

UNPACKING DEPOSIT REFUND SCHEMES FOR SINGAPORE

2021-2022



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EXECUTIVE SUMMARY

The Deposit Refund Scheme (DRS), commonly known as the Beverage Container Return Scheme (BCRS), is a key initiative under the Extended Producer Responsibility (EPR) framework. The DRS has been in place in over 40 countries and studies on the programme suggest that it is effective in reducing waste production, increasing the rate of recycling, and stimulating circular economy business activities. The programme when implemented well is highly effective in facilitating the collection of large volumes of empty containers in clean waste streams for high-quality recycling, or refill-or-reuse systems.

As the DRS has been successful across jurisdictions, this paper aims to highlight some of the key learning points that contribute to its success. These learning points serve to inform how Singapore should design its own DRS. As such, the objectives of this paper are summarised as follow:

1. Understand DRS operations in different jurisdictions through European case studies;
2. Identify key challenges and opportunities that European Chambers of Commerce (“EuroCham”) member companies face in other jurisdictions in their roles as producers, recyclers, or buyers of DRS materials; and
3. Analyse key learning points to guide a successful implementation of the DRS in Singapore.

The position paper also highlights key considerations and learning points based on the use cases of DRS by some EuroCham member companies and current industry practices in Europe. Qualitative insights through email interviews with beverage producers and importers with operations in Singapore were conducted to understand the challenges faced by these companies in adopting the DRS in other jurisdictions where they operate in.

The summary of responses lends itself to a thematic analysis of key recommendations which suggests the following:

1. A phased implementation of the DRS should be considered as the gradual exposure to a DRS would help to ease stakeholders into the process.
2. The set-up of DRS would need to account for the convenience of the collection points to support easy deposit of containers.
3. Creating educational materials for consumers on the purposes and scope of the DRS would facilitate the DRS implementation process as consumers have the responsibility of bringing the beverage containers to collection points.
4. Cost considerations of designing and implementing the DRS would need to be managed effectively.
5. Governance and oversight would be necessary to ensure the accountability of the system. This will also help monitor DRS’ impact on national recycling rates and its effectiveness compared to other waste management initiatives in Singapore.



ABOUT EUROCHAM



WHO WE ARE

EuroCham is an independent non-profit organisation governed by members, representing the common interest of the European business community in promoting bilateral trade, services and investments between Europe and Singapore and the region.

WHAT WE DO

EuroCham represents the voice of the European business community in Singapore. We provide our members with a forum for advocacy, networking and information sharing within the European and Singaporean business communities and governmental circles.

OUR NETWORK

EuroCham gives you access to a large networking pool consisting of the bilateral National Business Groups, European companies operating in Singapore, the Singaporean government, the Singaporean business community, the diplomatic circle and key partners across ASEAN.

Our network helps you connect with business leaders from a variety of business industries. We offer a wide range of events such as prestigious gala dinners or luncheons attended by high-level executives like the "European Luncheon", "Schuman Lecture" and the "Awards Gala Dinner". Take part in discussions rounds with experts and business representatives and social networking events such as the "European Networking Nights" that provide your company with a increased corporate visibility.

OUR COMMITTEES

Our committees provide a common European platform to exchange information, discuss common issues businesses face and undertake coordinated initiatives. Through 12 committees we carry out advocacy work and publish position papers to put forward our recommendations.

- | | | |
|--------------------|------------------------------------|------------------------|
| SMART MOBILITY | HUMAN DEVELOPMENT | SUSTAINABILITY |
| DIGITAL ECONOMY | INTELLECTUAL PROPERTY RIGHTS (IPR) | WINE & SPIRITS |
| FINANCIAL SERVICES | REGIONAL TAX | AEROSPACE & AIR TRAVEL |
| HEALTHCARE | SUPPLY CHAIN | PACKAGING |

SETTING THE STAGE

CIRCULAR ECONOMY AND WHAT DOES IT MEAN TO SINGAPORE

Singapore's only landfill, Semakau Landfill, is projected to reach capacity by 2035, leaving the city-state with few options to dispose its waste. This comes at a time when the country is increasing economic activities – Singapore's manufacturing sector is projected to grow 50% by 2030 – to remain globally competitive.¹ This would likely put even more pressure on the city state's waste management system.

