

European Plastics Pact

Plastic Packaging – Recycling and collections best practice.

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Best Practice Collections and Recycling - Introduction

This resource was proposed as a desk-based review which aims to support Target 3 of the European Plastics Pact – which focusses on Collections, sorting and recycling – by providing information on five case studies across Europe which offer insights into conditions and practices that have contributed to the delivery of high recycling rates supporting the drive toward a circular economy.

The research was conducted from January-March 2023 and is accurate at time of publication to the best of the European Plastics Pact's knowledge.

Please note this resource does not cover best practice for increasing quality of recyclate outputs, as this was out of scope and would require further focussed investigation.

The following views and opinions do not reflect those of the European Plastics Pact.

Plastic Packaging Collection

- Introduction

Global consumption of plastics has [increased twentyfold](#) in the last 50 years. Around 40% of plastics are used for packaging. At current rates, plastic packaging volumes are expected to more than quadruple by 2050 to [318 million tons per year](#). For the material that continues to be used, improved efficiencies and performance in the capture and recycling of this material is vital to ensure that plastic does not escape into the environment.

The EU has adopted policies that are intended to reduce the volume of plastic packaging placed on the market (POM) and encourage reuse and refill options. The EU27+3 recycling rate for post-consumer plastic waste in 2020 is 35% recycling, 42% energy recovery and 23% landfilled. ([Plastics Europe, 2022](#))

[The 2022 report](#) from Plastics Europe stated that “Plastic waste recycling rates are 13 x higher when collected separately but for Plastic Packaging waste recycling this becomes 80 x higher when collected separately compared to mixed collection schemes.”



Plastic Packaging Collection - Introduction

In 2019, EU member states reported an average of [41% plastic packaging recycling](#) across the EU 27, with only a few opting to report using the new measurement method. From 2022, member states were required to report using the new measurement method for the reference year 2020, which was published during the time of writing this report and lowered the plastic packaging recycling rate across the EU to 32%.

It is likely that member states will need some time to move to the new measurement method. We can expect further years of data gathering, analysis, reporting, and auditing before the figures reported to Eurostat accurately reflect all elements of the updated methodology by which member states will be judged on the 2030 targets.

As it stands only [9 EU countries](#) are expected to achieve the 2025 reuse and recycling targets for all packaging waste.

Plastic Packaging Collections in practice

Separate collection of plastic packaging has been widely adopted across Europe but what is collected, and the method adopted, varies significantly. In some countries plastic packaging is a separate recycling stream but more commonly it is collected co-mingled either with metal or with other mixed dry recyclates.

Plastic packaging formats most commonly collected are bottles (PET & HDPE), pots, tubs and trays (PET, PP & PS) and films (LDPE, HDPE & PP). All collected materials are subject to contamination either from unrecyclable formats (multi-layer polymers, PVC, etc.) or with non-target materials (paper, card, metals & organic material, etc.). Citizen research by WRAP (2023, unpublished) shows that 81% of adults in the UK incorrectly dispose of at least one item in the recycling which isn't collected locally. This level of contamination has significant impact for the commercial viability of recycling options and reduces the quality of recycled material available to end users.

Success of collection schemes are significantly influenced by economic incentives. This can be in the form of a direct financial incentive i.e. deposits charged under a DRS scheme redeemed once the packaging is returned for recycling, or indirectly through charges made for wastes not recycled, both having an important role in improving both the quantity and quality of plastic packaging recycled.



Plastic Collections – Case studies

The case studies highlighted in this review were selected based on a range of criteria identified as impacting on the recycling rates achieved, these included:

- High capture/collection rates (The Netherlands, Sweden)
- High recycling rates (The Netherlands, Wales, Parma)
- Low or declining use of EfW (Wales, Sweden)
- Low per capita generation of plastic packaging waste (Sweden)
- Regional/local divergence (Wales, Parma)
- Use of statutory targets and/or financial incentives e.g. 'pay as you throw'. (Wales, The Netherlands)
- Recent and rapid improvements in capture/collection rates (Lithuania)

None of the countries or regions selected ranked highly across all of the criteria but were selected to illustrate approaches and strategies adopted for the collection of plastic waste ultimately leading to high levels of achievement in one or more of the criteria. The following countries/regions were selected:

- Netherlands, Sweden, Lithuania, Wales (UK), Parma (Italy).

It is intended that the case studies illustrate a range of different approaches adopted for the collection of plastic packaging across Europe at national, regional and city level.



Netherlands



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Netherlands - Introduction



The Netherlands attaches great importance to its environmental performance and is reputed to be the first Western European country to introduce separate waste collections going back as far as 1972. The country has low levels of landfill, and consistently high recycling rates but also still heavily relies on the burning of waste in its waste management system.

Both recycling and waste collection are managed at a local level by municipalities – and paid for through city/regional taxes. In some municipalities, separate recycling containers are provided for kerbside collection, encouraging citizens to separate materials at home (fines can be applied if this is not done correctly). In other areas, including Amsterdam and some other large cities, citizens are asked to deposit recycling in communal, roadside containers. These are either underground or on street level and are emptied regularly by municipal services. The collection and recycling of plastic packaging in the Netherlands are funded from the Packaging Waste Fund under an Extended Producer Responsibility (EPR) scheme.

