily of synthetic plastic material, take several years to degrade and can release toxic chemicals into the environment. The clean-up of littered cigarette butts is also costly, with an estimated annual cost of roughly USD 15.68 per capita in large U.S. cities. While recycling technologies for tobacco waste are emerging, they are currently niche, and economically unviable. Efforts such as Re-Cig in Italy have collected millions of cigarette butts for recycling. The implementation of EPR for tobacco product filters is not widespread, but it is expected to be adopted by EU member states by 2025.

A4 Textiles (garments, carpets, and mattresses)

The textile product sector comprises items made from fibre-based materials. This can include woven fabrics used in clothing, footwear, carpets, furniture, sheets, and towels. In this section, we will concentrate on clothing, carpets, and mattresses, all contributing to textile waste. Some EU member countries have already implemented or are in the process of discussing EPR programs for these items. Textiles make up a significant and increasing portion of municipal waste. In 2020, clothing, and household textiles consumption in the EU-27 was 6.95 million tons, around 16kg per capita, a 20% increase from 2003 (European Environment Agency, 2024). Managing this waste stream is expensive. In the United Kingdom alone, clothing, and household textiles management costs an estimated 82 million GBP annually (WRAP, 2014). Separate collection is crucial for maintaining the value of household textiles. The percentage of separately collected textiles varies from around 20% in Italy to over 75% in Germany. Charities play a significant role in accepting textile donations for separate collections, and some retailers also have take-back operations. In some countries, the public sector provides separate collections as well. Approximately one-third of textiles put on the European market each year are collected separately, which amounts to between 1.6, and 2.5 million tons (European Environment Agency, 2021).

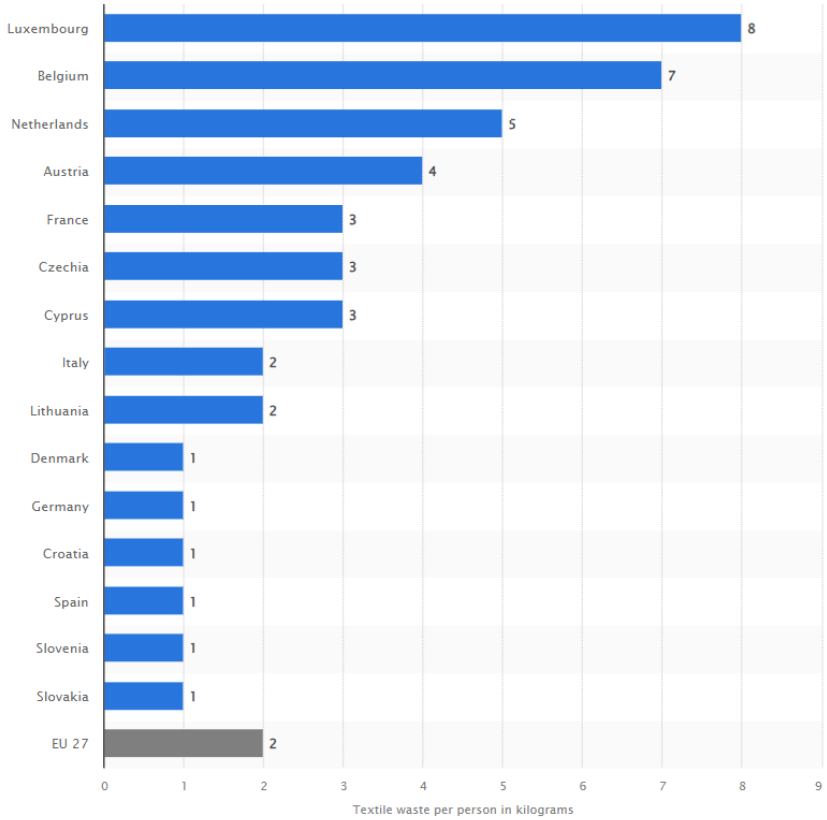


Figure 1. Per capita clothing consumption, and separate collection(kg) (Source: Statista, 2023)

Reusing, and recycling textiles to replace new production, can significantly reduce the textile industry's environmental impact. Textile production requires land, water, and energy to grow raw materials such as cotton, and for production, and transport. Proponents of textile recycling argue that reusing, and recycling textile fibres could decrease the demand for new textile production, and its associated environmental footprint (Watson et al., 2018). Some textiles are still in good condition when collected at the end of their useful life and can be reused. In Europe, 50 to 75% of collected textiles are intended for reuse (European Environment Agency, 2021).

