



Deposit Refund Systems in the EU

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Table of abbreviations and definitions

CEAP	Circular Economy Action Plan
Composite Packaging*	Packaging made of two or more layers of different materials which cannot be separated by hand and form a single integral unit, consisting of an inner receptacle and an outer enclosure, that it is filled, stored, transported and emptied as such.
Consumers	Citizens/customers who buy beverages in packaging on which deposit is payable, and receive it back upon return.
Deposit Return System	Deposit refund schemes charge users an extra fee when they buy a product, which is refunded if the product packaging is returned for recycling or reuse.
DKK	Danish Krone
DRS	Deposit Refund System
ELV	End of Life Vehicles
EPR Scheme	A set of measures taken by a state to ensure that producers of products bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product's life cycle.
EUR	Euro
GHG emission	Greenhouse Gas Emissions
HRK	Croatian Kuna
ISK	Icelandic Króna
LRA	Local and Regional Authority
MS	Member States (EU)
OECD	Organisation of Economic Cooperation and Development
Operators*	In relation to packaging shall mean suppliers of packaging materials, packaging producers and converters, fillers, and users, importers, traders and distributors, authorities and statutory organizations.
ORD	Own Resource Decision
PET	Polyethylene Terephthalate
PMD	Paper Metal Drink Cartons fractions

PPWD	Packaging and Packaging Waste Directive
PRO	Producer Responsibility Organisation – collective organisation in charge of meeting individual producers' obligations arising from the application of EPR principles.
Producers	Includes beverage manufacturers, breweries, importers and trademark owners. These are enterprises that package, import or sell packaged beverages in the course of their economic or professional activities.
Recycling*	The reprocessing in a production process of the waste materials for the original purpose or for other purposes including organic recycling but excluding energy recovery.
Retailers	Includes stores, shops, supermarkets that sell beverages to consumers and then accept the returned packaging on which deposit is payable, refunding the deposit back to the consumer.
Reverse Vending Machine (RVM)	Automated device which accepts empty beverage containers and issues a refund for deposit amount attached to the container that has been previously paid.
Reusable packaging*	Packaging which has been conceived, designed and placed on the market to accomplish within its lifecycle multiple trips or rotations by being refilled or reused for the same purpose for which it was conceived.
Reuse*	Any operation by which packaging, which has been conceived and designed to accomplish within its life cycle a minimum number of trips or rotations, is refilled or used for the same purpose for which it was conceived, with or without the support of auxiliary products present on the market enabling the packaging to be refilled.
RON	Romanian Leu
rPET	Recycled Polyethylene Terephthalate
Single-use beverage packaging	Beverage packaging intended to be used only once by the consumer.
SUPD	Single-Use Plastics Directive
USD	United States Dollars
WRAP	The Waste and Resources Action Programme

Definitions marked with * come directly from the EU legislation.

Executive summary

This publication is a follow up to the ACR+ report on Deposit Return Systems (DRS) for single use-packaging that was published in 2019. The almost five-year time frame between the two publications has been an important period in the European and world history. Together, we witnessed a global pandemic, the start of wars still on-going and an economic crisis. The push for a more sustainable, healthier, and fairer Europe gained new impetus in the same period with the European Green Deal and the legislative overhaul it triggered.

Against this background, policy makers at all governance levels, including local and regional level found themselves facing new challenges but also discovering new opportunities. Most of these are interconnected: from plastic pollution to resource efficiency, from climate change to loss of biodiversity. To face these complex and interconnected challenges, we need a mix of policy tools that are efficient, fair, and ambitious. Deposit systems are one of the tools in the policy arsenal and have impacts on a wide range of issues from pollution to more sustainably designed products.

As underlined in the section 1 of this report, the relevance of waste management tools such as deposit systems has been emphasised in the latest EU and global developments. Legislation stemming from the Green Deal is increasingly demanding in terms of waste and resource management and has implications for the local and regional authorities. The most important among these are the Circular Economy Action Plan, Single-Use Plastics Directive,

Packaging and Packaging Waste Directive, Landfill Directive, and the Own Resource Decision. At the same time, developments at global level such as the changes made to The Basel Convention and third countries banning plastic waste imports are putting additional pressure to all parties, forcing them to better manage their waste by collecting and recycling more, and ideally not to create waste the first place. This comes at a time when the waste is growing, presenting a double-challenge.

It is therefore no surprise that these challenges make policy tools like deposit systems attractive. At the end of 2023, 14 European countries (DE, DK, EE, FI, HR, IS, LT, LV, MT, NL, NO, RO, SE, and SK) have a deposit system in place for beverage packaging, mostly targeting single-use containers. Romania has become the latest, in November 2023. This makes the total number of people living with a deposit system 164 million in the EU and EFTA countries. Some of the systems have been around for decades, while others were introduced in the last two years.



[Read the 2019 report](#)

In November 2023
14 European countries
 have a deposit system
 in place for beverage
 packaging, covering
164 million
 citizens
 living in the EU and EFTA



Many other systems are currently being developed. The existing ones vary in terms of organisational choices, materials and beverages involved and the roles and responsibilities for different stakeholders. Overall, they achieve high collecting and recycling rates for the beverage packaging types that they target. They also contribute to reduce litter to some extent and influence design choices even though the magnitude of these impacts has not been fully researched.

The second part of the report aims at contributing to a general discussion about the deposit systems. This is mainly about looking at the bigger picture, focusing on the potentials and limitations of deposit return systems in addressing pressing issues such as waste reduction and plastic pollution. When these are explored, we can see that their potential impact depends on many factors, and we are looking at a mix picture. While deposit systems increase collection and recycling rates, they do not necessarily address waste hierarchy by design. For instance, only a small minority of deposit systems in the EU include reusable beverage packaging in their policy framework. This leads to an over-emphasis for recycling, which is, based on waste hierarchy, a less desirable choice than reuse. In the same vein, deposit systems encourage more recyclable products or provide purer recyclate but they do not guarantee circularity of packaging. The latter requires a whole ecosystem with reusables and where not possible, an efficient collection, recycling network as well as secondary materials market, stable in supply and demand and financially attractive to economic operators. When it comes to reducing litter, there is evidence that deposit systems contribute to limiting the pollution, but this does not mean they can solve this growing problem on their own, nor address legacy pollution.

It is important to emphasise that these limitations are not a reason for not making use of this effective policy tool. They simply point out to the shortcomings in our knowledge that we need to address. These include a better understanding of the relationship between the quantities of beverage packaging and the total quantities of relevant material and waste flows in circulation. In the same vein, we need to have a better understanding of the impacts on litter with before/after comparisons from field surveys. Both necessitate robust, transparent and publicly available data, which is currently limited.

Further, while exploring the existing deposit systems, we need comparative frameworks that go beyond descriptive analyses. This will help discerning blueprints, for instance important structural elements across these varying systems which can be replicated elsewhere. We also need to better explore the relationship between Extended Producer Responsibility schemes and deposit systems since the interaction between the two seems to be crucial for the effectiveness of both. Finally, we need to develop a deeper understanding at product and material level. Since materials like glass, aluminium or plastic have different properties, market values and consumption trends, different measures might be more effective for each. This will avoid adopting blanket measures, or binary choices between ‘deposit or not deposit’.

Addressing these gaps will help us to finetune future policy choices, while continuing to explore context-based solutions. The increasing number of countries implementing deposit systems will certainly help in this regard, with more information and insights.

Introduction

The policy landscape around resource management and circular economy in the EU is constantly evolving. This comes as a response not only to EU's own sustainability ambitions but also to global challenges, including raw material shortages and volatility of energy markets, supply dependencies and ever-increasing waste quantities and pollution despite numerous initiatives. These complex and interdependent challenges necessitate holistic approaches which need to be designed and implemented with the participation of diverse stakeholders. In such a context, no actor or policy is insignificant.

Against this background, deposit refund systems (DRS) are getting increasing attention and are introduced in a growing number of countries around the world. It has been proposed as a 'no regret' policy solution to some of the most pressing challenges of waste management, particularly low separate collection and recycling rates as well as littering. A specific instrument targeting beverage packaging, deposit systems function as a sub-form of extended producer responsibility (EPR). While making the producers responsible for financing and organising a collection system, they also rely on cooperation between diverse stakeholders, from citizens to retailers. They also contribute to shaping consumer behaviour as they incite them to take back their empty containers with an economic incentive. As such, they represent an important policy tool combining complex issues with principles such as good governance.

In January 2019, ACR+ published a [detailed study](#)¹ on DRS for single-use beverage containers in Europe exploring the existing mechanisms in place in the EU Member States. The study aimed at identifying good practices and drawing lessons for the policy makers to better design and implement such systems.

Incidentally, 2019 was the year of **the European Green Deal**, a major moment in the history of the European Union, setting out a holistic and ambitious roadmap for the continent. It is the reflection of the policy ambition to become a healthier, toxic-free, climate neutral and fairer society by 2050. It triggered many initiatives in all policy areas, including those directly related to waste and resource management. The most pertinent examples are the Single-Use Plastic Directive or the Circular Economy Action Plan. The work stemming from the European Green Deal is on-going and will continue to shape the policies of the Union for years to come.

These challenges and the policy developments have direct implications for the local and regional authorities. At the junction where global challenges become local realities, policy tools like deposit systems have never been more pertinent. Furthermore, with the evolving challenges, it is important to understand their less-explored dimensions such as their contribution to reuse and refill. It is therefore important to revisit our knowledge on the topic, understand the new developments and keep up with the ever-changing landscape.

The study

Against this background, it is time to revisit the 2019 study to integrate the new realities we are facing today. This new report builds on the previous one, without repeating the information that was already available in 2019. Instead, it only underlines what has been changed, both on Member State and EU level in terms of policy. For the MS, new data on 10 MS² that already had a deposit system in place is provided, where available.

We also took the opportunity to discuss some of the main questions around deposit systems. We focused on their effectiveness in reducing littering, costs and benefits for different actors involved, their interactions with other policy tools such as Extended Producer Responsibility schemes. Another important addition is a short section on reuse and refill, as this aspect will become increasingly important but remains underexplored.

Scope and methodology

The scope of the study is the developments at EU level and the Member States regarding deposit systems since 2019, mainly focusing on single-use beverage packaging.

Desk research and targeted literature review are the main methods used. For updating the information for the Member States included in the previous study, we refer to national data, either from the organisation centrally managing the DRS or other various resources. Where needed, we completed this with secondary resources.

We used publicly available information on system results from the DRS schemes and consulted relevant actors where this data was not available. We conducted a literature review to answer the main questions of the study, including:

- What are the latest legislative developments at the EU level which have an impact on deposit systems?
- What are the overall positive arguments for deposit systems?
- What are the shortcomings and negative arguments for deposit systems?
- What is the impact of deposit systems on multiple topics such as recycled content, litter, and sustainable product design?

Limitations and need for further research

Several limitations must be mentioned:

- Some MS do not have data on the system results, and this was confirmed with the relevant PRO organisation. This is mentioned in the section dedicated to the MS.
- There are some gaps in the data. The most important is the ratio between the quantities of beverage packaging subject to a deposit system to the overall packaging in circulation in the country. Further, in some cases, the deposit system does not cover the entire market. Such limitations hinder a comprehensive overview of the real impact of deposit systems.
- A comparative analysis of deposit systems should be further explored. Although there are descriptive comparisons, a more useful analysis would rely on an analytical framework which would identify common building blocks and divergencies between the existing systems.
- The reusable packaging, although a potential (and sometimes already) part of the deposit systems, are mostly missing from the existing analysis. In this report we dedicate a section to it, but this issue needs further exploring.

Section 1

This section provides an overview of the latest developments at EU and international level relevant for packaging waste management in general and deposit return systems in particular.

Section 2

This section provides an update on the situation in the MS where DRS was already in place in 2019 and presents the four new systems launched since then.

Section 3

This section is a brief overview of the systems in the EU that currently incorporate reusable beverage packaging and insights from their experience.

Section 4

This section discusses the main questions around deposit systems based on the latest information available, trying to contribute some insights. It also includes a sub-section on the relationship between the deposit systems and EPR schemes.

Section 5

This section addresses some of the 'meta' issues regarding DRS, focusing on insights based on desk research and provide some suggestions to improve the understanding of DRS.



Section 1

Developments at EU and international level since 2019

An increasingly ambitious EU legislation to tackle a growing problem

The Circular Economy Action Plan (2020)

An important turning point in the EU legislation relevant for waste and packaging is the new Circular Economy Action Plan (CEAP) adopted in 2020³. DRS is not directly mentioned in the CEAP. However, its ambitions regarding reducing litter, waste prevention, higher recycling rates (for instance for plastics) or restricting single-use items are all relevant policy goals for which DRS can be deployed as an important instrument.



Already before CEAP, the EU Strategy for Plastics⁴ had already set out similar ambitions such as improving collection, sorting and treatment systems for plastics and preventing litter. Unlike the CEAP, the EU Strategy for Plastics makes direct reference to EPR (extended producer responsibility) and DRS as important tools to achieve these objectives⁵.

Single-Use Plastics Directive (2019)

Another directly related legislation is the Single-Use Plastics Directive (SUPD), published in 2019 (entry into force in 2021). It aims at minimising the impacts of single-use plastic products on the environment. Among other important measures, SUPD introduced new responsibilities/obligations for the producers, specifically concerning management of waste and clean-up costs related to the single use products. Previously, Waste Framework Directive (Directive 2008/98/EC) and Packaging and Packaging Waste Directive (Directive 94/62/EC) addressed a more limited area within this field, making the producers responsible for the waste management operations for their products. SUPD extends this to other activities such as covering litter cleaning costs public spaces and marine areas, collecting data on collection and treatment activities, as well as awareness raising activities targeting the public to prevent pollution in the first place⁹.

SUPD is directly relevant for DRS because it introduced a mandatory separate collection target for single-use plastic bottles: 77% for 2025, and 90% by 2029. It also requires that at least 25% of plastic bottles are made of recycled PET by 2025 and of 30% by 2030¹⁰. Given the current collection and recycling performance in many Member States, reaching these targets will require substantial efforts. DRS is often mentioned, also by the European Commission¹¹, a potential way of improving separate collection and recycling rates, as well as securing purer (less contaminated) recycle¹².

[More on the Single use Plastics Directive](#)

[More on the Own Resource Decision](#)

Own Resource Decision (2021)

Unlike the other policy initiatives in this section, the Own Resource Decision (ORD) is about the EU's budget, structuring how it is financed by the Member States and borrowing from the financial markets. What is relevant for DRS however, is that it introduced a national contribution linked to non-recycled plastic packaging waste. This was the first own resource created since 1988⁶. In practice, this means that the Member States will pay directly to the EU budget EUR 0.80 per kilogram for plastic packaging waste that is not recycled⁷. This will be calculated based on the methods laid out in the Packaging and Packaging Waste Directive and as reported to the Eurostat⁸. This creates an important incentive to increase recycling performance, in addition to mandatory requirements, and can become an argument to introduce a DRS system. Even though a DRS system has its own costs to set up and run, these might be counterbalanced, at least partially, with the payments avoided based on the ORD.

Packaging and Packaging Waste Directive (Proposal for Revision – 2022)

The legislative framework most directly relevant for DRS is the Packaging and Packaging Waste Directive. The European Commission tabled a proposal for its revision in November 2022¹³. The proposal intends to counter the main issues identified by the impact assessment:

- The fact that quantities of waste packaging are growing despite the legislative efforts (mainly related to shift in consumption patterns and increasing online sales).
- Recycling rates and use of secondary materials stalling (mainly due to product design and composite materials).
- Related to the previous point, low recycling quality of packaging (downcycling)¹⁴.

Update November 2023:
As this report is being finalised, the European Parliament voted on its common position in the Plenary on 22 November.

Where relevant, the latest updates are included in the text under each article.

The Council's position is not clear yet. The final outcome of the revision will only be available after the trilogues between the three institutions.

The following highlights are relevant for the purposes of this study:

A regulation instead of a directive

The proposal sets out a regulation, instead of a directive. This removes the need of transposition by the Member States. According to the EC, this will remedy the lack of effectiveness for certain provisions and allow a more harmonised regulatory framework (which is currently considered problematic). This is expected to result in more coherence and long-term visibility for the industry actors, both inside and outside the EU.