In 2020 The Netherlands recycled 65% of plastic packaging ([Plastics The Facts, 2022](#)), the remaining 35% being sent to Energy Recovery and zero to landfill.

Data collected for the European Plastics Pact in 2022 suggested that just 4.3% of plastic packaging in the Netherlands is unrecovered. However, [other sources](#) note that plastic is still a significant litter concern with 3,500 kg of plastic packaging removed from Amsterdam's waterways every day.

Netherlands – Policy landscape



[National Waste Management Plan](#) (now in a third iteration 2017-2023)

The plan is made up of policy documents and sector plans. Each sector plan describes the policy for the relevant waste as well as particular aspects relating to licensing and imports and exports.

Objectives include:

- *"To promote the prevention of waste and decoupling the development of Gross Domestic Product (GDP) and the development of the total volume of waste. This means that the total volume of waste must not exceed 61 million tonnes in 2023 or 63 million tonnes in 2029.*
- *To increase the proportion of the total volume of waste that is prepared for reuse and recycling from 77% in 2014 to at least 85% by 2023.*
- *To halve the volume of waste in the Netherlands that 'leaves' the economy via incineration plants and/or landfill sites by 2022, compared with 2012".*

Targets for recycling exceed the EU Directive targets:

- **More and Better Recycling (2015)**
- **Making the Circular Economy Work (2019)** - for the Dutch economy to be completely circular by 2050. By 2030 the consumption of primary raw materials should have been reduced by half. Plastic is one of the five key sectors targeted for change.

How has this been achieved?

Actions	Implementation
EPR	Dutch regulations have implemented Extended Producer Responsibility (EPR) for an extensive range of products and waste streams, including plastic packaging, from as early as the mid 1990's. As of 1 January 2022, a producer or importer who markets beverages in a plastic bottle of three litres or less must ensure that at least 90% of the weight of the total number of the marketed bottles, caps and lids is collected separately during a calendar year.
DRS	Since 1 July 2021, small plastic bottles for soft drinks and water have been subject to a deposit. Every producer or importer who markets water or soda in plastic bottles with a volume of three litres or less must request a deposit for each bottle. DRS is applied to plastic drinks bottles, with minimum tariffs of €0,15 for bottles up to 0,5 litres and €0,25 for larger bottles. Producers may charge higher tariffs to ensure higher return rates. Deposits can be redeemed at supermarkets as vouchers that can be used against purchases or converted to cash.
Fines and penalties	Around half of Dutch municipalities charge their citizens for the amount or weight of residual waste they produce through unit-based pricing. Pay as you throw for residual waste acts as an indirect incentive for households to separate and recycle more, and therefore save on waste disposal costs. Municipalities collect up to 40% more plastic packaging where PAYT is in place.
Single use plastics ban	From 3 July 2021 it is prohibited to place on the market single-use plastic products for which there is a reasonably affordable, sustainable and less harmful alternative available. This includes: cotton swabs, cutlery, plates, straws, stirrers for beverages, etc. Additionally, the marketing of products made of oxo-degradable plastics is also prohibited.

What was the outcome?

Actions	Implementation
Recycling targets	Government target for recycling of at least 45% by weight of plastic packaging waste in 2015, rising to 51% by weight in 2021 (this has been achieved). Bans to landfill have been in place since the mid 90's for any material that could be recycled (including plastics).
Best practice	The establishment of the Waste Management Council in 1990. The Council was established on the basis of a voluntary agreement between the three tiers of government (national, provincial and local) to achieve a joint and coherent approach for the waste management challenge. The officially reported Dutch plastic (packaging) waste recycling yield increased from 47% in 2013 to 52% by 2018. In this context, waste separation relates to both separation at the source and separation post collection.
Reducing waste generation	The Netherlands has achieved absolute decoupling of waste generation from GDP, with waste per capita falling by 13.7% between 2006-2021 whilst GDP grew by 36% in the same period from c. 734 billion to 1.01 trillion .
End markets	<p>Much of the plastic collected in the Netherlands is of low value due to the mix of polymers in packaging design. According to the Netherlands Institute for Sustainable Packaging (KIDV) and the Packaging Waste Fund, the quality of the recycled plastics—and therefore also their application possibilities and the price could already be improved using currently available techniques. However, this relies on 'slowing down' the recycling process having cost implications for the final product.</p> <p>From 2025, 25% of the material of a PET bottle (polyethylene terephthalate) must consist of recycled material rising to 30% by 2030. Around 10% of plastics placed on the market are produced from recycle.</p>

Netherlands – Collection infrastructure

Deposit Return Schemes



On-street bring containers



Netherlands – Next Steps

- Collecting more material separated at kerbside is a policy priority.
- Building infrastructure for 'difficult to recycle' plastic is progressing e.g. <https://amsterdamsmartcity.com/updates/news/the-netherlands-first-plastic-waste-recycling-plant-is-in-Almere>
- Plastic is one of the five key focus areas for delivering a circular economy in the [Netherlands Circular Economy Plan](#).
- SABIC and Plastic Energy are building what they hope to be “the world’s first commercial (non mechanical) recycling unit to produce circular plastic polymers” in the Netherlands.
- Government policy is focussed on moving away from waste-to-energy industry. Netherlands will continue to increase the taxing of waste incineration, while at the same time stimulate EfW operators to enhance their sorting capacity in order to remove plastic from the residual waste stream.