The confluence of economic growth and environmental limit likely means that Singapore needs to shift away from a 'linear' waste management approach that may not be sufficient to manage an increasing waste load in the coming years. One potential solution to this issue is to adopt a circular economy approach which creates a closed-loop on materials and waste management to prolong product durability, reusability, and recyclability over a longer period. This will, in turn, minimise waste generation and maximise resource efficiency.

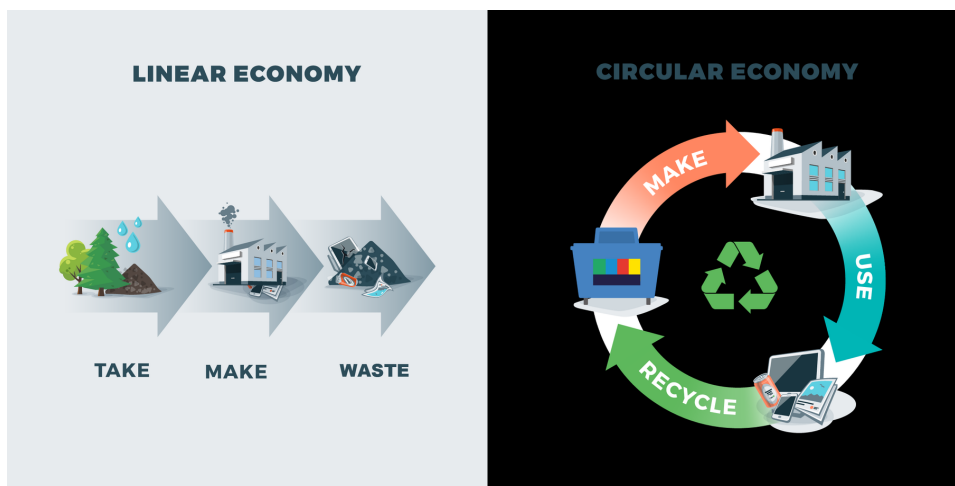


Figure 1: Linear and circular economy

In Singapore, the incineration of waste has been widely practiced as it remains the most efficient waste treatment method to reduce large quantities of waste. However, the process of incineration is also known to pose a threat to public health and the environment, contrary to a waste hierarchy that prioritises reducing, reusing, and recycling.

Therefore, to realise Singapore's larger vision of becoming a Zero Waste Nation, it is imperative to tap on eco-modulation waste management opportunities that are aligned to the Circular Economy principles such as the Extended Producer Responsibility (EPR), Deposit Refund Schemes (DRS), and other regulatory schemes. The circular economy model is also helpful for businesses looking to embrace sustainability while capturing value through growth and capital.

¹ 10-year plan for Singapore manufacturing to grow 50% by 2030: Chan Chun Sing. The Straits Time. Retrieved from <https://www.straitstimes.com/business/economy/10-year-plan-for-singapore-manufacturing-to-grow-50-by-2030-chan-chun-sing>

SINGAPORE'S PRIORITY WASTE STREAMS

As part of its Zero Waste Masterplan, Singapore aims to close three resource loops, namely, food, electrical and electronic equipment, and packaging (including plastics). These priority resource loops were identified due to the significant generation of such wastes, accompanied with low recycling rates. To properly manage these waste streams, the Singapore government introduced a landmark legislation in 2019, the Resource Sustainability Act, which comprises of the EPR Framework for e-waste and packaging waste as well as other management initiatives for each of the three priority waste streams.

A key waste stream to monitor is packaging. Packaging waste has predominantly experienced significantly lower overall recycling rates, which undergirds the need to improve the current waste management mentality. Apart from a low recycling rate, other challenges facing Singapore when it comes to managing packaging waste include:

1. Difficulty in segregating materials: plastics cover a wide range of materials with similar chemical and physical properties which makes the segregation of plastic difficult, and
2. High level of contamination: plastic recovered from household waste streams is often combined with other materials or contaminated with organic material; making the separation and recycling difficult.