Update November 2023:
This was retained, the new legislation will be a regulation therefore directly applicable in the MS.

Extended Producer Responsibility

Section 3 of the proposal is about the Extended Producer Responsibility. More specifically, it aims at harmonising monitoring and reporting obligations under EPR schemes which would impact the comparability of operations in the MS as well as performance, further ensuring transparency (Sec 3, Art. 39-42). Such a harmonisation is also expected to have a positive impact on the ability of operators selling packaging in different MS.

Deposit and Return Systems

Section 4, Art. 44 of the proposal lays the foundation for mandatory DRS for two types of **single-use beverage packaging**: plastic and metal beverage containers up to 3 litres. An exemption is foreseen for dairy and milk products, wine and aromatised wine products and spirits. This is mostly in line with the existing schemes, in terms of exceptions and volume thresholds (see after).

Rewarding good performance

Another exemption proposed in the **Art.44** is for MS whose separate collection rate is above 90% for years 2026 and 2027 (that is, 24 months prior to the mandatory introduction of DRS systems in 2029). However, there is also a possibility for the MS to ask for exemption, without reaching the separate collection target. For this, the MS will send the EC a detailed implementation plan for achievement of the target. The exemption is conditional on the attainment of the 90% rates within a defined time frame. Failure to do so for three consecutive calendar years will result in the removal of the exemption, therefore making the introduction of a DRS the following year in the MS in question.

Update November 2023:
The 90% threshold was amended as 85% by the European Parliament.

Further, **Art. 44** also puts an emphasis on the importance of putting in place convenient systems for **single-use glass, cartons and reusable packaging**, without making it mandatory.

Finally, **Annex 10** of the proposed regulation lays down the minimum general requirements for the establishment and operating of the DRS.

Reuse and refill

Art. 26 proposes reuse and refill targets for manufacturers and final distributors of most beverages that usually fall under a DRS. If adopted, this means a certain percentage of these products will have to be available in a reusable container through a system of refill or reuse (see table below).

Table 1 Reusable packaging targets for different types of beverages

Beverage Type	2030 target	2040 target
Alcoholic beverages (beer), carbonated alcoholic beverages, fermented beverages (except wine and similar)	10%	25%
Wine (except sparkling wine)	5%	15%
Non-alcoholic beverages in the form of water, water with added sugar, water with other sweetening matter, flavoured water, soft drinks, soda lemonade, iced tea and similar beverages (exception for milk and drinks containing milk fat)	10%	25%

Update November 2023:

These refill targets for specific beverage types have been removed from the text by the European Parliament. New articles added refer to 'final distributors who make the beverages.

The latter should make sure that a certain share of the beverage in question is available in reusable packaging within a re-use system in the MS:

- **20% for non-alcoholic beverages (with the exception of milk) by 2030 (35% from 2040)**
- **10% of the alcoholic beverages (except for wine and sparkling wine), (25% by 2040)**

The text also states that such targets will not be applicable if the MS exceeds 85% recycling rate for the packaging in question.

Art. 38 reiterates waste prevention targets, building on the waste hierarchy. These are set in reference to year 2018 and aim at achieving 5 % by 2030; 10 % by 2035 and 15 % less waste generated by 2040. Waste prevention targets reinforce and work together with the other provisions, particularly the reuse/refill targets and are relevant for DRS.

Update November 2023:

The European Parliament MEPs voted for additional prevention targets for plastic packaging: 10% by 2030, 15% by 2035 and 20% by 2024¹⁵.

Recycling targets

Art. 46 lays out the recycling targets for packaging, which is one of the most important intended outcomes of the regulation as presented in the below.

Table 2 Recycling targets for different packaging materials

By weight	2025	2030	Current EU Average
All packaging waste	65%	70%	64%
Plastic	50%	55%	38%
Wood	25%	30%	32%
Ferrous metals	70%	80%	76%
Aluminium	50%	60%	
Glass	70%	75%	76%
Paper and cardboard	75%	85%	82%

Update November 2023:
This was retained, MEPs voted for an additional 90% separate collection target by 2029 for all materials.

Monitoring and reporting

The proposal introduces new reporting obligations, in addition to existing ones:

- Concerning plastic carrier bags;
- Collection rate for packaging that is included in the DRS;
- Data on specific packaging categories that will be used to assess their recyclability.

In addition, based on the introduced targets, the proposal indicates that the EC will adopt implementing acts to establish detailed calculation methods for the re-use and refill targets (Art. 26).



[More on the Packaging and Packaging Waste Directive](#)

Changes to the PPWD and municipal waste data reporting

In July 2019, the European Commission adopted an implementing decision setting out the rules for calculating the quantities of municipal waste prepared for reuse and recycling¹⁶. Previously the Member States were able to choose the one of the four calculation methods for reporting data¹⁷. This created challenges for comparing the MS performance but also provided some leeway for the MS to attain slightly higher rates. This will be no longer the case: same calculation method to report data will be used across the EU starting from 2020¹⁸. Under the new rules, only the quantities entering recycling process will be qualified as 'recycled'. Before, quantities collected and sorted, before eventual losses from shredding, cleaning and second sorting were eligible. According to Plastics Europe, this would mean for 2019, a recycling rate of 32% for plastic packaging instead of 46% in the EU¹⁹. According to its own estimates, the German Environment Agency puts the downwards revision from 74,3% to 64%²⁰ for recycling of all packaging materials combined. In Italy, ISPRA (the Italian Institute for Environmental Protection and Research) estimated that the new calculation methods will lead to lower recycling rates for certain fractions²¹.

This is especially significant in conjunction with the new proposed mandatory introduction of DRS in case the MS fails to reach recycling targets for packaging waste.



More on the changes to the PPWD and municipal waste data reporting



More on the Landfill Directive



More on the EU Shipment Regulation

The Landfill Directive

The Landfill Directive is another important piece of the 'waste puzzle' in the EU. In theory, a functioning circular economy would minimize or even remove the need to have landfills; however this is far from the reality. Around 20% of the waste generated was landfilled in the EU in 2020²². The Landfill Directive was amended in 2018, introducing a 10% limit for landfilling in addition to a ban on landfilling of recyclable waste streams effective as of 2035. Since there is a negative correlation between how much waste separately collected, recycled/reuse or landfilled, it is logical to assume that DRS can have an important role to play in reducing landfilling rates across the EU.

The EU Waste Shipment Regulation: no more waste exports?

In parallel, the EU is also trying to tackle the problematic issue of waste shipments to the third countries. In January 2023, the European Parliament overwhelmingly voted in favour of banning all hazardous waste exports to non-OECD countries and all waste exports that would otherwise be destined for disposal in the EU²³. To be able to import waste from the EU, the destination countries would have to prove that they can properly handle and treat the waste, in a sustainable way²⁴. This means waste shipments will be exception, rather than common practice. This was done as a direct result of the amendments to the Basel Convention (see below).



International context

The continuing impacts of import bans on plastic waste

China's ban on imports for a long list of plastic waste types is in place since 2018. This happened outside the timeframe of this report, but it is important to mention due to its ongoing impacts. Since the biggest importer of plastic waste has left the scene, exporting countries, including the EU, have been looking for new destinations. However, this does not seem to be a long-term solution, as some of these countries are now restricting imports as well. Malaysia followed China with a plastic import ban in 2019²⁵. Thailand announced a ban on plastic waste to be effective as 2025²⁶. Indonesia is still accepting plastic waste but preparing a much stricter control over the flows²⁷. Overall, this has an unprecedented impact on plastic waste flows and creates problems for countries which rely on exports to manage their waste.

The BAS&L Convention, making it harder to send plastic waste elsewhere

The Basel Convention regulates the transboundary movements of hazardous waste. The international treaty was amended in 2021, enlarging the scope of plastic waste considered as hazardous²⁸. This partially came as an attempt to control the whack-a-mole game described above, with plastic waste always finding new destinations as old ones become inaccessible. It is effectively making movement of plastic waste much more difficult between the countries therefore restraining the option of exporting waste.



[More on the BAS&L Convention](#)

What does this all mean? A convergence of challenges

We are witnessing a convergence of very challenging trends: the waste targets are increasingly demanding, waste quantities are growing, and it is getting increasingly harder to 'get rid off', for instance by landfilling or sending it to other countries. In other words, the MS and local authorities will have to find ways of minimizing waste generation and better treatment methods for generated waste which in turn necessitates adequate infrastructure (for instance for recycling). These converging forces push the policy makers to try finding effective tools to tackle these issues in a way that is acceptable to diverse stakeholders, in a cost-effective way.

Table 3 Overview of relevant legislation and changes since 2018-2019

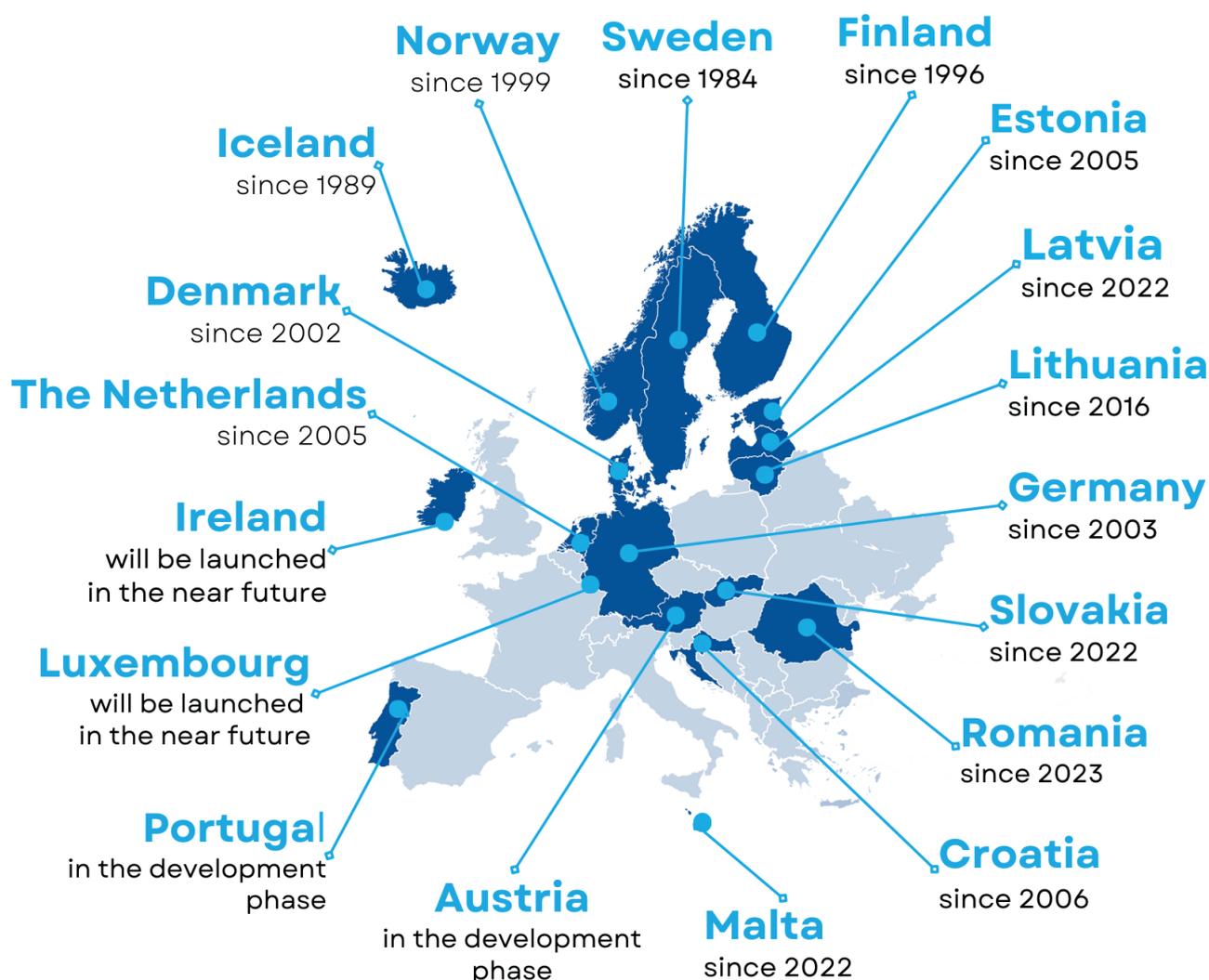
Waste Package (Part of CEAP) (2018–Present)			
Name	Status	Relevance for DRS	Important links
Waste Framework Directive (Directive 2008/98/EC) ²⁹	Expected revision in 2023	High	Targets directly impact recycling and calculations methods determine the performance, see section below
Directive 1999/31 on land-filling of Waste ((Directive (EU) 2018/850)) ³⁰	Amended in 2018	High	The restriction of landfilling will increase the need for other methods of waste management, including recycling
Directive 94/62/EC on Packaging and Packaging Waste	Amended in 2018 (Directive (EU) 2018/852) ³¹ Proposal for a regulation published in Q4 2022 ³²	High	Possible introduction of DRS and other links see section below
Directive 2000/53/EC on End-of-life vehicles	Revision on going Proposal for a new regulation repealing 2000/53/EC published in July 2023 ³³	Medium	The proposal sets out a target of 25% for recycled plastic content for vehicles, 25% of which should come from ELVs. This will increase demand for recycled plastic ³⁴ . Currently, it is estimated that 5% of vehicles composition is PET, but this is expected to rise. Recycled PET is also used in applications such as seat fabrics, underbody panels or air deflectors. One of the sources of recycled PET for such applications is post-consumer packaging ³⁵ . With rising shares of rPET in vehicle manufacturing, demand from automotive sector will put additional strain and competitive pressure on close-loop recycling for beverage packaging.
Directive on batteries and accumulators (Directive 2006/66/EC)	Last amended in 2018	Low	NA
Directives on waste electrical and electronic equipment	Currently undergoing evaluation ³⁶	Low	NA
Others (2019–Present)			
Single-Use Plastics Directive (The Directive EU 2019/904)	In force (2021)	High	SUP introduced separate collection targets for plastic bottles: 77% by 2025 and 90% by 2029. It also introduced mandatory recycled content for PET bottles, 25% from 2025 and 30% for all plastic beverage bottles by 2030.
Own Resource Decision (2020)	In force since 2021	High	Direct contribution from the MS to the EU budget based on the amount of plastic not recycled.
EU Waste Shipment Regulation	Commission proposal in negotiation with the Parliament and the Council, the latter adopted its position in May 2023 ³⁷	High	Restrictions to ship waste outside of the EU
Basel Convention (2021)	Amendments to the Convention in 2021	High	Amendments to Annexes II, VIII and IX of the Basel Convention making it more difficult to ship hazardous waste outside of EU



Section 2

**The evolution of DRS in
Europe since 2019**

This section looks at developments since 2019 at Member State level. At the time of writing, 14 European countries (DE, DK, EE, FI, HR, IS, LT, LV, MT, SK, NL, NO, RO, SE) have a DRS in place, covering a 164 million people across the continent³⁸. In addition to this, there are several countries where DRS is in the development phase (e.g. Portugal, Austria) or will be launched in the near future (Ireland, Luxembourg³⁹). In some cases, like Scotland, the implementation was delayed despite the system being ready to launch.



Updates for MS with DRS in place prior to 2019

The first 10 factsheets present a quick update for the 10 countries which already had a system in 2019: Croatia, Germany, Denmark, Estonia, Finland, Iceland, Lithuania, The Netherlands, Norway, and Sweden. As mentioned in the introduction, we will not repeat the descriptive elements of these systems. These are provided in the previous report and many other resources listed in the bibliography. Instead, we will provide a short overview and focus on what changed (if any) in terms of legislation and provide latest available data on system performance.

Four new deposit systems in Europe since 2019

The four last factsheets present a brief description of the four new systems introduced since 2019: Latvia, Malta, Romania, and Slovakia.