Image: van Bezooijen (2009)

Netherlands – Summary

- The Netherlands have a long history of addressing environmental concerns.
- They are early adopters of environmental policies intended to increase recycling.
- Generally, citizens are supportive of environmental and recycling policies and are active participants in recycling.
- Financial incentives have been applied to encourage recycling behaviours.
- Policies and dependencies on waste-to-energy industries facilities may have impacted on further increases in recycling.



Image: Shutterstock

Sweden



Image: BEWI (2021)

Sweden - Introduction



Each year, producers supply the Swedish market with approximately 200,000 tons of plastic packaging about 30% of the total plastic use in Sweden. This figure represents one of the lower levels per capita of plastic packaging waste generated in Europe at 29.3kg.

Sweden has a history of reporting relatively high levels of plastic packaging recycling (~50% in 2016, 53% in 2019) however this included plastic packaging disposed of to EfW. Revised EU reporting requirements has led to a drop in reported recycling to ~33% in 2020.

Most plastic packaging is captured via bring sites run by one of the producer responsibility organisations. From 1st January 2023, a permit from the Swedish Environmental Protection Agency is required for collection schemes to be able to collect packaging waste from households (funded via EPR); this should lead to greater levels of sorted plastic captured kerbside.

Around 90% of collected plastic packaging waste is sorted at Svensk Plaståtervinning's facility in Motala, a fully automated plant. However, large quantities of plastic packaging waste input into the sorting plant are not currently sorted for recycling (~50%) at the facility. This is primarily due to recyclability issues resulting from packaging that has not been designed for recycling and a lack of end markets for some materials. Most of the materials sorted at this plant are recycled outside of Sweden but within EU.

Sweden – Policy landscape

- Sweden built incinerators to address landfill bans in the early 2000s
- Sweden has had legislation covering deposits on beverage containers since 1984 (1994 for plastic).
- **The Swedish Environmental Code 1999** - to promote sustainable development which will ensure a healthy and sound environment for present and future generations. Consolidated 15 previous acts. Detailed provisions are laid down in ordinances issued by the Government or in regulations issued by government agencies, such as the Swedish EPA.
- **Ordinance (2005:22)** established in 2006 on the return system for plastic bottles and metal cans.
- **Ordinance (2006:1273)**, on packaging 1994 introduction of Producer Responsibility for packaging.
- **Decree (2021:996)** Decree of the Ministry of the Environment seeks to reduce waste production and to promote a circular economy. Disposable products are defined as non-recycled products, and plastic disposable products as those consisting wholly or partially of plastic.
- **Ordinance (2022:1274)** on producer responsibility for packaging. The ordinance comes into force on 1st of January 2023 replacing the 2006 Ordinance.
- In 2018 the Swedish government established a special advisory group, **Delegationen för cirkulär ekonomi** (the advisory group for circular economy), to help make circular economy a key part of government policy.
- Since 2020 the Swedish EPA has the task of running the “**National plastic coordination**” with the aim to gain and spread knowledge around sustainable plastic use as well as creating cooperation.

How has this been achieved?

Actions	Implementation
Recycling targets	50% plastic recycling target for 2021. Achieved under old measurement but not under new EU rules.
Collection for recycling	<p>Households can deposit their plastic waste (including packaging) in a network of public recycling stations ("bring system") operated by Förpackningsinsamlingen (FTI) a 'not for profit' organisation. Approximately 70% of the collected household plastic packaging waste is collected in this way. Recycling stations usually include separate containers for packaging waste of metal, plastic, paper, coloured and transparent glass and newspaper.</p> <p>A growing number of households also have access to kerbside collections wherein plastic packaging is collected separately from other waste in multi-compartment bins or colour coded bags – accounting for ~30% of the collected household plastic packaging waste</p>
Sorting	<p>Sweden sorts and processes the majority of its plastic packaging in a single recycling facility. 90% of collected material is sorted at Svensk Plaståtervinning's facility in Motala, a fully automated plant. Around 50% of the input is not sorted for recycling primarily due to formats that have not been designed for recycling and a lack of end markets for some materials. Outputs are rigid HDPE and PP, clear PET and LDPE. Most of the materials from this plant are recycled outside Sweden but within EU (primarily Netherlands and Germany). Sweden's other PRO Omni Polymers also have a sorting facility.</p>
End markets	<p>There are no specific regulations on the use of recycled materials in packaging. It is reported that much of the collected packaging is used in low value end market products i.e. refuse sacks.</p> <p>In the packaging regulation (2022:1274) the goal is that packaging containing more than 50% of plastic should contain 30% of recycled content by 2030.</p>

How has this been achieved?