RESOURCE SUSTAINABILITY ACT

Under the Resource Sustainability Act, it is mandatory to report packaging data and 3R plans² for producers of packaged products and retailers. This is an extension to the current waste reporting framework where large malls and hotels are required to disclose their waste data.

Under the new regulations, producers of packaged products and supermarkets with an annual turnover of more than \$10 million will be required to disclose data on the packaging that they put on the market and their 3R plans for packaging. The mandatory packaging reporting framework will also lay the foundation for an EPR framework to manage packaging waste. This ensures producers are responsible for the collection and recycling of the materials they use to package their products.

Additionally, the National Environment Agency (NEA) in Singapore will also be implementing a DRS for beverage containers by 2022.³ The DRS is an extension to, and a key initiative under the packaging EPR regulation, which will be a critical step targeted at improving the recovery rates (i.e. reusing and recycling) of used beverage containers in Singapore.



² 3R plan" means a plan by a producer to reduce, re-use or recycle packaging in Singapore

³ NEA To Implement Deposit Refund Scheme (DRS) By 2022. National Environment Agency. Retrieved from <https://www.nea.gov.sg/media/news/news/index/nea-to-implement-deposit-refund-scheme-as-first-phase-of-extended-producer-responsibility-framework>.

DRS DEVELOPMENTS IN SINGAPORE



Under the EPR, Singapore has announced the intention to implement a DRS for beverage containers by 2022 as part of Singapore's sustainability agenda. Following the legislation in 2022, there will be a transition period before the implementation of DRS in 2023, which will allow consumers and the industry to make the necessary adjustments.

As a global trading hub, Singapore is primarily involved in the distribution, use and reuse, and end-of-life packaging. Singapore's move from a Linear Economy towards a Circular Economy provides strategic opportunities to position itself within the closed-loop to contribute most effectively. This brings our focus to manage waste-at source through careful review of packaging material imported into Singapore, which can, in turn, raise the proportion of packaging material suitable for DRS and spur companies to reduce the amount of packaging used. Consideration should also be given to the management of imported beverage products and interregional arbitrage.

As part of the Citizen's Workgroup on Reducing the Excessive Consumption of Disposables' initiative, under the banner of #RecycleRight, a range of recommendations was co-created. This ranges from policy interventions to educating the public on environmental sustainability.⁴ In late 2019, a pilot DRS was launched: Recycle N Save initiative was implemented by NEA and F&N Foods from October 2019 to December 2020. This initiative saw almost 200 containers collected from each reverse vending machine (RVMs) daily, 4 times that of a smaller-scale pilot scheme in 2018. The 2019 pilot of 50 machines⁵ island-wide collected a total of almost 3.65 million containers. These RVMs accept empty and clean plastic bottles and aluminium cans. In 2021, as an expansion of the pilot programme, ALBA Q&H Smart City has also deployed reverse vending machines (RVMs) in Jurong.

⁴ Eight Recommendations from Citizens' Workgroup On Reducing Excessive Consumption Of Disposables Supported And To Be Further Developed. NEA. Retrieved from <https://www.nea.gov.sg/media/news/news/index/eight-recommendations-from-citizens-workgroup-on-reducing-excessive-consumption-of-disposables-supported-and-to-be-further-developed>
⁵ Reverse Vending Machines. NEA. Retrieved from <https://www.nea.gov.sg/our-services/waste-management/reverse-vending-machines>



UNDERSTANDING DEPOSIT REFUND SCHEMES

Despite the industry facing headwinds - from trade tensions, currency volatility, and economic uncertainty - the “ready-to-drink” market has seen significant growth over the last few years on the back of convenience, and is projected to grow 41% between 2019 and 2024.⁶ The rise of pre-packaged beverages would mean an increase in aluminium, plastic, and glass waste, which would pose greater challenges to global waste management systems.

While aluminium, PET, and glass are theoretically 100% recyclable,⁷ most countries experience significantly low recycling rates of these materials, amid indiscriminate disposal by consumers, the contamination of materials in the process of recycling, and the lack of appropriate recycling infrastructure. This is where a DRS can be helpful.