Brief overview and developments since 2019

Origins of the return system in Sweden dates back to early 20th century, which is still in place for glass bottles. A separate DRS for single-use aluminium cans was introduced in 1984 and later was extended to PET bottles in 1994⁴⁰. The system was initially based on voluntary participation but became mandatory in 2005⁴¹. In Sweden, the DRS is functioning under the broader framework of Extended Producer Responsibility (EPR) as the municipality does not provide door to door collection service for the recyclable packaging materials, including beverage containers⁴². The latest legal framework for DRS is based on the Ordinance (2022:1274) on producer responsibility for packaging⁴³.

Pantamera (also known as Returpack), a private, not for profit entity is responsible for managing the system centrally, from collection to sorting of material as well as sale to recycling facilities⁴⁴. Its owners include retailers, brewers and grocery stores associations.

The DRS covers single-use PET and aluminium beverage containers up to 3L in volume. Almost all drinks are included with the exception dairy products⁴⁵. The deposit fee is variable depending on the volume and the material, either EUR 0.08 (all aluminium and plastic less than 1L) or EUR 0.16 (plastic bigger than 1L)⁴⁶.

The following developments since 2019 are worth mentioning:

- Ordinance on Producer Responsibility for Packaging⁴⁷ (2022:1274) came into force in 2022, combining into one two separate legislations (EPR Regulation (2018:1462) and the regulation on return systems for plastic bottles and metal cans (2005:220)⁴⁸:
 - It introduced mandatory DRS for juice and fruit syrups which were voluntary since 2018 (started as of 2023).
 - Dairy products in metal cans can participate voluntarily⁴⁹ (to be made mandatory as of 2028)⁵⁰.

Update on targets and system performance

Both Statistics Sweden and Pantamera provide information on the performance of the system. Statistics Sweden provides separate data on single-use cans and PET bottles subject to DRS.

According to Pantamera, 3 billion units subject to DRS were put onto the market in 2022, a 10% increase compared to previous year. Collection rates are 87.8% for aluminium cans and 86.7% for PET. The overall collection rate is 87.5%^{51,52}. It is reported that the cross-border movements of consumers between in Sweden and Norway impact these results. Norwegian consumers buy beverages in Sweden therefore take these items out of the country-lowering the collection rate⁵³.

Recycling rates is available from Statistics Sweden. Based on the data available, recycling rates for PET bottles and cans within the deposit system fluctuates between 81% and 90% since 2012, with PET recycling rates consistently lower with the exception of year 2019. Sweden is close to reaching the overall 90% recycling target.

Figure 1 Collection rates for single-use aluminium cans and PET bottles subject to DRS, based on volumes put onto the market 2019-2022 (source: Pantamera)

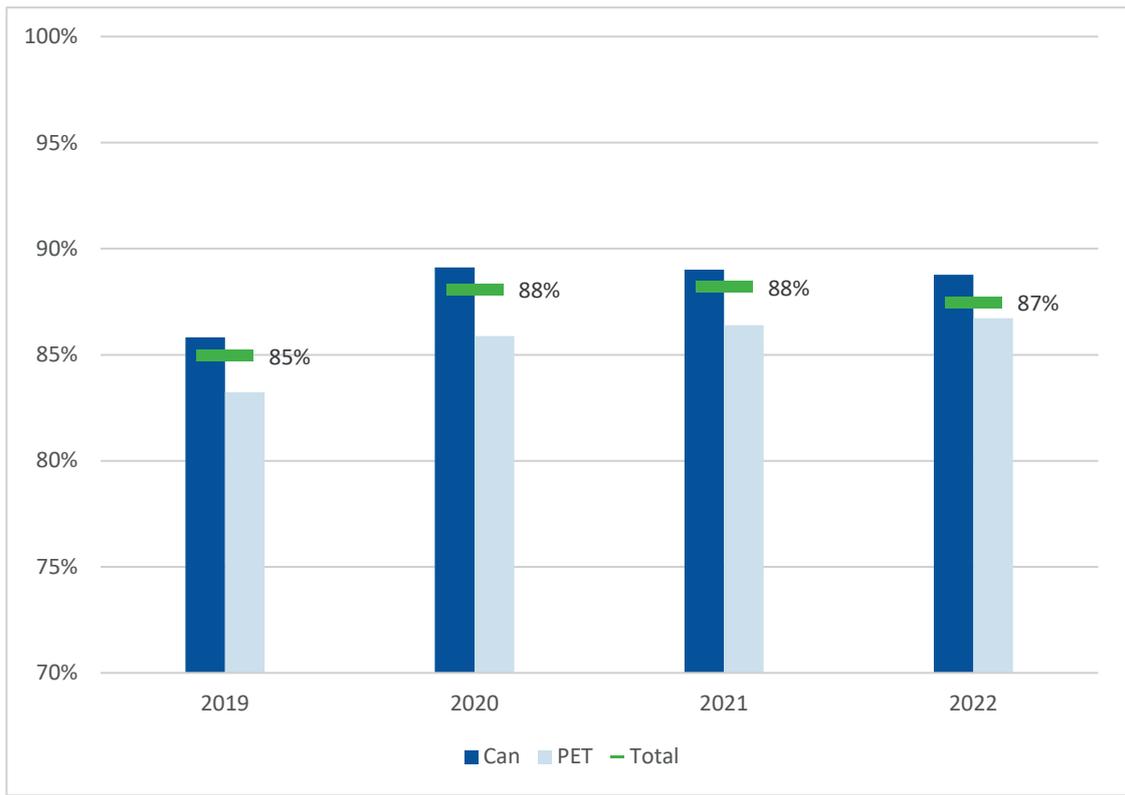
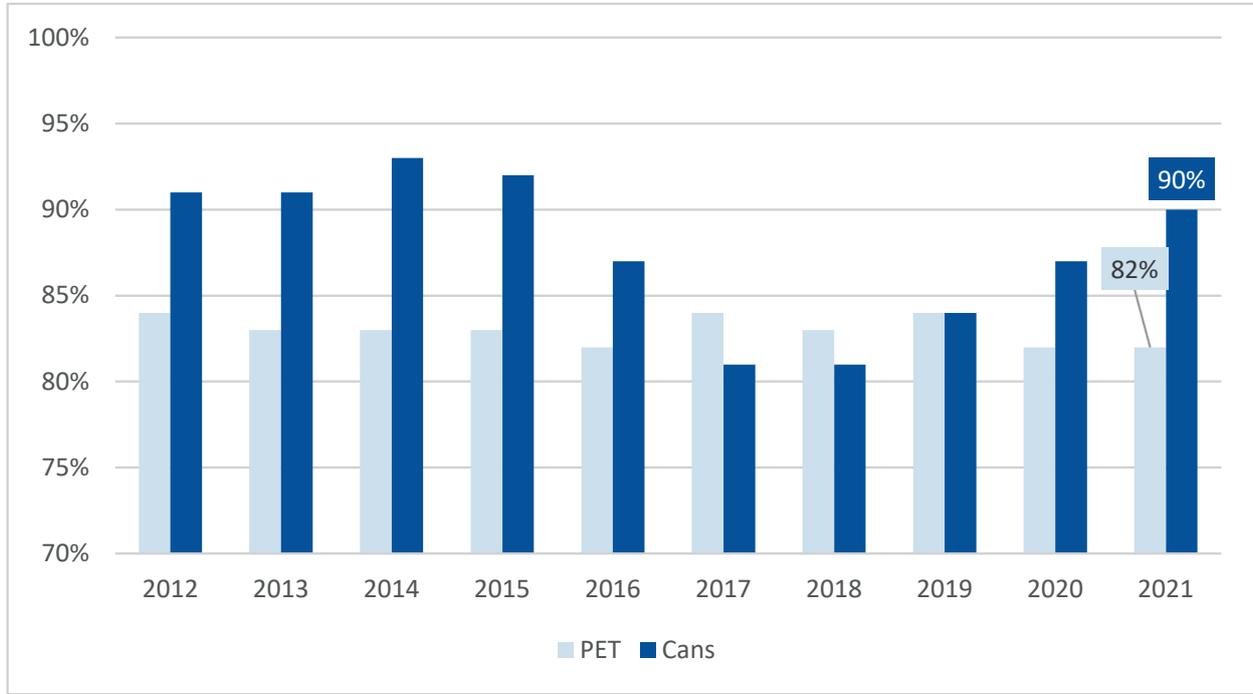
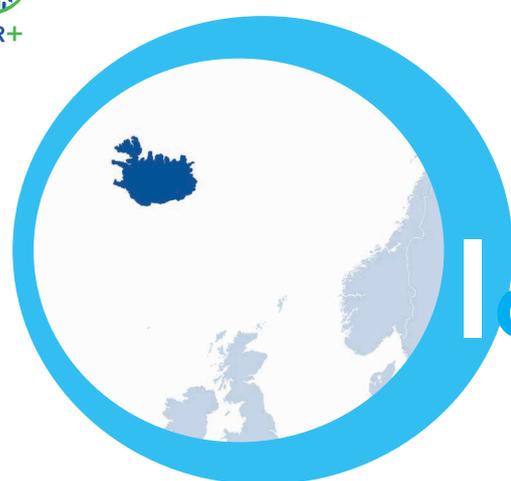


Figure 2 Recycling rates for aluminium cans and PET bottles subject to DRS, based on volumes put onto the market, 2012-2021 (source: Statistics Sweden)





Iceland

Start date: 1989

Brief overview and developments since 2019

Iceland has a DRS in place for single-use beverage packaging since 1989, one of the earliest in the world. The legal framework is based on Law No. 52/1989 (Law against environmental pollution caused by disposable packaging)⁵⁴ and Regulation 750/2017 (Regulation on the collection, recycling and return fee for disposable beverage packaging)⁵⁵ which replaced Regulation 368/2000 (Regulation on the collection, recycling and return fee for disposable packaging for beverages).

Endurvinnslan, the central operator is managing the scheme on the island since its establishment, including all stages of operations. It has a larger spectrum of ownership compared to other countries, including the state, metal treatment companies, national scout association and local authorities together with beverage manufacturers⁵⁶.

DRS system is one of the most comprehensive in Europe, covering all alcoholic and non-alcoholic drinks of all sizes. Only exceptions are fresh milk and fresh milk products and fruit extracts⁵⁷. Single-use plastic, aluminium (cans) and glass beverage packaging are included.

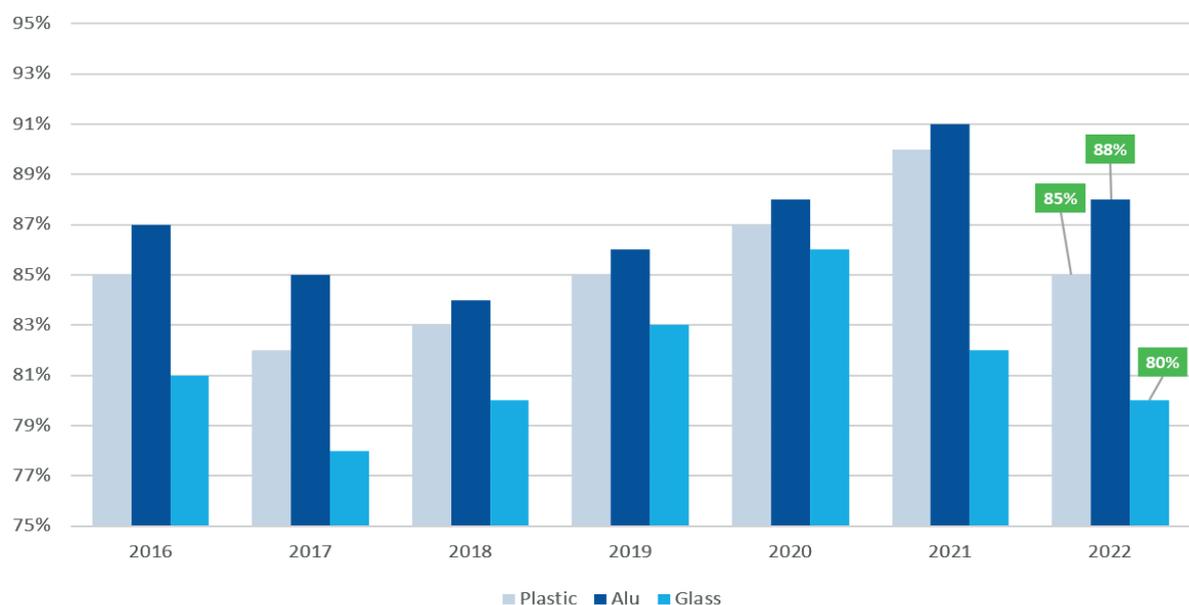
There was no changes to the system since 2019, except for a small increase in the deposit fee in 2021 from ISK 16 to ISK 18 (approx. EUR 0.13). This is a standard deposit fee which applies to all types of material and volume⁵⁸.

Updates on target and system performance

Limited information is available from the *Endurvinnslan*'s website. We could not identify yearly reports or similar providing a year-to-year overview.

In the graph below, it can be seen that plastic and aluminium packaging within the system reach high recycling rates with lower rates for glass. Information presented on the *Endurvinnslan*'s website mentions that glass has been used as substrate rather than recycled, but they have started shipping the glass for recycling in May 2023⁵⁹.

Figure 3 Recycling rates for glass, plastic and aluminium beverage packaging in Iceland (source: *Endurvinnslan*)





Finland

Start date: 1996

Brief overview and developments since 2019

In Finland, DRS for single-use beverage packaging started with cans in 1996, it was expanded to PET bottles in 2008 and to glass bottles in 2011⁶⁰. The main legislation providing the framework for the DRS are Government Decree on a return system for beverage containers (526/2013)⁶¹ and Waste Act (646/2011)⁶².

DRS participation is not mandatory but by participating, producers avoid paying the Beverage Packaging Tax introduced in 1994, currently EUR 0.51 per litre⁶³. As a result, most of the producers joined the system, except for those putting very small volumes in the market⁶⁴.

There are multiple system operators, the biggest being PALPA (*Suomen Palautuspakkaus Oy*)⁶⁵, a non-profit company owned by beverage producers and retailers. It manages the operations but does not own any equipment (such as recycling plants or RVMs), all of which are outsourced⁶⁶. PALPA is representing the majority of the beverage market falling under DRS.

The system covers cans, plastic bottles and both single-use glass bottles of volume 0.1 to 3L. Finland has a relatively large coverage of product range from water to strong alcoholic drinks (up to 80% in volume). Only exception is dairy products. Different deposit fees apply to different sizes and materials.

There are no changes to the system since 2019.

Updates on target and system performance

Comprehensive overview of return and recycling rates is not available. Some figures are available from PALPA's website: around 2 billion beverage units are returned in Finland every year and return rates for 3 single-use product groups for the last three years are the following⁶⁷:

Table 4 Return rates for different materials (source: PALPA)

	2020	2021	2022
Cans	98	97	99
PET	92	90	90
Glass	95	98	98



Brief overview and developments since 2019

Norway has a DRS targeting single-use beverage containers since 1999. Since 1995, the country has a tax-based incentivisation policy. Taxes on beverage packaging are reduced as their collection rates increase: starting from 25% as the minimum and lifted entirely if the rate reaches 95%⁶⁸. Thus, participation to the system is not mandatory, but much more advantageous compared to operating a separate process for each producer. This results almost all of the producers participating to the scheme⁶⁹. The system, which promotes collective success, had reached its set targets: the tax on bottles was lifted in 2011 and its counterpart for cans was lifted 2012 as both reached 95% collection rate⁷⁰.

The industry-led non-profit entity Infnitum (previously known as *Norsk Resirk*) was established in 1996 to manage the system, from collection to recycling. It is owned by manufacturers and retailers.

The system includes all plastic and metal single-use beverage containers of volume between 125mL to 4.9L⁷¹. The law does not specify any exceptions⁷².

There are no changes legislation since 2019, but the following is relevant for the scope of the scheme:

- Various industry players joined the scheme on voluntary basis, for instance a producer of plastic beer kegs of 10L, 20L and 30L and festivals to collect and recycle plastic cups⁷³

Update on targets and system performance

Both financial and operational data is available in yearly reports published by Infnitum, also in English. The reports provide an overview of yearly return and recycling rates as well as financial statements. The system is highly successful, achieving more than 90% return rates for both materials since 2020⁷⁴.