Actions	Implementation
EPR	<p>Packaging in Sweden is covered by EPR systems with data from producers gathered via an electronic survey. Producers are responsible for reporting data on amounts of packaging placed on the market, quantities of waste collected and the treatment of these. There is no de minimis for EPR however there are thought to be a large number of free riders and the estimated POM could be as much as 30% higher than reported, significantly impacting on the recycling rate.</p> <p>From April 2019 packaging recycling fees have been modulated. Plastic packaging that is easy to recycle costing less to place on the market than packaging that is more difficult to recycle.</p>
DRS	<p>A deposit return system (PANT) exists for PET bottles achieving an 83% recycling rate. The deposit for cans and small bottles is 1 krona and 2 kronor for large bottles. Returpack AB is in charge of a deposit return system for PET bottles and recycled by Cleanaway Svenska PET AB. 97% of the PET bottles delivered to Returpack are collected through reverse vending machines.</p>
Citizen engagement	<p>At the moment there is no stated legal responsibility for the communication to households about collection and recycling of plastic packaging waste.</p>
Single use plastics tax	<p>In the 2020 budget bill, the Swedish Government announced its plan to impose a new excise tax on plastic bags which are typically used by consumers for packing and carrying groceries. The tax is three kronor for standard plastic bags and 30 öre for the smaller fruit and vegetable bags. It is the manufacturers who pay the tax on the bags, and the price for a plastic bag for the consumer is between six to seven kronor.</p>

Collection Infrastructure

**Coloured bags
for kerbside
recycling**



DRS



**Bring sites
for recycling**



**Energy
from
Waste**



Sweden – Next steps?

- Roll out of municipality operated kerbside separate collection systems (in place of the prevalent bring systems) by 2027, funded through EPR. This is anticipated to increase collection rates for household plastic packaging from the current level of ~50% to ~80% by 2030
- Swedish Plastic Recycling ([Svensk Plaståtervinning](#)) is investing 1 billion SEK (120 million dollars) to build the world's largest and most modern facility for plastic recycling, 'Site Zero' (200,000 tonnes capacity). The facility will be able to recycle all plastic packaging from Swedish households without generating any CO₂ emissions. The completion of the facility (2023) will effectively double sorting capacity for plastic packaging. Other infrastructure investments have also been announced.
- [Increasing the coverage of the existing deposit return system](#). From January 2023 this was also applied to plastic bottles for other beverages like juice, squash, cordial, soups, etc. (though beverage containers for dairy products will remain exempt until 2026).

Sweden – Summary

- Sweden has been heavily reliant on Energy from Waste facilities as a justifiable route for plastic packaging disposal.
- Citizens are required to make greater effort to recycle packaging as it is not collected 'kerbside'.
- Sweden is heavily reliant on large scale single infrastructure developments to manage packaging waste. A lack of competition may hinder increases in recycling.
- Use of EPR and DRS is driving collection and capture rates for plastic packaging. Amendments such as modulation of EPR fees and broadening the scope of DRS are likely to deliver increased recycling rates.



Lithuania



Lithuania - Introduction



Lithuania has made significant improvements to its recycling system over the past few years. Some of the key steps involved in this achievement include:

1. Modernizing infrastructure: Including upgrading recycling facilities and implementing new waste sorting technologies, as well as separate collections. This has helped to improve the efficiency and effectiveness of the recycling system.
2. Implementing a deposit system: In 2016, Lithuania implemented a deposit system for single-use beverage containers, which has helped to increase recycling rates for these items.
3. Encouraging public participation: Lithuania has launched public awareness campaigns to encourage residents to recycle more and to do so correctly. This includes providing education on what can and cannot be recycled, and how to properly sort materials for recycling.
4. Collaborating with businesses: The Lithuanian government has collaborated with businesses to improve recycling rates, including working with manufacturers to design products that are more easily recyclable, and requiring producers to take financial responsibility for the disposal of their products.

These efforts have led to significant improvements in the country's recycling rates, which have increased from around 25% in 2010 to over 59.4% in 2019 (Eurostat). According to data from the [European Environment Agency](#), in 2016 Lithuania has reached its targets for 2030 in packaging waste recycling.

Waste Management and Collections

There are 10 regional waste management systems created in Lithuania (Alytus, Kaunas, Klaipėda, Marijampolė, Panevėžys, Šiauliai, Tauragė, Telšiai, Utena and Vilnius).

For the development of these systems, regional waste management plans have been prepared in all 10 regions.

Municipal waste management plans and municipal waste management rules are developed and approved at the municipal level.

Table overviewing the main separate collection systems in Lithuania.
Source: [LT National factsheet.pdf \(municipalwasteeurope.eu\)](https://municipalwasteeurope.eu/lt-national-factsheet.pdf)

Collection Type	Paper	Glass	Plastic	Metal	Bio-Waste
Door-to-door	Primary (for individual households)	Primary (for individual households)	Primary (for individual households)	Primary (for individual households)	Very rare
Co-mingled			Primary (for individual households)		
Bring points	Primary (for apartment buildings)	Primary (for apartment buildings)	Primary (for apartment buildings)		Very rare
Civic amenities	Additional collection for all streams on top of other such as waste tyres, i.e., hazardous waste from households, etc.				
Producer/retail take-back		Bring back scheme for glass bottles	Bring back scheme for plastic bottles	Bring back scheme for metal tins	

How has this been achieved?