A DRS can cover beverage containers such as metal cans (e.g. aluminium, steel), plastic bottles (e.g. PET, PP), beverage cartons, glass bottles, and different types of pre-packaged beverages such as alcohol, soft drinks, dairy, juice, water, and other ready-to-drink beverages. Specific requirements will be imposed on producers of these pre-packaged beverages to facilitate the implementation of the DRS. This idea is also strongly supported by governments across the world amid the urgency to help manage the growing amount of waste generated by ‘ready-to-drink’ beverage industry.

HOW DOES THE DEPOSIT REFUND SCHEME WORK

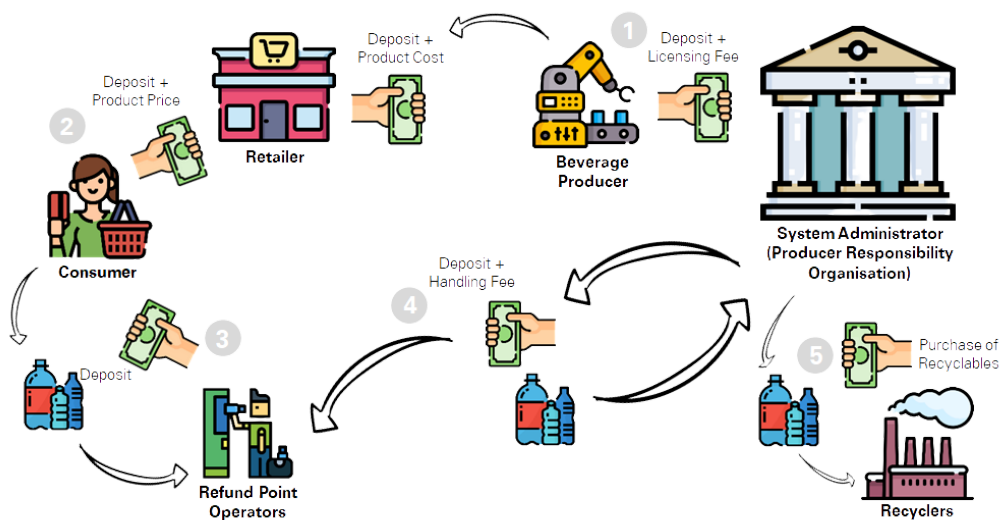


Figure 2: Deposit Refund Scheme

A conventional DRS comprises of a refundable deposit that is paid by consumers when they purchase a product or beverage that is covered by the scheme. When consumers return the product or beverage container at a return/ recycling point, the deposit that they have paid would be refunded to them. A centralised DRS is usually managed by a System Administrator or a Producer Responsibility Organisation (PRO). This organisation oversees the various processes of the DRS, from licensing of producers, collecting or hiring third-party contractors to collect returned products/ beverage containers and selling them to appropriate recyclers.

⁶ The IWSR is the leading source of data and analysis on the beverage alcohol market.

⁷ What to Recycle. Towards Zero Waste. Retrieved from <https://www.towardszerowaste.gov.sg/recycle/what-to-recycle/>

A DRS requires sources of funds to pay for operating costs and the hiring of third-party contractors. These funds are derived from sources such as licensing fees that producers pay to the System Administrator to register their products/ containers for the scheme, the sale of returned beverage containers material to recyclers, and the administration of unclaimed deposits when consumers fail to return their products/ beverage containers.

In summary, there are four main sources of funds within the DRS:

1. the deposit from consumers (this has to be returned to consumers);
2. the licensing fee paid by producers to the system operator, which then becomes a handling fee for retailers;
3. the system administrator’s earnings from the sale of collected materials, which can be used to cover operational costs; and, finally,
4. unclaimed deposits, which arise when a consumer does not return empty containers.