Recycling rates are also very high, consistently reaching above 95% since 2016 for both materials⁷⁵.

Figure 4 Return rates for single-use PET bottles and cans participating to DRS, 2016-2022, based on weight (source: Infinitum yearly reports)

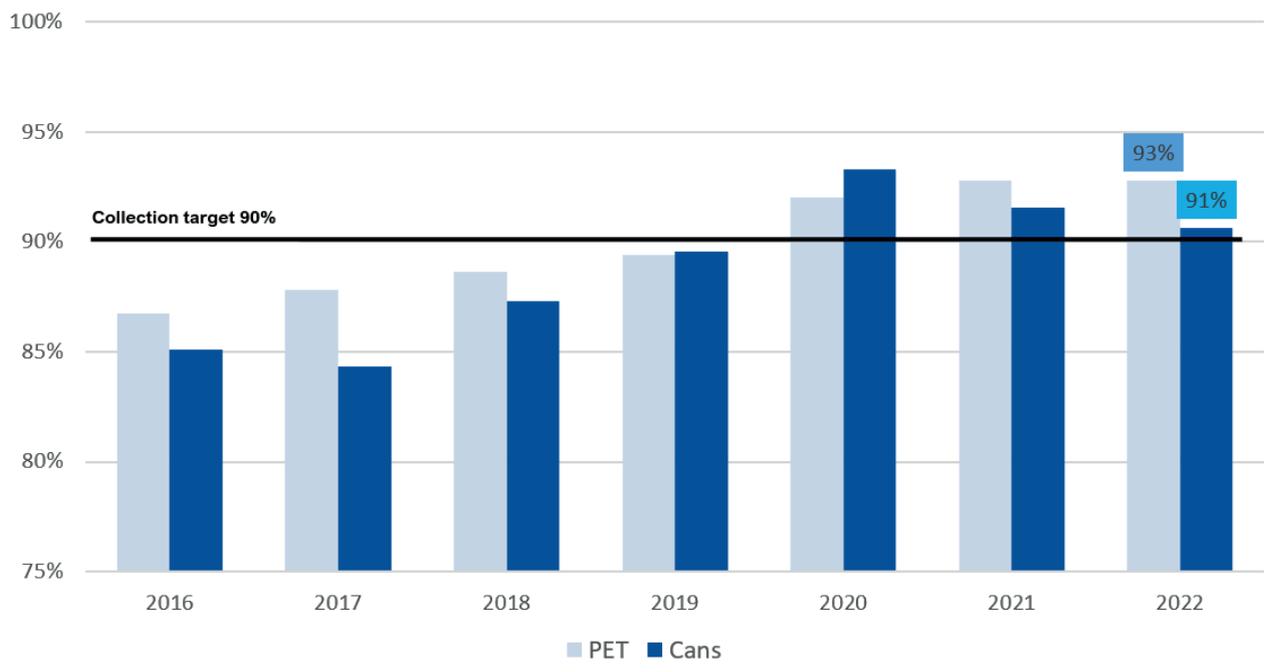
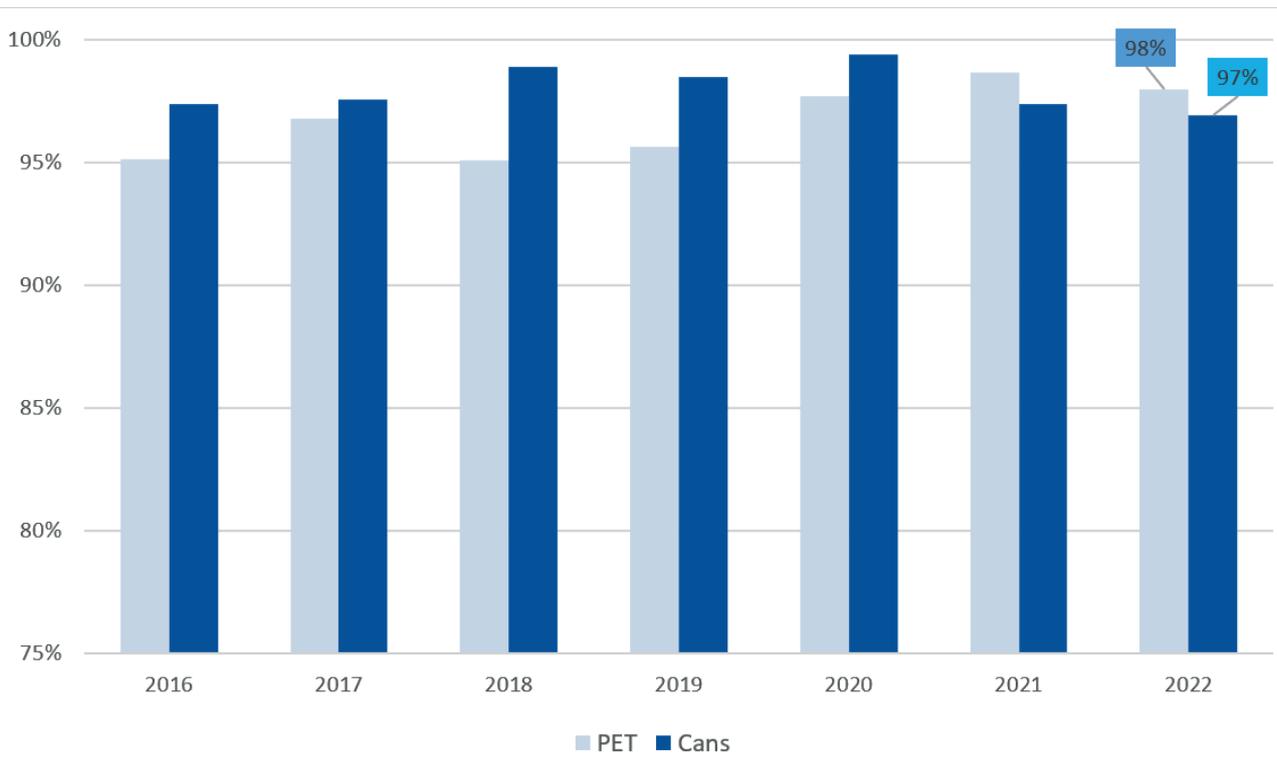


Figure 5 Recycling rates for single-use PET bottles and cans participating to DRS, 2016-2022, based on weight (source: Infinitum yearly reports)⁷⁶





Denmark

Start date: 2002

Brief overview and developments since 2019

Denmark is one of the early adopters of DRS. The system was put in place in 2002, directly following the introduction of single-use bottles to the Danish market. It has been slowly expanding to other products/types of containers since then. The main legal framework for DRS is the Statutory Order on Deposits⁷⁸, which was last amended in 2020⁷⁹.

DRS is managed centrally by Dansk Retursystem since 2002⁸⁰, whose members include producers, retailers and public entities⁸¹. The system covers single-use containers of glass, can and plastic with a volume up to 20L (depending on the material, this changes). Reusables are also covered but this will be discussed in section 3.

There are different deposit fees for glass, cans and plastics bottles of different sizes⁸²:

- DKK 1.00 for glass bottles and aluminium cans less than 1L
- DKK 1.50 for plastic bottles less than 1L.
- DKK 3.00 for all bottles and cans between 1 to 20L.

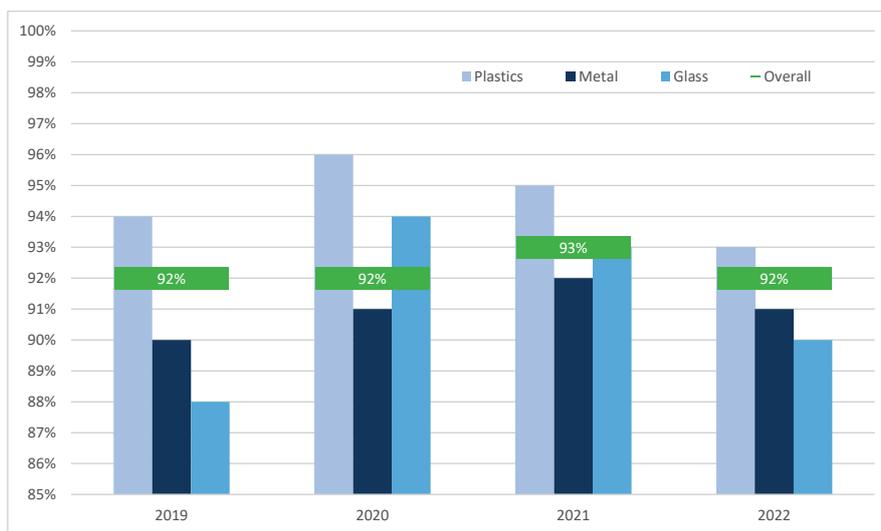
The system did not change since 2019 except for the following:

- Fruit juices and concentrates are included since 2020⁸³.
- The operating fees are steadily going down as the system becomes self-sufficient. Average fees for packaging to be paid by producers continues its downward trajectory: since 2017, it was reduced by 98%. The rising costs due to energy prices and inflation were compensated by high revenues from recyclable materials. As a result, this means all operating expenses of the Dansk Retursystem can be covered by the revenues. 2022-2023 period achieved 100% self-sufficiency for all three material groups⁸⁴.

Update on targets and system performance

Over 2 billion units were returned to the system in 2022. Collection rates for packaging remain over 90% and stable⁸⁵. Target for 2025 was set at 93% for single-use packaging, which might have been reached already in 2023⁸⁶. There is no separate information on recycling rates, however it is safe to assume that the return recycling rate approach the return rates with little loss in the process.

Figure 6 Return rates for beverage packaging within the DRS, overall and by material (source: Danksretursystem, compiled from yearly reports)





Brief overview and developments since 2019

Germany's DRS was introduced in 2003 with the main goal of preserving the market share of reusable bottles, that fell below 72% in 1997, which triggered the DRS legislation⁸⁷. Thus, reusable issue is an inherent part of the DRS debate in the country, as further discussed in section 3.

The main legal framework laying out the basis and implementation of the packaging waste is the new German Packaging Act (*VerpackG*)⁸⁸ which entered into force in 2019, replacing the German Packaging Ordinance⁸⁹. It lays out the legal framework for DRS but its scope is wider, including all packaging waste.

Unlike most other countries, the system is not centralised. The *Deutsche Pfandsystem GmbH* (DPG), established in 2005, is overseeing the administrative side of the system. It ensures smooth running for all actors involved in the system by providing the legal and organisational framework. This includes standard labelling of beverage containers that are in the system, keeping a central database of all actors registered and providing IT systems to enable the use of unique barcodes and ensuring the contracts are legally compliant⁹⁰. It does not take part in the operations which are organised between the manufacturers and retailers. DPG is jointly owned by retailers and beverage manufacturers.

The system covers single-use plastic, aluminium and glass bottles up to 3L. A standard fee of EUR 0.25 is applied to all single-use packaging, among the highest in the world⁹¹.

There have been multiple changes to the Packaging Act since 2019. These were motivated mainly by the evolving EU regulation (e.g the Single-Use Plastics Directive⁹²), the issue of 'free-riders', the impacts of online retail sector and challenges associated with excessive amounts of single-use packaging use that emerged during the pandemic.

Overall, an expansion of obligations towards an increasing number of operators (from producers to initial and final distributors) and to other products is observed. This applies both to EPR in general and DRS in particular.

The following changes are relevant for this study:

- Since January 2022 and triggered by the transposition of the EU Single-Use Plastics Directive⁹³, mandatory deposit was extended to the following items previously exempted from the scheme, (with the condition that they are sold in single-use plastic bottles or cans with a volume between 0.1 to 3L):
 - Wine and sparkling wine drinks (as they are and mixed with other drinks);
 - Wine-like drinks and mixed drinks;
 - Alcohol products and other mixed drinks containing alcohol;
 - Fruit juices and vegetable juices;
 - Non-carbonated fruit nectars and non-carbonated vegetable nectars⁹⁴;
 - Milk, and mixed-milk drinks, other dairy products, beverages for infants or young children (if sold in cans only, to be expanded to plastic bottles in 2024)⁹⁵.

These changes effectively mean that almost all single-use beverage containers are subject to DRS in Germany⁹⁶. Furthermore, there are some changes to the administrative obligations of producers:

- As of July 2022, manufacturers of single-use beverage containers subject to DRS will have to register to the LUCID, the central register managing all packaging-related obligations of the market operators⁹⁷. Previously, due to the separate system, they were exempted from this obligation, if subject to DRS. This comes as an additional step to registering with the DPG.

- In line with the EU legislation, the German Packaging Act introduced minimum 25% and 30% recycled content for plastic bottles by 2025 and 2030 respectively.

Update on targets and system performance

Since there is not a centralised entity responsible for the whole DRS structure, information on overall performance is not available. ‘Pieces of the puzzle’ need to be compiled from multiple resources. The German Environment Agency (*Umweltbundesamt*) provides information about the overall packaging waste management and recycling in the country. The latest report estimates that the volume of beverages consumed in Germany covered by the DRS amounts to 32 billion litres (out of 42.6 billion litres total consumed), around 70% of the whole beverage market for up to 10L containers⁹⁸. However, these reports do not provide information on collection or recycling rates.

The overall recycling performance for all packaging waste is available from the German Environment Agency and the Central Packaging Register (*Zentrale Stelle Verpackungsregister*) who reports data based on the Packaging Act Requirements. However, as mentioned earlier, these do not provide information on the DRS results.

For the DRS system exclusively, data is scattered and not up to date. It was not possible to identify a report providing detailed, year-to-year information. Since the DPG does not the overview of the flows, it does not an overview of the quantities⁹⁹ and refers to other sources, such as the reports from the German Environment Agency. Bund Getränkeverpackungen, the industry initiative working only with single-use beverage packaging provides some data on recycling rates for single-use beverage packaging. They publish reports based on research done by the GVM (Society for Packaging Market Research) a private market research company specialising in beverage packaging. However, these reports are not published regularly, the latest one dating 2019¹⁰⁰. The recycling rate for PET bottles is 94% for 2019 and 31.4% of PET bottles is composed of recycled material¹⁰¹. The website of the PET FORUM, another industry association (German Association for Plastics packaging and Films) reports that 98% of the PET bottles in Germany are recycled¹⁰² without specifying the information source.



The Netherlands

Start date: 2005

Brief overview and developments since 2019

In the Netherlands, a DRS is in place since 2005 for single-use plastic bottles¹⁰³. The latest legal framework laying out the conditions of the DRS is the Packaging Decree (*Besluit Beheer Verpakkingen*)¹⁰⁴. The deposit system initially covered only plastic beverage containers bigger than 1L in volume. In 2018, the Dutch government gave the producers and importers time until 2021 to reach 90% recycling rate for small bottles (smaller than 1L. Failure to reach this target triggered the latest amendments to the aforementioned legislation and changes mentioned below.

Statiegeld Nederland is managing the deposit system, overseeing the implementation and activities from collection to recycling¹⁰⁵. Another important actor is the Waste Fund (*Het Afvalfonds*) the professional responsibility organisation in the country for all packaging¹⁰⁶. The latter is responsible for various financial aspects of the deposit system¹⁰⁷.

The system covers water, beer and other low alcoholic drinks and soft drinks. Excluded beverages are dairy, pure fruit juice and syrups, medium and high alcohol content drinks (wine, spirits)¹⁰⁸. Juice producers can participate on a voluntary basis¹⁰⁹.

Currently the system includes plastic bottles and cans of up to 3L. The coverage has expanded significantly with the changes introduced since 2019:

- The Packaging Decree was amended to include small plastics bottles (<1L), included in the system as of July 2021¹¹⁰ and;
- Beverage cans (metal and aluminium) smaller than 3L as of April 2023¹¹¹.

Variable deposit fees applied depending on the material and size: EUR 0.15 small plastic bottles, EUR 0.25 for plastic bottles bigger than 1L and EUR 0.15 for cans¹¹².

An important and clearly stated dimension of the system in the Netherlands is the issue of littering.