Actions	Implementation
Law on Waste Management of the Republic of Lithuania [LT WML 1998]	<p>The NSWMP imposes requirements for municipalities to implement separate collection systems. The following specific requirements are set:</p> <ul style="list-style-type: none">• Approve schemes of bring points by January 2015.• Provide containers for separate collection of secondary raw materials in the largest cities (Alytus, Kaunas, Klaipėda, Marijampolė, Panevėžys, Šiauliai, and Vilnius), i.e. not less than one bring point in apartment building areas with 600 inhabitants; for all other cities: not less than one bring point in apartment buildings with 800 inhabitants.• In residential areas with individual houses when house owners are not supplied with individual containers, install not less than one bring point at the main entrance into the residential area.• Bring points must be organised in public places with frequent visitors and temporary bring points are to be established during public events.
National Strategic Waste Management Plan for 2014-2020	<p>The following recommendations were specified to municipalities: the average distance to bring points in the apartment building areas should be not more than 150m by 2016; the average distance to bring points in apartment building areas is to be not more than 100m by 2018; at least one bulky waste collection site serves 50,000 inhabitants, but there should be at least one such site in any municipality [LT NSWMP 2014].</p>

Lithuania - Policy

Actions	Implementation
Deposit Return Scheme	Deposit rate of €0.10 for refillable Glass and non-refillable glass, plastic and metal beverage containers, 0.1-3 litres in size. After the beverage has been drunk, the package can be returned to the automatized bottles and cans collection machine. These machines can be found in every supermarket larger than 300 m². The deposit system has remarkably improved recycling rates of bottles and cans. InterregEurope state that Lithuania collect and recycle 92% of sold to market beverage packages (PET, glass and metal).
Landfill Tax	Planned increase of landfill tax when energy from waste plants are running. Tax for non-hazardous landfill was increasing with 5 €/t each year until 15 €/t for 2022. Now it is set to be 50 €/t every year from 2023.
GPAIS	Lithuania has implemented an electronic system where waste movement can be tracked – GPAIS . From creation to transportation to elimination, government officials can track waste of each company, regulating the disposal routes and preventing illegal waste management.

How has this been achieved?

Actions	Implementation
<p>Citizen Engagement Campaigns: LEPA (Lithuania Environmental Protection Agency)</p>	<p>LEPA used a combination of public awareness and education, infrastructure development, and policy measures to motivate citizens to increase recycling and improve waste management practices.</p> <p>By the end of 2016, 99.8% of the Lithuanian public were aware of the deposit system, with 89% having used it at least once. 58% of consumers reported recycling more and 78% believed the deposit system is good and necessary. Prior to the scheme, only one-third of all beverage containers in Lithuania were returned. DRS management of non-profit USAD had a goal of a 55% return rate in 2016 and far exceeded that target with 74.3% of all beverage containers returned for recycling. The return rate reached a huge 91.9% by the end of 2017.</p>
<p>EPR</p>	<p>Managed by the National Packaging Depository. Membership of a PRO is mandatory for all producers or importers who place more than 0,5 metric tons of packaging on the Lithuanian market per year. Modulated fees cover cost of waste management. Reporting of packaging production and importation is mandatory.</p>
<p>NWMP 2021-2030</p>	<p>The new National Waste Prevention and Management Plan for 2021-2027 in Lithuania sets out ambitious targets for waste management and recycling. Some of the key targets include:</p> <ul style="list-style-type: none"> • Increase the separate collection of municipal waste to 80% by 2027 • Reduce the landfilling of municipal waste to a maximum of 5% of the total amount of municipal waste by 2030
<p>Law on Waste Management (Article 26)</p>	<p>Increase the recycling and preparing for reuse rate of municipal waste to 55% by 2025 and 60% by 2030; recycling rate of packaging waste to 65% by 2025 and 70% by 2030; and recycling, preparing for reuse and other recovery rate of construction and demolition waste to 70% from 2021.</p>

Lithuania - Summary

Lithuania's recycling rates have been steadily improving in recent years.

The government have focused on:

- Strong policy agenda
- Modernizing infrastructure
- Implementing a DRS for beverage containers
- Improving infrastructure for collections
- Encouraging public participation through national awareness campaigns
- Electronic tracking of waste materials to ensure transparency and traceability



Image: Shutterstock

Parma Italy

Parma, Italy - Introduction



Parma is a Municipality in Emilia-Romagna, in the North-East region of Italy, with a population of ca. 194,000. In 2014, waste per capita was 636kg, 160kg over the European average ([Zero Waste Europe, 2019](#)). The region recycled 58.2% of Municipal waste and 45-50% of waste was collected separately. By end of 2016, Parma was generating less than 100kg of residual waste per person and achieved 80% separate collection ([Zero Waste Europe, 2016](#)).