HOW DOES THE DEPOSIT REFUND SCHEME WORK

Stakeholder	Roles and responsibilities
Consumers	When a consumer buys the product, they pay a small deposit in addition to the product price. The deposit serves as an incentive to return the products later. This deposit is forwarded to the system administrator via the beverage producer, who received the deposit from the retailer. When the consumer returns their empty container, their deposit is refunded to them.
Retailers	Retailers help to collect deposits from consumers, which are passed on to the beverage producer. Retailers can also act as refund point operators.
Beverage Producer	A beverage producer would have to pay a licensing fee to the system administrator to join the scheme. The beverage producer passes on the deposit to the system administrator.
System Administrator	A system administrator, which could be a non-profit organisation, is responsible for managing the whole DRS. The system administrator receives the deposit paid by the consumer from the beverage producer. This deposit plus additional handling fee would then be passed to the refund point operators to cover any costs incurred. The system administrator would then arrange for the returned empty beverage containers to be sent on to recyclers and turned into new materials.
Refund point operators	Refund point operators are responsible for returning the refund back to consumers who have returned their empty containers. This can be done over the counter or using a reverse vending machine (RVM).

KEY TENETS OF HOW DRS REDUCE WASTE GLOBALLY

The objective of DRS is to reduce waste and increase recycling quickly over a short period of time. The key benefits are summarized below:

- **DRS is a proven tool to collect high quantities of beverage containers for reuse and high-quality recycling.**

In jurisdictions where the scheme has been implemented for more than 10 years, recycling rates have stabilized at 80-90% (mostly in European countries).⁸ In jurisdictions where the scheme has been implemented for less than a decade, recycling rates were boosted and are continually rising. The UK Environmental Audit Committee found that countries with DRS tend to recycle up to 95% of their plastic bottles.⁹ DRS has varying legislation globally, with the majority including small refund for the return of PET, glass, and aluminum containers.¹⁰

- **Create awareness on segregation and helps add value to waste.**

The DRS helps create and improve consumer awareness on waste segregation (i.e. what can be recycled and what cannot be recycled). It also shifts the responsibility for waste collection to consumers rather than retailers and producers through the deposit-based scheme.¹¹

By implementing a paid-by-consumer deposit system, this system could also help reduce littering, reducing the contamination of the environment from packaging waste.

- **Can also be expanded to include bigger scope of materials and other types of packaging.**

Research has shown that a broad DRS scope can help boost recycling rates as it prevents confusion from consumers and includes more producers in the scheme. By increasing the following three aspects, - namely, beverage category, container material type, and container size - the performance of DRS can be improved. This can be seen in an initiative to expand DRS's scope in 2009 to include more beverage categories. Subsequently, the amount of PET plastic containers collected in the system doubled.¹²

Studies on DRS further suggest that the scheme can be expanded to include other types of packaging, such as glass, steel, and paperboard drink containers,¹³ to curb wastage and increase the reusability of materials.

⁸ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. ReLoop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>

⁹ Plastic bottles: Turning Back the Plastic Tide. Parliament UK. Retrieved from <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/339/33908.htm#footnote-040>

¹⁰ Global deposit return schemes. Edie. Retrieved from <https://www.edie.net/blog/global-deposit-return-schemes/6098359>

¹¹ National Center for Biotechnology Information. US. Rethinking and optimising post-consumer packaging waste. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7509574/>

¹² Key elements of high-performing deposit return systems. TOMRA. Retrieved from <https://www.tomra.com/en/collection/reverse-vending/case-studies/drs-1-broad-scope-beverages-containers>

¹³ List of beverage containers included in the container deposit scheme. Government of Western Australia. Retrieved from https://dwer.wa.gov.au/sites/default/files/WA_CDS_beverage_container_list.pdf#:~:text=List%20of%20beverage%20containers%20included%20in%20the%20container,containers%20between%20150m%20and%203L%20will%20be%20eligible.

GLOBAL CASE STUDIES AND KEY LEARNING POINTS

The figure below shows the high beverage container return rate across the case study countries.