Since 2008, regular litter surveys¹¹³ in the country allow to quantify the scale of the problem¹¹⁴. In the recent years (2019 and 2020¹¹⁵), they showed growing quantities of plastic bottles and cans in the environment. This pushed the Dutch government to propose a mandatory deposit system for cans in case the littering was not reduced by 70% by 2020 compared to 2016/2017¹¹⁶. The amount of plastic and cans in the environment continued growing hence their current inclusion in the system.

Update on targets and system performance

New targets were introduced with the aforementioned legal amendments. The current targets cover all beverage packaging with or without deposit:

- 90% of all plastic bottles from 1 January 2022¹¹⁷;
- 90% of metal cans from 1 January 2024¹¹⁸.

There is no data available on the return and recycling rates from *Statiegeld Nederland* as the latter does not have data on the quantities of beverage packaging put on the market¹¹⁹.

Very limited information is available from *Afvalfondsverpakkingen*:

- Around 1.5 billion large and small single-use plastic bottles are collected annually,
- This is expected to grow to 3.5 billion when aluminium cans are added¹²⁰
- For single-use plastic bottles, the overall return rate is 68% and 64% is collected¹²¹ through the deposit system¹²².
- Looking only at single-use plastic bottles that are within the deposit system, the return rate is 75%¹²³¹²⁴. More specifically, 88%

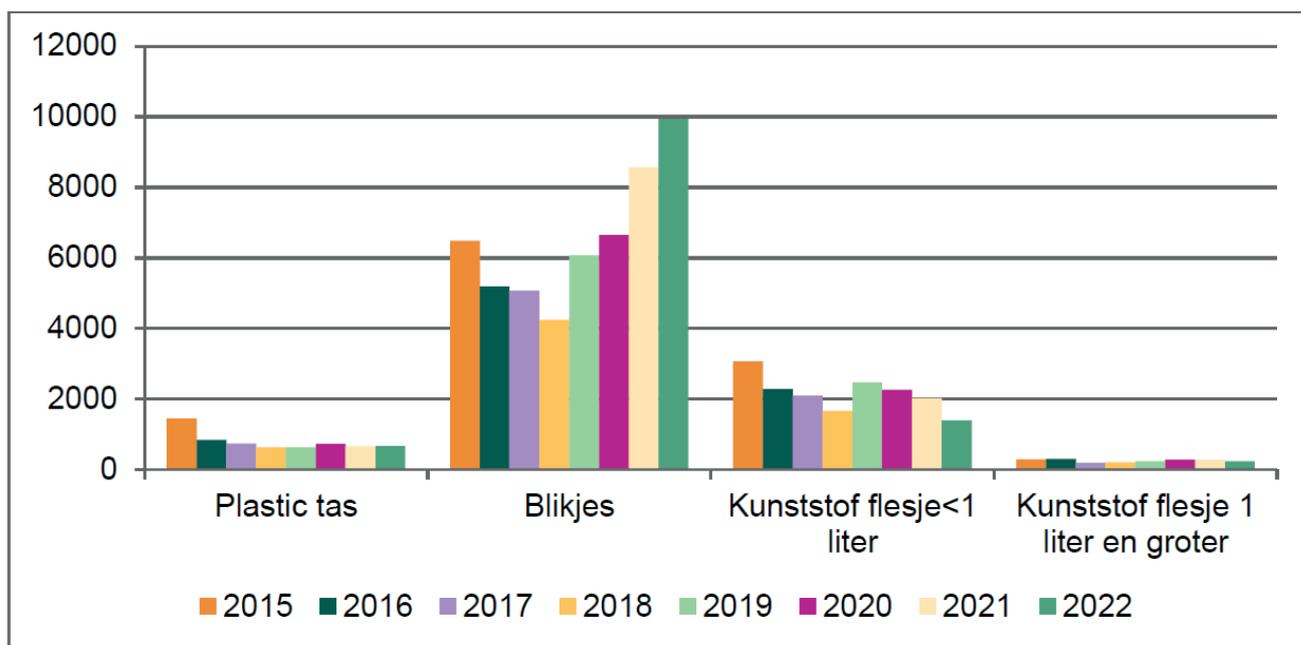
for large bottles (already subject to DRS prior to July 2021) and 58% for smaller bottles (introduced as of July 2021)¹²⁵. It is reasonable to assume that as the consumers will take up the habit of returning small plastic bottles, the return rate will go higher.

- 97% of all aluminium packaging was recycled or reused in the country in 2022. There is no separate data on aluminium cans as they are still not part of the deposit system.

The results for plastic bottles show that improvements are needed to achieve the 90% target. Both *Statiegeld* and the *Afvalfondsverpakkingen* mention measures that will be put in place to improve the return rates, from improving the return points to a national communication campaign¹²⁶. A focus on improving the collection of items consumed on the go/outside the house such as in airports or train stations is also mentioned¹²⁷. On the other hand, several factors are suggested for the under-performance. For instance in 2021, the amendments to the existing legislation removed the take-back obligation for retailers. Benelux Recycling Network, a NGO working on plastic pollution, argues that this undermined the system, leading to fewer return points. Further, they mention the inconsistent scope for small bottles leading to confusion among the consumers¹²⁸.

On the other hand, as mentioned above, the country is closely monitoring the litter quantities. This provides an insight into the effectiveness of the policy measures aiming at reducing the problem (in this case, a 70% percent decrease in the amount of small plastic bottles in the environment). The *Rijkswaterstaat* conducts six times a year, a total of 25 400 measurements across 1 400 locations, complemented with a survey of 2 000 citizens¹²⁹. The monitoring system is now adapted to gather data on small plastic bottles and cans as well¹³⁰. The latest information from 2022 states that the incidence of small plastic bottles in the litter is in decline whereas the overall number of single-use plastics in the mix is increasing¹³¹. After their inclusion in the DRS, the quantities of small and bigger plastic bottles found in the environment has decreased by 51% and 33% respectively¹³². The incidence of cans is clearly increasing (*blikjes* in graph below) as can be seen below. It is still too soon to see the effects of the expansion of DRS to these items.

Figure 7 Number of times a certain type of item was counted in the litter surveys: plastic bags, cans, small plastic bottles and bigger plastic bottles (source: Rijkswaterstaat Leefomgeving)





Estonia

Start date: 2005

Brief overview and developments since 2019

Estonia was the first Baltic country to adapt DRS in 2005. The legal basis is laid out in the Packaging Act (*Pakendiseadus*)¹³³ and Packaging Excise Duty Act (*Pakendiaktsiisi seadus*)¹³⁴.

The system is centralised, managed by Eestipandipakend, a non-profit organisation owned by the producers, importers and retailers. Through *Eestipandipakend* they take responsibility for the entire chain of DRS operations from collection to recycling¹³⁵.

A deposit fee of EUR 0.10 applies to all materials (glass, metal, plastic) regardless of size.

DRS covers beverage packaging with a volume between 0.1 and 3L containing soft drinks, low-alcoholic beverages (e.g beer) and cider. Dairy products, drinks sold in beverage cartons and strong alcohols are excluded.

There have been no major changes to the system since 2019, except:

- As of 2021, it is possible for strong and low (above 6%) alcoholic drinks to join the system on a voluntary basis¹³⁶ (e.g wine, spirits, syrups¹³⁷).

Updates on target and system performance

Annual reports from Eestipandipakend provide data on the quantities of single-use packaging put on the market and returned. As seen in the graph below, the figures fluctuate since 2014, although steadily growing since 2018, reaching a record 350M units in 2021¹³⁸, of which 293 M unites were returned (84%)¹³⁹. By weight, as expected, glass bottles make up more than half (54%) of the share within the total.

Return rates also fluctuate between 85% and 87% since 2017, after a rapid increase of around 10 pp compared to 2016, however the results remain successful, with 84% return rate for the last year reported.

Return rates vary depending on the material. Figure 9 shows the trend since 2014. Return rates for glass and plastic have been mostly consistent, staying above 85% with metal packaging showing a steeper improvement, reaching 89% in 2021, from 64% in 2014. For all materials, targets are met, namely 85% for plastic and glass and 50% for metal¹⁴⁰.

Figure 8 Single-use beverage packaging put on the market and collected 2014-2021(right axis), and return rates (left axis) (source: Eestipandipakend, compiled from yearly reports)

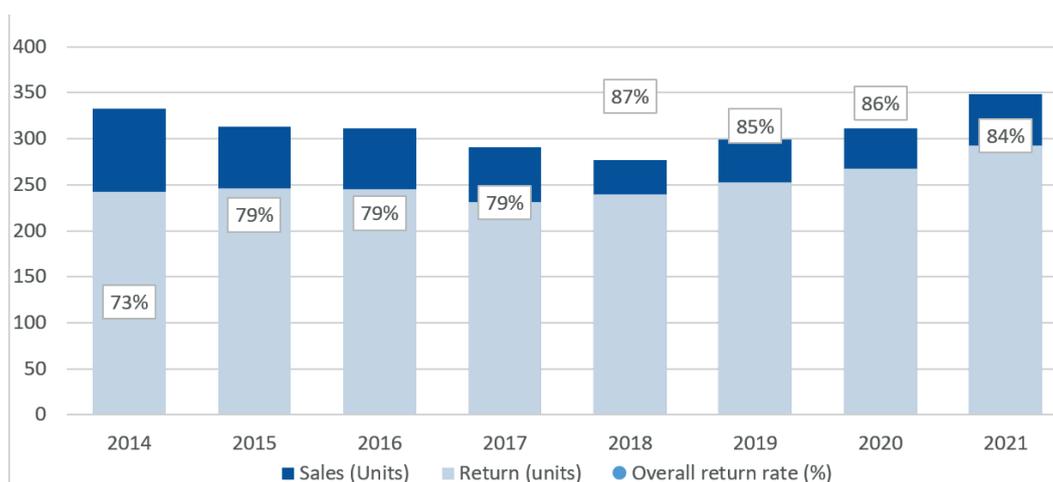
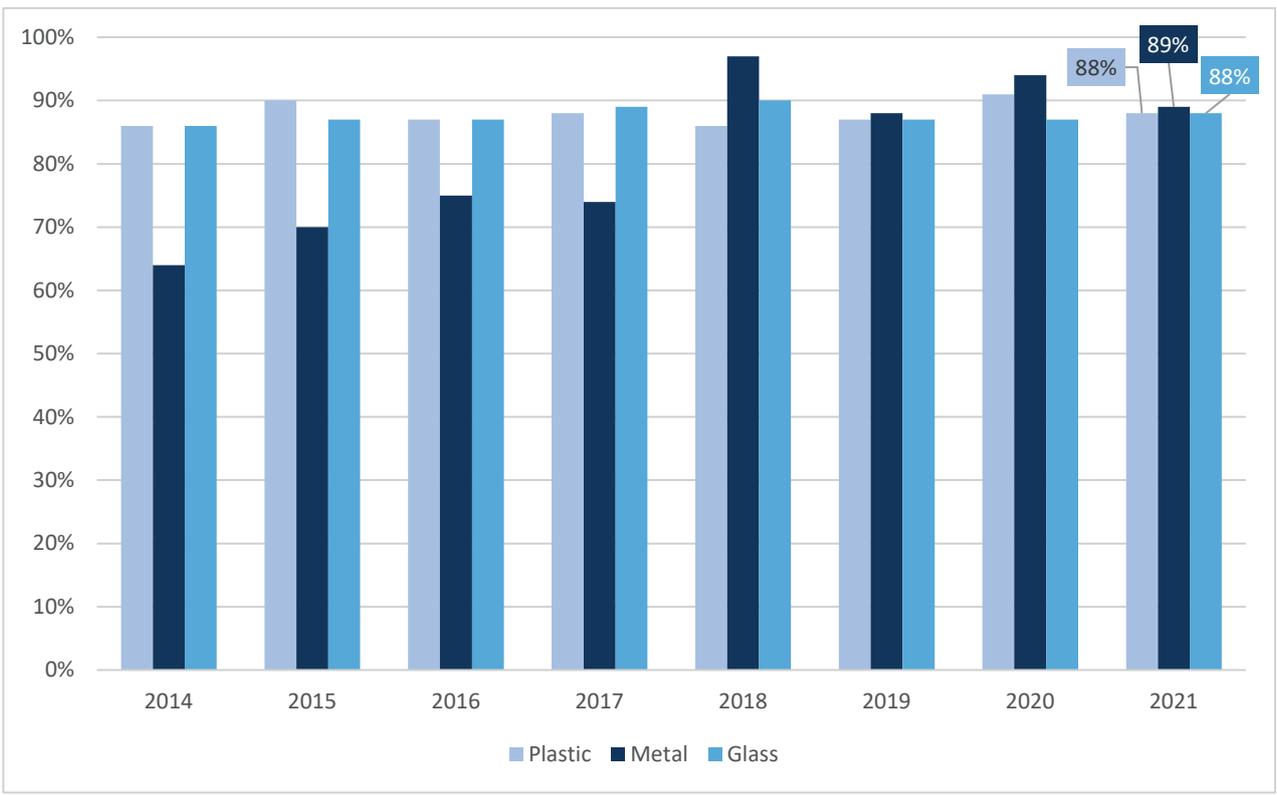


Figure 9 Return rates for single-use beverage packaging by material, 2014-2021 (source: Eestipandipakend, compiled from yearly reports)¹⁴¹





Croatia

Start date: 2006

Brief overview and developments since 2019

Croatia has a DRS in place since 2006. The latest legal framework for the system dates to 2015, namely the Ordinance on Packaging and Packaging Waste (88/2015) and Regulation on Management of Waste Packaging (97/2015). Both legislations cover packaging waste in general but have dedicated sections on DRS. The Waste Management Act (adopted in 2021) lays down collected and recycling targets (see below) that also applies to the deposit system¹⁴².

The Environmental Protection and Energy Efficiency Fund (FZOEU - *Fond za zaštitu okoliša i energetske učinkovitost*) is managing the DRS. FZOEU is an official entity managing the revenues and investments from extra-budgetary sources according to the regulations concerning the environment, energy efficiency and renewable resources¹⁴³. As such, its field of activity is larger, an exception compared to other countries¹⁴⁴.

The system covers single-use glass and PET bottles as well as aluminium cans, with a volume larger than 0.2L. Almost all beverages are included (see below). A standard fee of HRK 0.5 (EUR 0.07) applies to all volumes and materials.

Since 2019, several important amendments were made to the legislation:

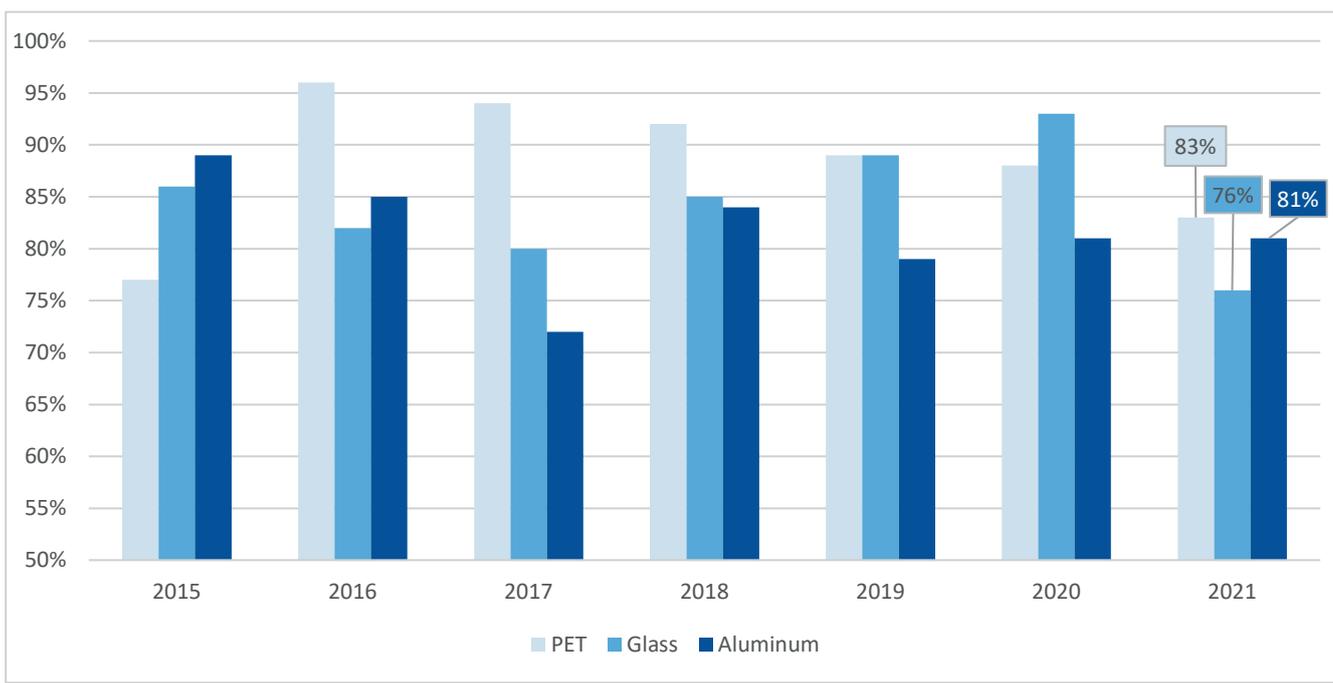
- In 2021, the system was expanded to all types of drinks including milk and dairy products in containers larger than 0.2L in volume. Previously the latter were exempted¹⁴⁵.
- In 2022, the government announced plans to expand the DRS to all containers, including those smaller than 0.2L and include different types of packaging (composite & multi-layer)¹⁴⁶.