Due to citizen pressure, a zero-waste strategy was implemented in 2012 and the region has been successful in quickly increasing their collections and capture rate, as well as improving the quality of their recycled materials by reducing contamination.

Since 2012, Parma managed to improve their separate collection system, lowering the costs for citizens. The total investment Parma made was €2.4 million over the course of 2012-2018, or €12.30 per inhabitant ([Collectors, 2020](#)). Comparing the waste fee in 2012 and 2016, we see a drop of 1.6%.

Two possible explanations for the reduction in the waste fee are the foreseen producer fees that have been increasing from 2013 onwards, and the sharp decrease in residual waste and the accompanied costs.

Parma - Policy

- Introduction of kerbside collection system from 2014, modulated according to population density.
- Separation of materials for recycling collection into bio-waste; paper and cardboard; bottles, cans and cartons. For glass collection, 1,304 bell containers are available throughout the city.
- Parma has four civic amenity sites run by Iren Ambiente, and thirteen automatic eco-stations where citizens can bring their plastic & packaging waste (PPW).
- Pay-as-you-throw fixed and modulated fees per household
- Landfill-Tax
- Extended Producer Responsibility

Regarding how the PPW collection is funded in Parma, the items below are listed as a percentage of the total revenues (% of the total revenues);

- The waste fee decreased from 56% in 2012 to 49% in 2021;
- Revenues from incineration decreased from 16% in 2012 to 6% in 2021;
- Revenue from recovered materials increased from 18% in 2012 to 26% in 2021;
- The EPR fee contribution increased from 8% in 2012 to 12% in 2021;
- The eco-tax increased from 2% in 2012 to 7% in 2021.

Collection infrastructure



How has this been achieved?

Actions	Implementation
EPR	<p>900,000 companies which produce or use packaging have joined the EPR scheme: CONAI. From 2018 tariffs were linked to recyclability:</p> <ul style="list-style-type: none">- Level A: Sortable and recyclable packaging from the “Commerce & Industry” circuit – 150 €/t- Level B: Sortable and recyclable packaging from the “Household” circuit – 208 €/t- Level C: Packaging not sortable/recyclable with current technologies – 546 €/t.
PAYT	<p>The fee for every household is composed of two main elements: a fixed part based on the number of household members and the square meters of the household, and a variable part that depends on residual waste generation and home composting. The fixed part covers a minimum number of collections of residual waste per household, and additional removals are charged (€0.70 per bag, €1.40 per bucket and €4.20 per wheeled bin). Households making use of nappies are not charged for the extra removals. After the introduction of this system, the collection of residual waste has dropped and only 25% of inhabitants take out their bin to be emptied.</p>
Eco Points	<p>Eco-points are received for bringing waste to recycling points and offer a discount on e.g. electronic waste, hazardous waste and medical waste and depend on the quantity and sort of waste. Disposing packaging waste is free, but yields no eco-points. Each eco-point is worth a discount of €0.15, and citizens can receive a maximum discount of €20.</p>
Landfill Tax	<p>In Emilia-Romagna, a regional law (16/2015) states that municipalities should pay an Ecotassa, or Eco-tax of €15 per ton of waste landfilled or incinerated. With this eco-tax, virtuous municipalities are rewarded. In 2016, Parma paid € 160,288.</p>

How has this been achieved?

Actions	Implementation
Citizen Engagement	<p>In Parma, a strong communication campaign was implemented to involve citizens in the recycling system. This included communication in public spaces, targeting households affected by the change, and taking into account the different needs of citizens. Other initiatives included information about the sorting process, a three-year contest between schools to reduce waste, mobile eco-points, and collection adapted to different types of areas, organisations, and family size.</p>

Outcome

In 2020, the following quantities were captured and recycled in Parma (data from [Collectors, 2020](#)):

Material	Generated Waste (tonnes/year)	Capture Rate	Recycling Rate
Paper	17,679	81%	80%
Plastic	7,560	69%	53%
Metal	2,394	33%	33%
Glass	9,807	93%	74%
Composite Materials	445	36%	28%

- 34% of the material that enters the residual waste is incinerated in Italy
- Global Warming Potential associated with collecting and sorting for plastic was 4% in Parma. Greater environmental impact reductions can be achieved by reducing losses at the sorting and recycling stages.

Parma - Conclusion

Parma demonstrates how efforts can be made to transform a waste system within a small region, despite geographic challenges such as small historic city centres. This success due to a range of factors.

1. Strong local government support: The city government of Parma has been very supportive of recycling efforts, implementing policies and initiatives to encourage and facilitate recycling. For example, they have provided financial incentives to households and businesses that recycle and have established an efficient waste collection and sorting system.

2. Education and awareness: The city has also focused on educating the public about the benefits of recycling and the importance of reducing waste. This has been achieved through various awareness campaigns, public events and educational programs, which have helped to change the attitudes and behaviour of citizens.

3. Community involvement: Parma has a strong tradition of community involvement and social cooperation, which has helped to support and strengthen its recycling programs. Local residents are encouraged to take an active role in the recycling process, and there are many community-led initiatives and groups that promote recycling and sustainability.