The recycling of end-of-life textiles is currently minimal, with most recycling being done for lower-grade products such as filling materials. The Ellen MacArthur Foundation estimated that globally, only 12% of end-of-life garments are downcycled for less valuable use, and less than 1% is recycled to make new fibres for textiles of similar value. There are significant barriers to achieving a more circular approach to textiles. End-of-life textiles are often made of multiple materials, making separation difficult, and costly. Identifying and sorting materials in used textiles, especially cellulose-polyester mixtures, is challenging. Additionally, shortened fibres in recycled textiles further reduce their usability. Consequently, few mechanical recycling options are available for textiles (Damayanti et al., 2021). While chemical, and biological recycling technologies may help overcome some of these barriers, they are still niche or in the pilot stages (Ribul et al., 2021). As a result, incineration, and landfilling of end-of-life textiles remain common. The Ellen MacArthur Foundation estimated that approximately 73% of end-of-life

clothing garment waste is landfilled or incinerated globally. In Europe, an estimated 16 to 33% of collected textiles end up in mixed municipal waste, and are incinerated or landfilled (European Environment Agency, 2021).

A4.1 Examples of EPR for textiles

EPR schemes for textiles are beginning to succeed, with France, Netherlands, and Finland already implementing EPR for garments. Other markets are also considering adopting EPR measures for textiles. The European Commission has identified the textile sector as a key part of the new Circular Economy Action Plan and suggests that EPR could encourage producers to reduce textile waste, and increase reuse and recycling rates. The Commission plans to propose harmonized EU EPR rules for textiles with modulated fees. Additionally, Article 11(1) of the EU's Waste Framework Directive, requires member States to establish separate collections of textile waste by 2025. In response to this obligation, several member States are either implementing or considering introducing EPR requirements for textiles. The Netherlands has announced an EPR program for clothing, and household textiles, and Sweden plans to introduce EPR for textiles. Italy, and England are also considering EPR for textile waste. The European Commission proposes introducing mandatory EPR for textiles in its member states.

Table 2. EPR for textiles in EU member states

Country	Description	Status	Mandatory or voluntary
Belgium	An EPR program for mattresses involves compensating mattress retailers for accepting end-of-life (EOL) mattresses from customers when they purchase a new replacement mattress. Producers are obligated to remit an environmental contribution fee.	Established	Mandatory
France	An EPR scheme was introduced in 2007 to encompass clothing, shoes, and household linens. As of 2020, the scheme was extended to include curtains.	Established	Mandatory
The Netherlands	The five leading mattress manufacturers have formed a voluntary EPR organization called "stichting matras recycling Nederland" (MRN). Following a decision of general applicability, participation in the mattress EPR scheme has become mandatory. The PRO establishes its own recycling targets.	Established	Mandatory

The Netherlands	Will propose the implementation of an EPR for newly manufactured clothing, table linen, bed linen, and household linen. The EPR will establish targets for the percentage (by weight) of materials placed on the market in the previous year to be prepared for reuse or recycling. The initial target is 50% by 2025, with a subsequent increase to 75% by 2030. In addition to general targets, there are specific goals to be met: - At least 20% of textiles should be made ready for reuse by 2025 (increasing to 25% by 2030). - In the Netherlands, the goal is for at least 10% of textiles to be prepared for reuse by 2025 (increasing to 15% by 2030). - By 2025, at least 25% of recycled textiles should be turned into new fibers (rising to 33% by 2030).	Established	Mandatory
Sweden	Sweden's EPR for textiles, also known as Producentansvar för textil (Textile EPR), was implemented on January 1, 2022, with a two-year transition period. The main aim of the Textile EPR is to significantly reduce the amount of discarded textiles in the long term. The initial national target is to achieve a 70% reduction in the weight of discarded textiles by 2028, compared to the amount in 2022. Subsequently, the targets are set at 80% reduction by 2032 and 90% reduction by 2036. According to the new rules, remote sellers (producers selling textiles into Sweden) must also adhere to the regulations. To facilitate reporting, they are allowed to designate a representative within the country. Any producer whose textile product is already comprised of 80% or more textile waste will be exempt from reporting.	Established	Mandatory