Update on targets and system performance

The new Waste Management Act (adopted in 2021) introduced new targets for mandatory separate collection and recycling for PET bottles (77% by 2025 and 90% by 2029%) and mandatory 25% recycled content for PET bottles by 2025 and 30% by 2030¹⁴⁷. In 2021, around 156¹⁴⁸ thousand tonnes of packaging was recovered all means combined, which corresponds to 55% of all packaging put in the market¹⁴⁹. This falls below the 60% recovery target (when all packaging considered). On the other hand, recovery rates within the deposit return system are much higher, with 88%, 93% and 81% for PET, glass and metal/aluminium respectively¹⁵⁰. Additionally, it is reported that the DRS system leads to higher quality (less impurities) material¹⁵¹.

Annual reports on Packaging Waste Management from the Ministry of Economy and Sustainable Development provide a detailed overview of packaging waste collection and treatment. It has a dedicated section on the beverage packaging that fall under DRS. Only recovery rates by material are reported. Figure 10 shows that performance is fluctuating for all three materials with PET bottles overtaking glass and aluminium as the material with highest return rate over the years. Furthermore, there is a significant drop observed for glass return rates (from 93% to 76%) in 2021. According to the authorities, the latest expansion of the scheme in 2021 to cover more products mainly effected glass bottles which constitute a large share of this segment. It is possible that the consumers were not bringing back all the packaging recently added to the scheme. Since consumers might need some time to adjust to this change, the return rates for this type of beverage containers will very likely slowly improve, reaching their previous levels in the coming years.

Figure 10 Return rates for single-use beverage packaging subject to deposit by material, 2015-2021 (source: Croatian Ministry of Economy and Sustainable Development)





Brief overview and developments since 2019

Lithuania is one of the most recent adopters of the DRS, which was introduced for single-use beverage containers in 2016. The Law on Packaging and Packaging Waste Management¹⁵² provides the legal basis for the system.

Užstato Sistemos Administratorius (USAD), a non-profit organisation, is managing the scheme centrally. It is comprised of beverage manufacturers, importers and retailers. Together they represent 80% of the market in the country¹⁵³.

Single-use glass, plastic and metal containers of volume between 0.1 to 3L are included in the system. Almost all types of beverages are included, such as beer, cider, non-alcoholic drinks, alcoholic cocktails, juices and water. Some are exempted for glass packaging: fruit wine, fruit wine cocktails and fruit wine drinks). A standard deposit fee of EUR 0.10 applies, regardless of type and size¹⁵⁴.

There are no updates to the legislative framework or any other aspects of the system since 2019.

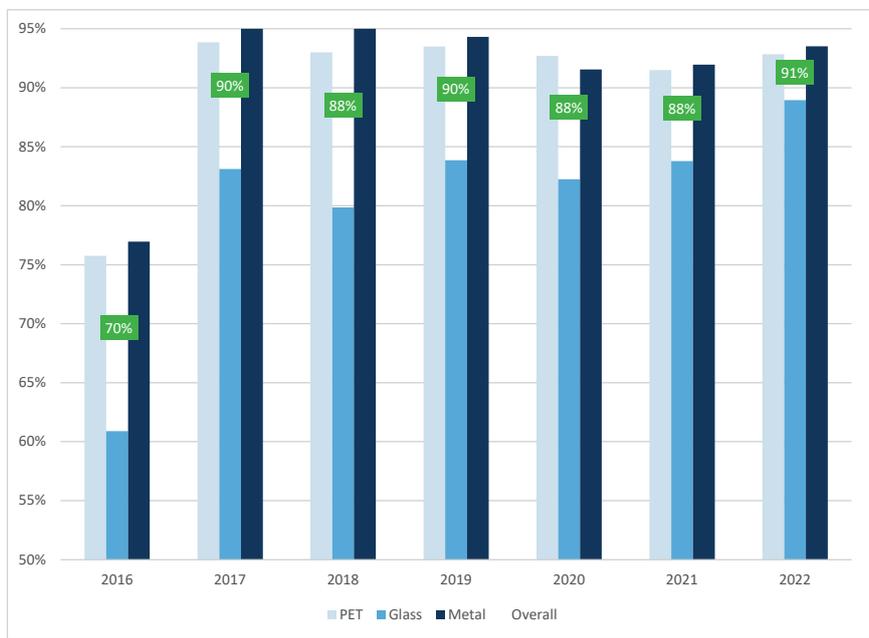
Update on targets and system performance

USAD provides easily accessible, well-structured and detailed information on the yearly performance of the scheme through the website and yearly reports¹⁵⁵.

Information is available on the volumes and quantities put on the market and collected by material providing an overview of the performance since the start of the scheme. In 2022, 672 million units of packaging was collected, resulting in a return rate of 92%¹⁵⁶.

Figure 11 shows the results based on weight calculations. The system is considered very successful after the first transition year and return rates for glass is also improving, after slugging behind plastic and aluminium. The 2029 target is already achieved (90%). The success of DRS system is particularly visible for PET recycling, where the rate was 33% before its introduction¹⁵⁷. It is reported that what is collected is recycled¹⁵⁸.

Figure 11 Return rates of beverage packaging subject to deposit, by material, based on weight¹⁵⁹ (source: own calculations based on yearly reports of USAD)





Slovakia

Start date: 2022

New
deposit system
in Europe since
2019

Legislation and implementation

Slovakia has adopted necessary amendments to the legislation outlining the DRS in the country in 2019¹⁶⁰ and the system was launched in 2022, after 10 months of preparation¹⁶¹. The centralised system is managed by *Správca Zálohového Systému* (System Operator)¹⁶² which was established in 2021 as a non-profit organisation, a consortium of four entities (AVNM, SZVPS, SAMO and ZOSR)¹⁶³. Together, these manufacturers and retailers represent 80% of the beverages that fall within the DRS in the country¹⁶⁴.

The system currently covers single-use plastic and metal cans from 0.1 to 3L and beverages made of at least 80% water, both alcoholic and non-alcoholic¹⁶⁵. In practice, this means water, soft drinks, energy drinks, beer, wine and mixed alcoholic drinks. Exceptions are milk drinks and drinks with a 15% and higher alcohol content¹⁶⁶. The deposit fee is EUR 0.15, standard for all types and volumes.

Initial results

DRS is considered an essential part of achieving the objective of separately collecting 90% of the beverage packaging by 2025 and enabling high quality recycles (eg. bottle-to-bottle and can-to-can recycling)¹⁶⁷.

The reports from the system administrator already provide some insights to the initial results: as of December 2022, 294 operators are registered to the system, putting onto the Slovakian market a total of roughly 1.1 billion units of beverage packaging, distributed between plastic bottles and metal cans (56% and 44% respectively). Share of different drinks (e.g wine, water, beer) is also available. Ratio of reverse vending machines to manual operators is roughly 3 to 1 (2 246 to 747)¹⁶⁸.

Around 821.5 M units were collected in 2022, achieving a 71% return rate. The latest collection rate stood at 60% prior to the implementation of DRS. Taking into account that the year 2022 was transitional and drinks without deposit labelling were still available in the market until 31 December, the results are encouraging. The set target for 2023 is 80%¹⁶⁹.



Latvia

Start date: 2022

New
deposit system
in Europe since
2019

Legislation and implementation

Latvia, the last Baltic country to adopt a DRS, started the full implementation of the system in August 2022 after a transition period of six months. Latvian National Waste Management Plan (2021-2028) had set itself several targets (e.g 65% of packaging materials recycled by 2025 or 10% landfill limit for household waste). These required additional measures such as a deposit system¹⁷⁰. Building on this, the legislative framework enabling the deposit system was amended in 2019¹⁷¹.

The central system operator, a non-profit entity called *SIA Depozīta Iepakojuma Operators (DIO)*¹⁷² was established in June 2020. It is granted the responsibility for managing the system for a seven-year period. It is comprised of important market players of the Baltic region (industry, local and regional beverage producers, retailers and AS PET Baltija – the largest recycler in the region)¹⁷³. The system is operating on a zero-profit principle, investing all revenues back into the system¹⁷⁴. It is supervised by the State Environmental Service, a public authority, which ensures it is functioning according to the principles¹⁷⁵.

Single-use plastic (PET), metal and glass beverage packaging are included in the system. A standard deposit fee of EUR 0.10 applies to all types and sizes. Initially the system covered different types of drinks depending on their packaging and volume (ranging between 0.1L to 3L):

- Carbonated and non-carbonated non-alcoholic beverages (i.e. mineral water, drinking water, lemonade, energy drinks, ice tea, juices, nectars);
- Beer;
- Other alcoholic beverages with alcohol content between 0.5% to 6% (except beer and wine).

After its initial implementation and transition period, the Latvian DRS has been extended to cover a larger segment of the market: in addition to what is listed above, a deposit is also applied to all alcoholic beverages (cocktails, syrups and others) in PET bottles and cans since January 2023¹⁷⁶.

Initial results

Given the recent implementation of the system, results are not yet fully available. However, the initial data show that since its introduction in February 2022, around 400 million units were collected through RVMs and manually¹⁷⁷. A return rate of 85% was achieved for the month of February 2023. Quantities collected are increasing steadily, reaching a 2M units daily record in June 2023¹⁷⁸. The current expectation for the end of first year's average is expected to be 77% overall return rate¹⁷⁹. 71% of the citizens are using the system regularly (at least once a month)¹⁸⁰.

Initial results indicate varying return rates across types of packaging and beverages. For instance, while 92% of containers for water have been returned in the first nine months of 2023, the rate goes down to 68% for alcoholic cocktails¹⁸¹. In terms of material, plastic is reported to be only one not reaching the collection and recycling targets¹⁸². However, these initial indicators will become more complete after the first calendar year ends in December 2023.



New
deposit system
in Europe since
2019

Legislation and implementation

Malta has become the 13th country in Europe with a DRS system in November 2022. The country has a particular context. It is a Mediterranean island with a very high-impact tourism and very low collection and recycling rates especially, for plastic packaging¹⁸³. The initiative has a dual objective, not only to improve the collection and recycling but also to encourage a cultural shift among the consumers¹⁸⁴. HORECA (hotel, restaurants and catering) industry is the biggest economic operator therefore is included in the DRS, as all other economic operators¹⁸⁵.

It is managed by a central operator, BCRS Malta Ltd (Beverage Container Refund Scheme)¹⁸⁶, a not-for-profit entity gathering industry association of beverage producers, importers, retailers.

The system covers single-use plastic (PET) and glass bottles, aluminium and steel cans with a capacity of 0.1 to 3L. The following drinks are included: water and flavoured water; carbonated and non-carbonated soft drinks; ciders, beers and other malt beverages; ready to drink coffee; flavoured alcoholic beverages having an alcoholic content level which does not exceed 5% and dilutables¹⁸⁷. Dairy products, juice and nectars, wines and spirits, beverages in carton, pouches and HDPE and drinks with alcohol concentration over 5% are excluded from the system¹⁸⁸.

A standard deposit fee of EUR 0.10 applies to all types and sizes.

No results are available on system results yet, but the 100 millionth beverage container was deposited to a RVM in June 2023¹⁸⁹.



Romania

Start date: 2023

New
deposit system
in Europe since
2019

Legislation and implementation

As this report was in final stages of publication, Romania became the 14th country in the EU to launch a deposit system for single use beverage containers¹⁹⁰. The legislative framework for the deposit system was finalised in 2021, namely the Government Decision No. 1074/2021 on the establishment of a deposit-return system on single-use packaging (GD 1074/2021)¹⁹¹.

The sheer size of the deposit system makes it an interesting case: upon introduction, it has become the second largest in the EU, only second to Germany and the largest integrated system in the world¹⁹². Through its 80 000 collection points, it is expected to handle around 7 billion beverage packaging units annually¹⁹³.

The deposit system is hailed as ‘the largest circular economy project in Romania’¹⁹⁴ by its own administrator. It is intended to increase the current low collection and recycling rates (around 13%) for relevant packaging¹⁹⁵. The set target for 2024 is 65%. It will also contribute to the recycling rates for glass, metal and plastic.

The system is centralised and operated by the not-for-profit RetuRO¹⁹⁶. RetuRO’s members are three private companies (beverage producers and retailers) and a public shareholder (Romanian Ministry of Environment, Waters and Forestry)¹⁹⁷. The system covers single-use plastic, metal and glass beverage containers between 0.1 and 3L, with a fixed fee of RON 0.5 (app. EUR 0.11)^{198,199}. The deposit covers all drinks except milk in glass containers. The beverage containers will be labelled in a standardised way and can be returned to any retail point. All retailers above 200 sqm size are obliged to organise their own return point, while the smaller ones can co-organise with others of the same size²⁰⁰. The return points can not be further than 150 m to the sale points²⁰¹.



Section 3

Reusable beverage containers

An important but (often) overlooked dimension of deposit systems

Reusable beverage packaging has a long-history and has an important role to play for circularity transition. It is therefore important to explore its role within the deposit systems, which currently remains untapped. There are close connections between the two concepts. Historically speaking, deposit systems that preceded the modern versions were put in place for reusable glass bottles. From a practical point of view, deposit systems rely on the physical movement of containers between retailers, consumers, and producers, which constitutes the backbone of reuse/refill systems²⁰². From a policy perspective, when circularity and waste hierarchy objectives are considered, reuse should be part of the discussion. When all these connections are considered, deposit systems seem to be the logical starting point to explore the potentials of reusable beverage packaging.

However, at the moment, deposit systems are mostly seen as instruments to increase recycling, without integrating the reuse dimension. Some even argue that the entire conception of EPR and DRS in the EU has been to maximize recycling based on use and throw model, which is at odds with the concept of reuse in particular and circular economy in general²⁰³. Examples from MS level also reflect similar choices: for instance, in Finland, tax on single-use beverage containers was lifted in 2008, effectively removing the cost advantage of reusable bottles, therefore further encouraging the shift to single use containers²⁰⁴.

However, some exceptions exist in the EU where the deposit system incorporates an element of reuse, albeit under different forms. In **Germany** the reusable glass bottles are not within the same deposit and labelling system as one way PET bottles and cans. However, their market shares are closely monitored, and reusables are an inherent part of the policy framework. In **Denmark**, the administration of both single-use and reusables are within the mandate of Danskretursystem, but the latter is not involved in the organisational management of the reusable bottles²⁰⁵. Market shares are nevertheless monitored, and the consumer perceives the systems as one. In **Lithuania** the previous system for reusable glass bottles is merged with the one-way system in operational terms, even though reusable flows are managed by another entity (DESA). To the consumer, there are no difference in labels or deposit fee²⁰⁶. In **Estonia and Latvia**, reusable glass bottles are part of the same system.