4. Infrastructure and technology: The city has invested in modern waste collection and recycling infrastructure, such as specialized collection trucks and sorting facilities. This has made the recycling process more efficient and effective and has helped to reduce contamination of recyclable materials.



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Wales UK

Wales - Introduction

- Wales, one of the devolved nations of the UK, has had its own government since 1999. A key feature of the Welsh constitution is a commitment to sustainable development and this is reflected in the Well-being of Future Generations (Wales) Act 2015. As a devolved responsibility, Wales has adopted ambitious statutory recycling targets, and has become a global leader in recycling, ranked as first in the UK, second in Europe and third in the world for household waste recycling. This success has built from the development of a clear, long term vision, strong partnership working, significant investment and clear milestones along the way.
- In 2021 the household recycling rate was 65.4% with 18 of 22 local authorities exceeding the statutory minimum target of 64% for Wales, and 13 reporting an increase in performance on the previous year.
- Wales recycled around 46,300kT of plastic in 2021, approximately 35% of all materials POM.
- Citizens can recycle plastic packaging as part of their kerbside collection services with 100% of Local Authorities offering services to capture plastic bottles and other rigid packaging (film is not yet part of the service).
- Plastic packaging recycling is recorded in 2021 as 75% for bottles and 47% for all other rigid packaging (PTTs). Non-packaging plastics (garden furniture, toys, etc.) can be taken to Household Waste Recycling Centres for recycling or disposal.

Wales - Policy



One Wales: One Planet: The Sustainable Development (SD) Scheme of the Welsh Assembly Government

The Environment Strategy for Wales 2006 – focus on resource efficiency, recycling and use of recycled materials. Key aim for reduce, reuse and recycle to be universally accepted in government, business, industry and home life.

Well-being of Future Generations (Wales) Act 2015 – establishing legally binding responsibilities for government and public sector in delivering sustainable development goals.

The Environment (Wales) Act 2016 gives powers to the Welsh Ministers in relation to waste recycling (including the separate collection of waste) and food waste treatment.

Wise About Waste 2002, the first national waste strategy for Wales.

Towards Zero Waste 2010 – charts a path to zero waste by 2050. Welsh Government have also set out Statutory Recycling Targets which Local Authorities must meet or risk substantial fines. This means that by 2024/25, 70% of municipal waste needs to be recycled with the remaining (residual) 30% to be dealt with by high efficiency Energy from Waste plants.

Beyond Recycling 2021 – set out the aim to build on Wales' recycling success to date by continuing to drive improvements in recycling of household, commercial, industrial, construction and demolition waste and to make Wales the world leader This includes setting new targets and infrastructure to achieve zero waste to landfill by 2050, improving the recycling of packaging, e.g., through EPR, DRS, mandatory reporting and recycling labelling, and the implementation of regulations on separate recycling for non-domestic premises.

How has this been achieved?

Actions	Implementation
Set statutory recycling targets	WG set statutory recycling targets for local authorities (LAs) – this has increased household recycling from 5.2% in 1998-99 to 65.4% in 2021. LAs face significant fines if they miss the interim targets.
Encouraged greater recycling	The introduction of a national recycling campaign for Wales, Recycle for Wales, has encouraged consumers to recycle more things, more often from all around the home and other websites like My Recycling Wales provide information on where recycling goes. https://myrecyclingwales.org.uk/materials/plastic
Development of a 'Blueprint' of best practice for the collection of recyclates and waste.	The Welsh Government's Collections Blueprint sets out the recommended method of waste collection, to ensure affordable and sustainable collection services for recyclable, compostable and residual waste. It recommends that local authorities provide comprehensive recycling collection service, glass, paper, card, metal cans, and plastic bottles, pots, tubs and trays and food are consistently collected across the country.
Over £1 billion provided since 2000 to help Local Authorities invest in recycling collection services	Wales has robust collection regimes and has supported the creation of infrastructure to deal with recycling. WRAP have been funded (via the Collaborative Change Programme) to support LAs providing guidance on communication, collection infrastructure and processes, infrastructure development, business planning, modelling and evaluation, and materials marketing support to assist LAs in finding markets for collected materials as close to source as possible (within the UK).

How has this been achieved?

Actions	Implementation
Separate weekly food waste collection	All 22 local authorities and 99% of households now have a food waste collection service after the Welsh Government introduced specific funding to Local Authorities. Food waste is processed at AD plants to create energy. Separating food waste from other materials increases the recyclability of other waste streams.
Improved facilities at waste recycling centres	Local authorities in Wales have significantly improved the provision for recycling at their local household waste recycling centres / civic amenity sites, many handling over 20 different waste streams including soft and hard plastics. Many now have shops and other enterprises on site which divert materials away from being recycled and allow them to be reused, repaired and sold i.e., plastic toys, garden furniture, etc.
Reduction in the frequency and/or volume of residual waste collections.	By reducing the frequency and/or volume of general rubbish collections (residual waste), households in Wales have been encouraged to recycle more items.
Introduced the carrier bag charge	Wales was the first UK nation to introduce a carrier bag charge, which saw a significant decrease in single use plastic bags >90%.
Ban single-use plastics	The Welsh Government has proposed restrictions on the use of unnecessary single-use, hard to recycle and commonly littered plastics, as part of wider efforts to tackle the problem of plastic pollution.
Energy from Waste Cap	Capacity is capped at 30% of total waste
Capital grants	For the waste management and manufacturing sectors to collect separate recycling from SMEs and use recycled materials in products and components.