Source: OECD, 2023

A5 Construction sector

This section discusses the use of two different types of waste in the construction industry; materials like leftover building materials, and the built environment such as construction, and demolition waste (C&DW) from entire buildings. The analysis of building materials is focused on waste streams with an EPR program in place, specifically paint, and flat glass windows. However, the insights gained from these programs could potentially be applied to developing EPRs for other building material waste streams.

A5.1 Examples of EPR for the construction sector

Several markets have implemented EPR policies for Construction, and Demolition Waste (C&DW) with the goal of increasing the recovery of these materials at the end of their lifecycle, particularly at brownfield construction sites. Traditionally, demolition, and construction firms have been responsible for managing the waste generated by their work, both physically, and financially, similar to individual producer responsibility. To further the goal of material recovery, the public sector can establish targets and provide incentives for these operations. Product

stewardship programs can also assist in the reuse, and safe disposal of unused building materials such as paint. In this system, producers of building materials pay an upfront disposal fee that covers separate collection for reuse or end-of-life treatment of the material. An example of this approach is the flat glass industry in the Netherlands.

A6 Food loss and waste (cooking oils and commercial food producers)

In this section, we will specifically address food loss, and waste within the framework of EPR programs in EU member countries, focusing on cooking oil, and commercial food waste. Cooking oil constitutes a substantial portion of waste, with a 2008 study revealing an annual waste volume of at least 16 million tons. Improper disposal of cooking oil carries significant environmental and economic ramifications. Leakage into environmental systems through landfill leachate or direct disposal into water bodies can adversely impact wildlife, and habitats, and contaminate drinking water sources. Furthermore, the introduction of cooking oil into water systems can lead to oxygen overload, and the formation of dead zones. Inadequate discharge in sewage systems can give rise to blockages, and subsequent maintenance issues, with the United States Environmental Protection Agency estimating that "grease" is responsible for 47% of reported sewer blockages. Separate collection of waste cooking oils is generally limited. For instance, in the EU, while per capita vegetable oil consumption averaged approximately 21.9 kg from 2010 to 2012, only about 1 kg per capita was separately collected. Consequently, disposal of cooking oils through the general waste stream or sewage is commonplace. Notably, waste cooking oils possess a high calorific value, and can be repurposed into alternative forms of energy such as biodiesel, thermal energy, electric energy, or biogas. This conversion, and utilization of vegetable oils in lieu of fossil energy sources can result in reduced greenhouse gas emissions.

A6.1 Examples of EPR for food waste

In several countries, cooking oil producers are required to handle the waste generated from their products. The EU's Waste Framework Directive specifies that the European Commission will assess the possibility of implementing specific targets for the recycling of waste oils (European Parliament, and Council of the European Union, 2018).

Table 3. EPR for cooking oils in EU member states

Example	Description	Source
Belgium	Edible oils fall under an EPR scheme, where producers contribute to end-of-life (EOL) costs by entering contracts with municipalities.	(European Commission, 2014)
France	The requirement is to sort bio-waste and treat it through suitable channels. Producers of 60 litres of edible oils per year	(French Ministry of the Ecological Transition, 2021)

Italy	A consortium known as CONOE is dedicated to collecting and treating used vegetable oils, with 90% of the collected material being processed into biodiesel.	(Ibanez et al., 2020)
Spain	The National Association of Waste and Edible Oil and Fat By-Product Managers (GEREGRAS) aims to collect and process 60% of total production by 2030.	(Ibanez et al., 2020)

circnets

Improving the management of end-of-life fishing gear

Blue Circular Nets (CIRCNETS) supports collection, treatment and recycling of fishing gear, so that these end-of-life nets are disposed appropriately, and they will not end up in seas and degrade the marine environment.

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