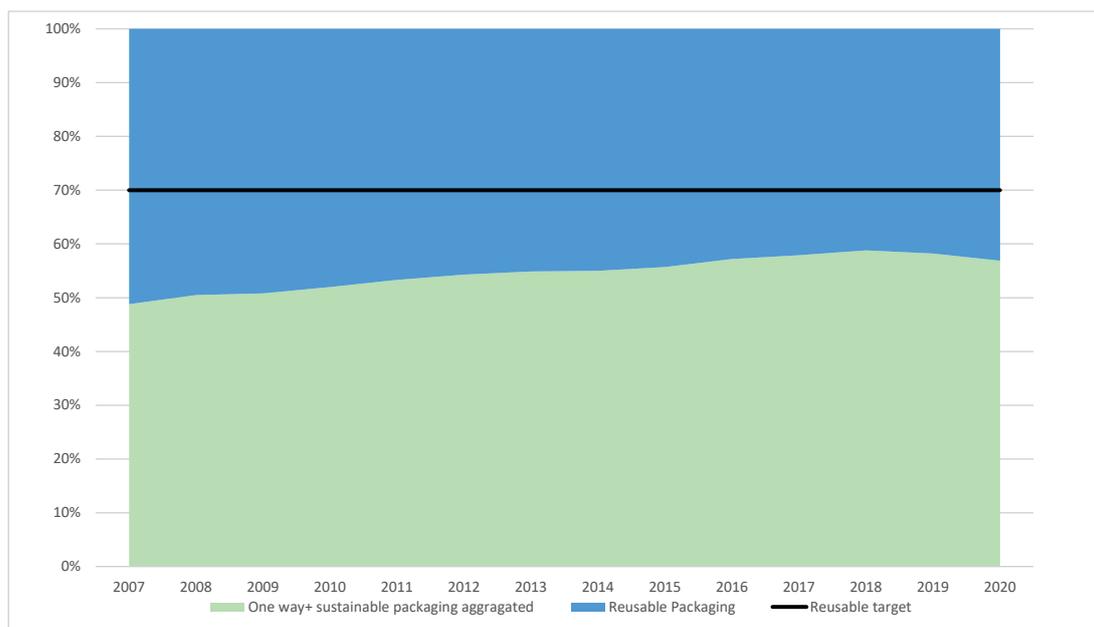
Deposit systems are not enough to encourage reuse

The experience from these countries offers useful insights for the future policy making. The first is that deposit systems alone do not necessarily mean a support for reusable beverage packaging. Even deliberate policy interventions seem insufficient. **Germany, where the policy is explicitly linked to reusables, offers a striking example.** The Packaging Act (*VerpackG*) sets a target of 70% market share for reusable packaging (*Mehrwegverpackungen-MW*). This is also reflected in the way the deposit fees are set, creating an advantage for the latter (with lower deposit fees for reusable glass). However, the evolving market composition shows that these measures are not enough to reverse the trend. The estimated market share is much lower than the target, at 43.1% in 2020 (of the beverage packaging covered by DRS). This is a slight improvement from last year (41.8%) but overall the share of reusable packaging has been in decline since 2007.

In Denmark there is a similar situation. The market share for the reusable bottles has been dwindling since 2002: it was 85% in 2005²⁰⁷, going down to 16% in 2017 and finally to 7% in 2021²⁰⁸. These observations are consistent with the global trends: according to the OECD, annual sales of single-use beverage containers more than doubled (60% increase) and sales of reusable containers declined almost by half (39%)²⁰⁹.

In Lithuania, the integration of both systems (single-use and reusables) is considered important to avoid creating a disadvantage for the reusables and to maximise convenience for the consumers. However, there too, the market share of reusable glass bottles is in decline. The sale volumes have declined from 240M units in 2007 to 61M in 2019²¹⁰.

Figure 12 Market shares of packaging types within the DRS (source: Umweltbundesamt, compiled from yearly reports)²¹¹

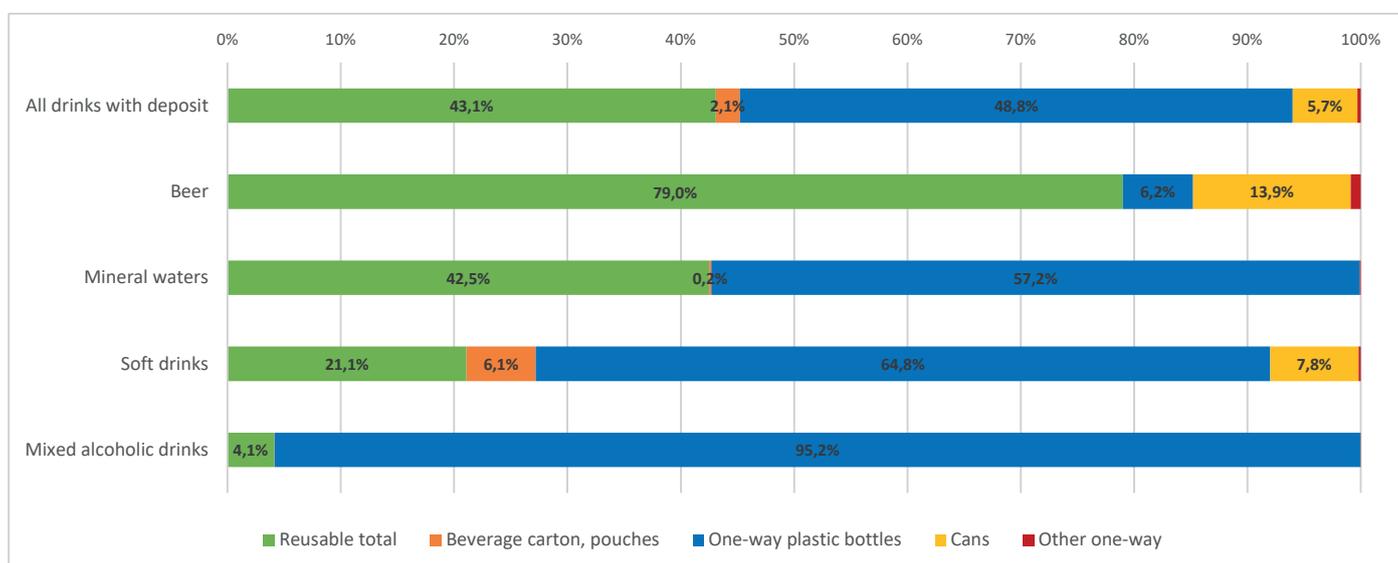


Not all materials and beverages are made equal when it comes to reusable packaging

Due to the design of the policy, some of these countries have data on different aspects of reusable beverage packaging, offering useful insights. These show that different types of drinks and containers might be more suited to reusable packaging than single-use and vice versa. For instance, the German Environment Agency publishes yearly reports about the consumption patterns broken down by type (single-use or reusable), material of packaging (metal, glass or plastic) and beverage

type (beer, water etc)²¹². It is possible to observe a decline in bottled water consumption (due to increase in tap water consumption) or a sharp decline in beer consumption due to pandemic-related bar/restaurant closures²¹³. The market share for the reusables varies depending on the beverage (see below) For instance, beer is the only beverage where the 70% target is met with a high share of reusables (79% in 2020).

Figure 13 Shares of packaging in the consumption of beverages with deposit 2020 (source: German Env. Agency, Yearly survey on beverage consumption)



Consumer convenience is important

In many of these systems the consumer does not perceive a difference between reusable and single use beverage packaging, and this is considered important for the convenience. The key is to avoid discouraging the use of reusable bottles (for instance the consumer can return everything to the same collection point, therefore does not have to make two separate trips). This is the case **in Lithuania and Denmark** where operational and administrative difference exist between the two systems but does not impact the customer. **In Latvia, one of the newest systems**, also incorporates reusable glass bottles, however the system makes a difference between standard-shape reusable glass bottles and specific designs. While the former is incorporated in the system both in terms of admin and logistics, the specific design glass bottles are collected by the producers themselves. For 2023, 27% of all deposit packaging put on the market is glass and within that 67% is reusable glass (shared between 52% standard shape and 15% unique design)²¹⁴.

Holistic approaches and a better understanding of the relationship between the reusables and deposit systems are needed

The few MS currently integrating some form of reuse in their deposit systems offer valuable observations for future policy. They might help us to understand what works and what does not, or like in the case of Germany, they might help determining which beverage categories might be more suitable for reusable containers from the consumer perspective. The experience also shows that it will take more than convenience to encourage the uptake of reusable bottles. Holistic approaches are needed, including many elements from the current systems combined with others, such as reuse targets²¹⁵, convenient take back systems for reusables or differentiated deposit fees. This holistic approach should also be applied when it comes to making a choice between single-use and reusable containers from a life-cycle analysis perspective, taking into account many dimensions from GHG emissions to toxicity. Deepening our understanding about these issues requires more research, which can be built on the already existing, very valuable experiences on the ground.



Section 4

**The big picture:
role of DRS in managing
(some of) our waste**

While discussing its organisational and operational details, it is easy to forget the ultimate objective of a policy instrument. Deposit systems, like any other policy intervention on resource management, are a tool for maximising the sustainable use of our resources and consequently, protecting our health and the environment. They achieve these general objectives through a series of measures and responsibilities distributed among different actors. These have inter-dependencies and operate in a complex ecosystem. Therefore, like any other policy instrument, they have their limits, either inherently or due to structural factors in which they operate. It is important to remember these so that measures to complement and improve deposit systems can be designed and implemented.

In this section we look at the potential and limitations of deposit systems within the bigger picture of waste management and circular economy. We try to revisit main questions around deposit systems such as their impact on recycling rates, recycled content, eco-design and littering.

DRS helps reducing litter, therefore limits environmental pollution but more data is needed

One of the main arguments for introducing a DRS is its efficiency in reducing litter. The assumption is that by providing an economic incentive to bring back the beverage containers, DRS can directly contribute to reducing of quantities left in the environment²¹⁶. Evidence from real life applications supports this claim. OECD's work on DRS mentions a series of compelling examples from around the globe: South Australia, Ecuador, US, Canada, Germany and Denmark where impact is documented²¹⁷. In The Netherlands, as indicated above, extension of the deposit system to small bottles seems to reduce their occurrence in litter. In another example from Estonia, a clean-up campaign organised before the introduction of DRS found that 80% of the litter was composed of beverage containers. Their share dropped to 10% two years later after the DRS was introduced²¹⁸.

The cases mentioned above constitute rare examples of quantification of direct impact. This is mainly because primary data on litter (field surveys) with regular monitoring is not common. Where such surveys exist, they are usually under the form of one-off cleaning campaigns or similar. They might focus on particular spaces (e.g beaches, highways) therefore might analyse entirely different samples, leading to different results. Furthermore, each context is different (e.g consumption and

mobility habits, cultural differences, population density), which makes comparisons difficult. Partial information available from multiple countries is an example in point. A 2020 report from Keep Britain Tidy states that 43% of the litter (by volume) found in England is small plastic bottles and cans²¹⁹. In Northern Ireland the latest litter composition survey states that there are 12M items in the streets in Northern Ireland at any given time, of which 10% made of non-alcoholic drink cans with another 10% distributed among non-alcoholic bottle products, cans with alcoholic products and alcohol bottle products²²⁰. In Wallonia, a similar exercise found that by weight, cans made 7% of litter (2% per unit) and 12% were plastic beverage packaging normally destined for separate waste collection (2% per unit)²²¹. Some surveys also look at volume comparisons for litter: in the UK, cigarette butts constitute the item which is found most frequently (66% of total), however by volume, non-alcoholic small plastic bottles and cans represent 24% and 19% of the total respectively. Another 7% if made of cans containing alcoholic drinks²²².

Available evidence shows that DRS increases separately collection and recycling of beverage packaging that falls under its scope

This has been documented in many cases, especially where before/after comparisons are available from countries which introduced a deposit system. Numerous examples can be cited: In Europe, collection rate for PET bottles under DRS is estimated to be twice as high compared to without DRS (99% to 48%)²²³. In Lithuania, the collection rates of PET bottles and cans increased

from 34% in 2016 to 92% within two years after the introduction of DRS²²⁴. In Ecuador, a deposit fee of USD 0.02 on PET bottles improved their recycling rate from 30% to 80% in one year²²⁵. In the US, recycling rates for beverage containers that fall under DRS is higher when compared to kerbside collection up to around 30% for aluminium cans²²⁶.

Available evidence shows that DRS leads to higher quality recycle therefore enables higher recycled content for beverage containers

Due to its organisational structure and well-defined scope, deposit systems collect similar type of containers that are suitable for food-contact, isolated from other packaging types. This aspect is a frequently mentioned advantage of deposit systems. However, it will become even more important for the upcoming mandatory recycling content targets, especially for PET bottles²²⁷. Access to high-quality, uncontaminated material for close-loop recycling is becoming an urgent need and a pre-condition to achieve circularity for the food packaging sector. This has been exacerbated due to competition from other users (the most important being textile and automotive sector)²²⁸. Therefore, DRS offers a partial solution, at least by increasing the amount of uncontaminated, high-grade materials available.

While circularity of plastics has its limits, it has been suggested that achieving 75% recycled content for PET is possible through deposit systems²²⁹. Examples from various contexts corroborate these. For instance, in the US, DRS achieves a plastic recycling process with much less loss, compared to other systems which reports 32% loss at processing facilities²³⁰. In Norway, the system is capable of securing a *'steady supply of recyclables with a high yield and required quality'* both for aluminium²³¹ and plastics²³².

DRS has a positive impact on some aspects of eco-design

Multiple sources argue that DRS can have a positive impact on product-design²³³. This is true to some extent: by using producer fees calibrated to different material types, weight or other aspects, deposit systems (or EPR systems in general) can influence the producer choice. In the EU, it is reported that producer fee modulation based on weight led to a drastic decrease in the average weight of PET bottles between 1990 and 2013, from 24 to 9.5 grammes²³⁴. In Norway, design of bottles is a pre-condition to participation to DRS²³⁵ and participation fees for producers are linked to recyclability or other criteria such as excessive packaging²³⁶. In Sweden, higher fees are applied to coloured PET bottles which are more complex to recycle. This might partially explain their smaller market presence²³⁷.

However, when considered from a wider 'sustainability' perspective, the impact of DRS needs to be nuanced and discussed carefully not to overemphasise recyclability. This issue has been raised also by several stakeholders during the consultations on PPWD proposal' impact assessment. They argued that the focus was too much on recyclability through 'Design for Recyclability' approach which is not equivalent to environmentally sustainable design²³⁸. Indeed, the latter is a much more complex and multi-faceted concept, trying to juggle many aspects from water and energy savings, emission reduction to non-toxicity. This links back to the holistic approaches, which would prevent to pursue false solutions, for instance designing a lightweight packaging but using highly toxic chemicals. As explained in section 3, the discussion on sustainability should also cover reusables and incorporate the complexity that exist between the trade-offs of each policy choice.

Limitations of DRS in fixing our waste problem

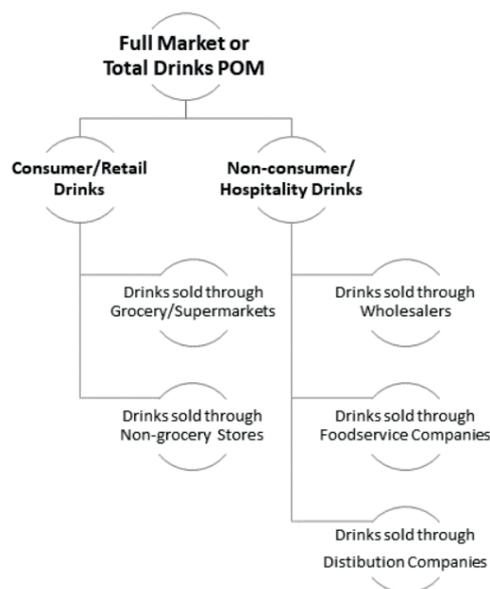
It is important to have a clear understanding of the limitations of deposit systems. This is not to say we do not need them, but to identify how they can be improved, and which other policy instruments are needed to offer a more effective solutions to complex issues regarding waste management.