Wales – Next steps



Target – 70% recycling, EfW capped at 30%. Subsequent targets are to be set to achieve zero waste to landfill by 2050.

Deposit Return Scheme (DRS) – To be introduced in 2025, for all plastics drinks bottles up to 3lts, a deposit will be charged per item and redeemed at grocery retail outlets.

Extended Producer Responsibility (EPR) – Kerbside collection of packaging will be funded through EPR (currently publicly funded through taxes). Unlike other parts of the UK costs for clearing up litter are also included.

Non household waste – A Code of Practice for separate collection of business (non- household) waste is currently under consultation for implementation in October 2023.

Increasing collections and recycling - Develop additional infrastructure to collect and recycle household materials not currently widely recycled including plastic film and rigid non-packaging plastic.

Wales – Conclusion



- Use of mandatory waste targets where unitary authorities face fines if recycling rates are not achieved
- A 'Code of Practice' or Blueprint for municipal waste collections
- Caps on Energy from Waste developments
- Normalising recycling behaviours "It's what we do"
- Separate collection of wastes kerbside
- Reduced frequency of residual waste collections to drive recycling
- Early adopters of bans on certain single use plastic items placed on the market
- Investment and support for local authorities and sectors recycling and using recycled plastics in products

Key features leading to high recycling rates		
Feature	Observations from the case studies	Case study examples
Citizen engagement	Long term commitments to citizen communication, 'normalising' recycling behaviours. Clear, consistent labelling to support recycling.	Netherlands, Wales, Lithuania
Comprehensive separate collection of plastic packaging	Separation 'at source' consistently delivers higher recycling rates. Capture of all polymers/formats including film.	Netherlands, Wales, Lithuania, Sweden, Parma
Extended Producer Responsibility paying for collections and subsidising recycling.	EPR has a key role to play but variations in delivery of the schemes (i.e., market based, competitive or single central operating bodies) impact on the delivery of high recycling rates. EPR supporting the whole cost of recycling (not just collection).	Parma, Lithuania, Sweden, Netherlands
Pay as you Throw	Though controversial, where applied, higher recycling rates are achieved.	Parma, Netherlands,
Post collection sorting facilities	Availability of sorting capacity and capability to deliver high quality outputs to reprocessors, improving end market opportunities.	Parma, Lithuania, Sweden, Netherlands
Removal of plastic from EfW	Plastic makes up ~13% of inputs to EfW but a very large percentage of carbon dioxide equivalent emissions from EfW . Removing/banning plastic from EfW and incineration increases recycling opportunities.	Sweden, Netherlands



Challenges still to be addressed

The case studies covered in this report still demonstrate some core challenges that need to be addressed for improved plastic recycling systems:

- **Citizen engagement** – clear, consistent binary labelling system. Improved transparency of recycling sector to increase citizen's trust in recycling as part of a circular economy.
- **Easy access** - recycling facilities at home, on the go or in the work place.
- **Design for recycling** – reducing the use of non-recyclable polymers and formats i.e. multi layer, metalised, etc. And finding alternatives in order to simplify both collection and recycling
- **Improved efficiency and capability** in sorting to increase the quality and consistency of recyclates.
- **Policy and technology developments** to deliver food contact recyclates (mechanical and non-mechanical).
- **Investment** in reprocessing capacity across Europe.
- **End market development** for higher value uses to improve the financial viability and demand for collection, sorting and reprocessing.
- **Consistency in reporting** - may cause initial decrease in recycling rate but would give a true picture of actual recycling.



Glossary

- **PET:** Polyethylene terephthalate. A type of plastic used in the production of bottles, containers, and packaging materials.
- **HDPE:** High-density polyethylene. A type of plastic known for its strength and resistance to chemicals, making it suitable for use in products such as pipes, bottles, and toys.
- **PS:** Polystyrene. A type of plastic that is often used to make foam products like disposable cups, food trays, and packaging materials.
- **LA:** Local Authority. An elected body that provides a range of services for a particular geographical area in the United Kingdom.
- **LDPE:** Low-density polyethylene. A type of plastic known for its flexibility and strength, making it suitable for use in products such as bags, film, and tubing.
- **PP:** Polypropylene. A type of plastic used in the production of a wide range of products, including food containers, packaging materials, and automotive components.
- **PVC:** Polyvinyl chloride. A type of plastic used in the production of pipes, vinyl flooring, window frames, and other construction materials.
- **DRS:** Deposit return/refund system.
- **EPR:** Extended producer responsibility.
- **USAD:** The public institution Užstatu Sistemų Administratorius (USAD) is a non-profit organization based in Lithuania that has an underlying objective of managing the deposit system as indicated in Law on Packaging and Packaging Waste.



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Thank You.

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