By definition, deposit systems target a specific type of material and products

The first key point is that deposit systems address a sub-section of packaging materials and types. This means, even when they are 100% effective, their overall impact on waste management and litter will depend on the share they represent within the total packaging materials in circulation. For instance, in its most common form, DRS currently addresses single-use beverage packaging containers of certain size, all intended for end-user consumption. These vary between 0.1L to 3 or 5L volume containers. These containers are made of different materials, including plastic (mostly PET), aluminium or sometimes metal and glass. In order to understand the full impact, it is essential to know the share these materials represent within the total amounts of packaging and materials in circulation. However, this information is not straightforward, only some estimations and partial data are available. For plastics, the following can be said of plastics in general and PET bottles in particular:

- Packaging (all packaging) is the biggest user within the plastics industry, with 44% of total amount by application globally and 39% in the EU²⁴⁰.
- PET constitutes around 6.3% of the entire plastic production (globally) and 7.9% in the EU²⁴¹.
- On the other hand, PET is the most important material for packaging as 97% of the PET used in the EU is for packaging applications. And in this, 64% is for beverage bottles²⁴².
- 92% of PET bottles are used for beverage applications (92%)²⁴³.

Figure 14 Streams and sectors used to build Drinks Container put on the market (image taken from WRAP, *Drinks Recycling on the go*²³⁹)



For aluminium, according to the industry association, up to 50 billion aluminium cans are consumed every year in the EU, with 76% recycled²⁴⁴. Overall, finished products containing aluminium in the EU was estimated around 20% of consumption in the EU²⁴⁵.

Data at MS level is equally hard to find for each country. For instance, the graphic below, taken from a WRAP report²⁴⁶ illustrates the composition of drink containers market, only focusing on beverage packaging (thus a more limited scope that what is discussed above) in the UK.

As such, beverage containers that fall under DRS constitute a limited share of the whole packaging market and the spectrum of materials used to produce packaging. The picture is further complicated with the fact that scope for each DRS is different in each country, with different market compositions for materials as well as consumption habits. As a consequence, impact of DRS might be amplified or undermined in each context. On the other hand, it is important to remember that DRS targets beverage containers that are more likely to be thrown away (e.g consumed on the go) and a big share of consumer beverage packaging, therefore its impact can be greater in terms of littering. As such, they present an important but a partial solution to the waste and litter problem.

Separate collection of materials is the first steps of a circular system but does not guarantee it

Although DRS can ensure separate collection of uncontaminated material, it cannot guarantee circularity on its own. Separate collection is only one step among others. A well-functioning, resilient system also needs to make sure that there is enough capacity for sorting and recycling. For instance, a recent Eunomia report estimates that washing and recycling facilities for PET are running at 87% capacity in the EU²⁴⁷. To be able to recycle the quantities collected to reach the 90% target for PET bottles, the European countries²⁴⁸ will need to triple its recycling capacity²⁴⁹. This point requires particular attention since many actors will have to work together both national and internationally to accommodate this demand, which is certainly a much wider issue than deposit systems.

A well-functioning secondary materials market requires more than separate collection and recycling

On their own, neither separate collection nor recycling can lead to a circular system. A fully circular economy needs a predictable, stable market with sufficient supply of and demand for secondary materials²⁵⁰. At the moment it does not seem to be the case, especially for recycled PET. In parallel to the inadequate recycling capacity, there is also a mismatch between supply and demand. This creates volatile markets where even limited increases in supply or demand lead to considerable price changes. This makes it difficult to make long-term plans for both suppliers and buyers²⁵¹. As such, DRS is part of the solution however it needs to be considered within the wider context and supported by other policy measures to be fully effective.

Deposit systems should address higher levels of waste hierarchy

Another often overlooked issue is that deposit systems do not necessarily address higher levels of waste hierarchy, particularly waste prevention. A truly circular economy goes further than merely managing the increasing amounts of waste: it should prevent it from happening in the first place. One of the most powerful approaches to waste prevention is reuse. Thus, deposit systems heavily focusing only recycling are not designed to achieve circularity in its true sense. As already discussed in section 3, this is the case for most of the current systems in the EU, with little or no consideration for reuse. In its current conception, DRS will continue to have a limited impact in minimising waste, especially in the current context of booming demand for single-use packaging.



EPR schemes and deposit systems: a complex relationship

Extended Producer Responsibility (EPR) and deposit systems are built on the same principle. They both make the producers and/or sellers (either partially or fully) responsible for the management their products once they reach end of life stage. They both encourage separate collection of waste streams and necessitate collaboration of diverse stakeholders from businesses to consumers. DRS has been considered a sub-category of EPR²⁵² or a means to achieve extended producer responsibility²⁵³.

At the same time, there are important differences between the two concepts' design and implementation. To begin with, DRS currently targets a sub-group of beverage containers whereas EPR can be applied to a wider range of products from textiles to electronics. Further, deposit systems engage the consumer more directly by placing a fee on the purchased product which is not the case for EPR systems.

The report from OECD remains the most important comprehensive study on the relationship between the two instruments. Based on this report and a limited number of other research, several factors can be identified, both positive and negative:

- **There are potential conflicts between an already established EPR scheme for packaging and a DRS system to be introduced.** This has been linked to different organisational structures: if the EPR scheme is collecting packaging through kerbside collection, a DRS system on top of this would create a parallel system via return to retail. This has multiple implications, including conflict of interest between parties involved. How different actors will be impacted will depend on the existing structures and roles both financial and operational and value of the material collected²⁵⁴.
- For instance, DRS is targeting high-value material which would be collected through an EPR scheme. Diverting the quantities from kerbside collection to return to retail (DRS) would lead to loss of material revenues for the PRO (producer responsibility organisation) already financing the kerbside collection. A notable example is Germany: after the introduction of DRS in 2002, the already existing 'dual system' registered a loss of 400 000 tonnes of recyclable material to the new system, due to shifting quantities from one system to the other and a 13% loss in revenues²⁵⁵. This can also apply to municipalities who would otherwise retain

the material ownership.

- Introducing a DRS in a context where EPR already exists might lead to additional administrative burden for the packaging producers. For instance, producers of multiple types of packaging might need to report to EPR and DRS separately²⁵⁶.
- Another point of conflict is the reuse and recycle ambitions – usually EPR schemes are designed towards recycling with few exceptions including reuse targets. DRS might emphasise reuse, which might create policy incoherence, in terms of waste hierarchy and priorities²⁵⁷.
- It has been suggested that these conflicts tend to be emphasised when DRS is introduced after an EPR scheme²⁵⁸.

The latest point deserves particular attention in the current context in the EU. At the time of writing, almost all MS have an EPR system in place for packaging. This means countries who are willing to introduce a deposit system might face challenges. It also is worth noting that only few countries have both systems for the same sector. Germany and The Netherlands are notable examples where both systems run in parallel successfully. In the case study on Belgium that will be published in the very near future, this issue is discussed in detail²⁵⁹.

On the other hand, if designed properly in a coherent way, both EPR and DRS schemes have the potential to reinforce and complement each other²⁶⁰. Complementarities are mostly related to the additional 'push' that the DRS brings to the results of EPR schemes in terms of higher collection and recycling rates. Further, DRS can contribute to littering and shaping consumer behaviour in a more effective way than EPR schemes²⁶¹. The higher recycling rates and quality can be beneficial for the entire supply chain, especially where same actors are responsible for both. Additionally, since DRS facilitates the movement of beverage packaging between consumers and collection points²⁶², it lays the groundwork for future policies relying on the same habits. This can be useful in the case of reusable bottles, but it can also be beneficial for other products or materials. A number of solutions to the incompatibility issues between EPR and DRS can be summarised as below:

- Clearly defining the scope of DRS which will function within an EPR system might prevent confusion both within the industry and consumers²⁶³;
- Integrating reuse targets within the DRS will help incentivising it offering a counter-weight within a system which encourages recycling before all²⁶⁴;
- DRS and EPR within the same sector should be introduced at the same time, or DRS should precede the EPR system²⁶⁵²⁶⁶.



Section 5

**A meta-discussion on DRS:
recommendations for
future research**

A comparative perspective on DRS is very limited and needs to be further explored

Although several studies provide detailed descriptions of the DRS across countries, few of them focus on similarities and differences between them from a conceptual perspective. This is partially because each is unique in some ways (e.g different legislative frameworks, cultures and material conditions). However, comparative analysis of packaging waste management is needed²⁶⁷, so is a conceptual framework for DRS which could be applied to different contexts²⁶⁸. This will allow benchmarking to design better fit systems to different contexts.

During our research we identified one such study which provides a useful theoretical framework to analyse and categorize different deposit systems. Using archetypes, Calabrese et al.²⁶⁹ provides a grouping of existing systems under four categories. Each archetype is based on the actor which closes the loop by transporting the empty items collected to the recycling facility (or washing facility for reusables). These four archetypes are explored through building blocks, namely actors, the cost and revenues for each other as well as money-material flows²⁷⁰. The table below recapitulates the archetypes and their main features. Note that this conceptualisation goes beyond the descriptive elements, which are already used in many sources to compare available systems. These include, for instance, whether the system is centralised or not, whether the deposit fees are fixed or not and many other features of the systems or who is paying the handling fees to whom. It is merely an example of how different systems can be conceptualised as many other approaches can be developed and used.

Table 5 Conceptual framework developed by Calabrese et al, as an example of comparative analysis of deposit systems

	Description	MS
Archetype A operator-closing mode	The DRS operator collects the empty containers brought back by the consumer to the retailers and transports them to the sorting/recycling centre. Operator is responsible for their recycling. Various financial arrangements are possible but producers bear the cost burden.	EE, DK, FI, HR, LT, NO, SE
Archetype B retailer-closing mode	Retailers are responsible for the transport of the empty containers and their recycling. Different cost/revenue distribution to Archetype A, mainly retailers bearing the costs.	DE
Archetype C producer-closing mode	Producers keep the materials, instead of the operator (A) or retailers (B). They need to organise the process of collection from the return points. Unlike A and B, the costs burden is split between the retailers and producers.	NL
Archetype D consumer-closing mode	Consumer returns the empty beverage containers directly to the DRS operator; retailers are not involved.	IS

More detailed and publicly available data is needed

The primary source of information for deposit systems is the relevant organisation in each Member State, but it is not always possible to find official information on the system and its performance. Ideally, this information should be provided from a single source annually and completed by other information such as legal framework, other activities and latest developments. Thus, the existence of a central operator helps in providing this type of information. Good examples include Lithuania, Norway, Denmark, Estonia, and Croatia where yearly reports from the system operator clearly present the results in a standardised way, allowing comparison across time. In Sweden, data is partially available from the DRS operator's website, with additional information from Statistics Sweden. On the other hand, detailed data is not available or can only be obtained through contacting the organisation (Iceland, The Netherlands). In countries where the system is not centralised, namely Finland and Germany, finding information on the system performance is more difficult, if not impossible. Addressing these information gaps where possible would improve transparency and help all interested parties (e.g researchers, policy makers, citizens or NGOs) to easily access the information they need in a reliable way.

The interaction between the EPR schemes and DRS should be further explored

As mentioned in section 4, it is important to understand the relationship between the DRS and EPR. Especially when EPR schemes target packaging, it is important for the policy makers as well as the industry to understand how DRS and EPR may complement or compete with each other. As the case study in Belgium suggests²⁷¹, complications are to be expected when both systems are to be run in parallel and a deposit system is introduced following a well-established EPR system. However, this complex relationship remains understudied. The only comprehensive work in this regard remains the OECD's report, exploring the interplay between the two instruments which is mentioned in section 4²⁷². While this report offers a very useful overview of the matter, more up to date and in-depth information will be useful, for instance focusing on different MS.

It is important to understand the role of DRS within the overall packaging waste management

The positive impact of DRS is well documented. However, it has to be put in larger context in order to understand the limitations of deposit systems in addressing our waste problem. As also discussed in section 4, more information is needed to establish the real impact of deposit systems in increasing circularity of packaging in general and reducing litter. The main component that is missing is what beverage packaging subject to DRS represents within the overall packaging flows and litter found in the environment. Both will be context-dependant. It is therefore important to develop an understanding of these elements in different countries. Findings suggest that more research is needed in this area and even in cases where there is a serious debate on deposit systems (e.g Belgium) some of these elements are missing.

A more granular understanding of deposit systems at product level is needed

The findings suggest that not all materials are equal when it comes to DRS. As discussed in several sections of this report, policy choices regarding re-use, refill, or simply what type of refund system will be optimal depends on the material targeted. What is preferable for glass might not be the best solution for aluminium beverage packaging. A specific approach to take-back could work well with light materials like plastic but might create issues when glass is involved. Such granularity is mostly absent from the discussions which treat DRS as a blanket measure and a binary 'DRS or not DRS' choice without going into further detail. Future research should aim at differentiating between the materials and to identify optimal solutions for different streams. This would help to improve the existing systems and help the countries planning to introduce deposit systems in the future.

As more and more countries implement DRS, our knowledge on it and its functions become more refined, allowing us to perfect the systems

Deposit systems are constantly evolving, allowing the newer and future systems to incorporate tried and tested elements of the forerunners. Even though context-specific approaches are necessary, and one-size fits all solutions are to be avoided, lessons learned in one country can be very valuable in another one. As more and more countries implement deposit systems, our knowledge on their different aspects, practical experience and impacts increases. This, in turn, allows more refined and evidence-based policy making. With the ever-growing information, it will be possible to have better designed systems, with clearer understanding of risks and challenges under different circumstances.

Conclusions

This report started off as an update of the 2019 ACR+ publication on the deposit return systems for single-use beverage containers but quickly evolved into something bigger. The iterative nature of research led us to explore aspects that were not initially included in the plan. This in turn led to new insights but opened other questions. It is therefore a start, rather than a finished product.

A series of conclusions can be drawn from different sections of this report:

- The global context is pushing policy makers at all governance levels to pursue ever more ambitious waste prevention and management policies.** LRAs are at the forefront of these challenges. Policy tools like deposit systems are proving themselves useful to address some of these. This is increasingly recognised in the EU legislation as well, for instance the revision of the Packaging and Packaging Waste Directive.
- At the same time, the number of countries with a deposit system is constantly growing.** This allows a more refined understanding on their risks and challenges. It will help us to design better systems in the future.
- At the moment, deposit system remains largely focused on recycling single-use beverage packaging.** Few countries incorporate reusables in their deposit system. Their experience shows that a policy mix is needed to overcome the challenges of re-integrating reusable beverage packaging into the markets. Further, a discussion is needed on the role of deposit systems to prevent waste in the first place, through encouraging reusable beverage packaging.
- The relationship between the EPR and DRS remains under-explored.** Available evidence from a limited number of studies suggest that depending on the context, there might be complementarities or conflict between the two systems. This seems to be the case especially when an EPR scheme predates a deposit system. More research would be beneficial for the EU context, since all the MS have an EPR scheme in place for packaging and many of those might be introducing a deposit system in the future.
- Deposit systems have a very important role to play in increasing collection and recycling rates, addressing litter and making the design of certain products more sustainable.** They also have positive impacts on consumer behaviour and encourage cooperation between multiple stakeholders. As such, they also contribute to preparing the ground for other policy instruments which might need such governance structures.
- However, they cannot be a standard, one-size solution to overcome the challenges across different contexts.** They cannot solve the waste problem on their own, nor guarantee circularity. They need to be combined with other instruments in order to provide a holistic approach. This is true for all positive aspects mentioned in this report from collection to recycling, from reuse to sustainable design and reducing litter.
- There are shortages in our knowledge to establish the impacts and limitations of deposit systems.** While the positive impacts of deposit systems are documented, the quantification and magnitude of these are less explored. This is especially the case when one tries to establish the relationship between the shares of beverage packaging falling under a deposit system and overall packaging materials in circulation in each country. The same goes for the occurrence of such beverage packaging in litter.
- Robust, transparent and verifiable data is at the core of the debate on DRS, especially when different policy options are assessed to find the best policy option.** The effectiveness of deposit systems will largely depend on the context in which they operate. They might be extremely valuable in a country where management of beverage packaging waste is only at the beginning stage. However, they might not be the best solution in another one, where the existing system is delivering better results. To make the distinction between different cases and to avoid ‘one size fits all’ solutions, each context should be analysed in-depth with transparent and independent information. It is therefore very important to continue the debate on deposit systems building on reliable and verified data.

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