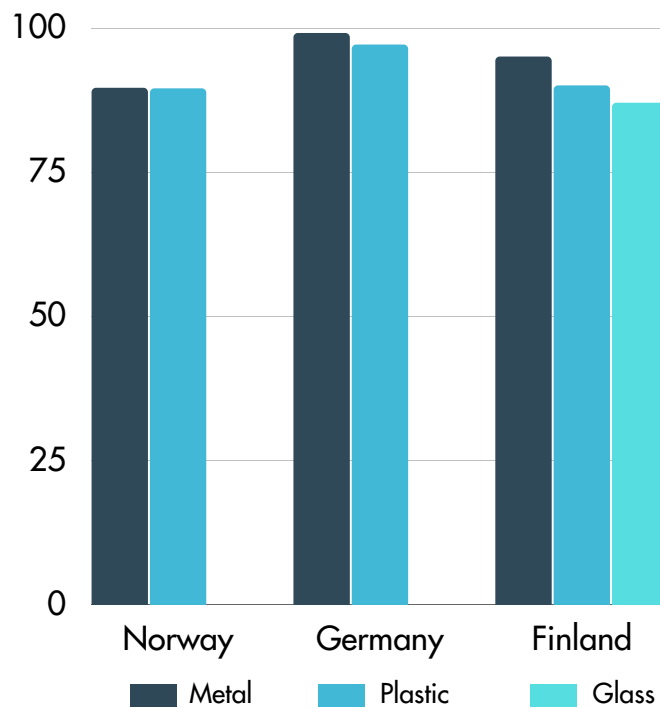
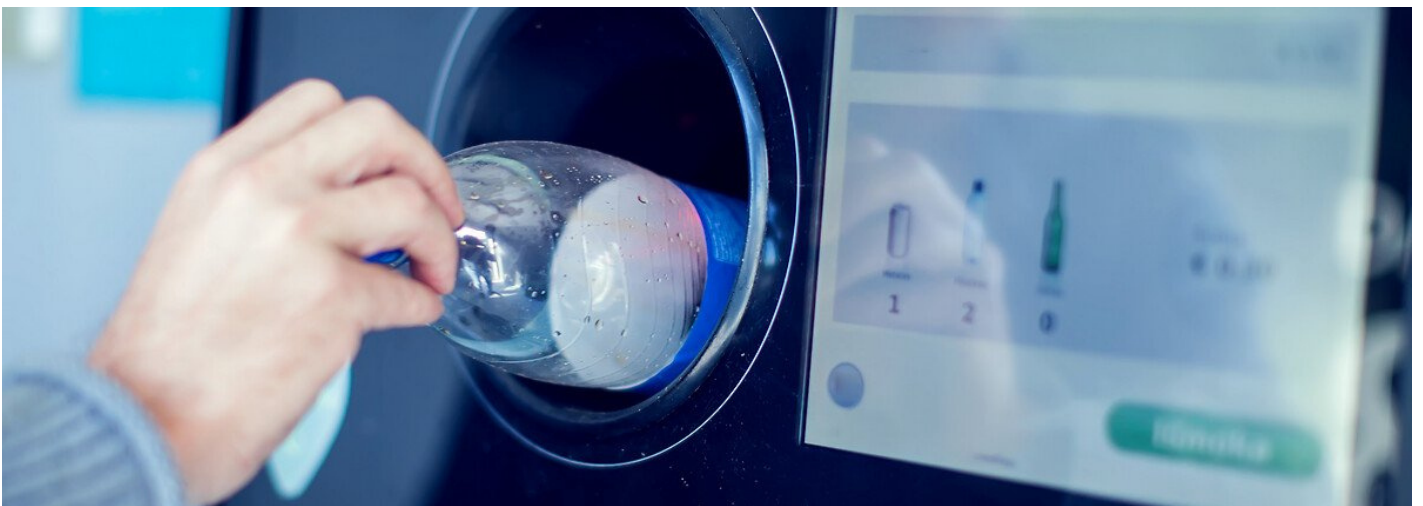


Figure 3: Return rates in various jurisdictions ¹⁴

The next section highlights case studies from three countries due to its high DRS success rate over a long period of time.

¹⁴ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. Reloop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>



NORWAY



Norway's Deposit Refund Scheme has an overall return rate of an 89.5% for metals and 89.4% for plastics in 2019.¹⁵ Using tax and the Deposit Refund Scheme, Norway was able to achieve a recycling rate of 97% for plastic bottles, and more than 92% of the recycled plastic can be used to make new plastic bottles.¹⁶ Norway's plastic recycling policy has been broadly based on incentives and penalties without heavy reliance on bans and restrictions. Singapore shares similarities with Norway in terms of the reliance on legislation to effectively implement public schemes; and can learn from Norway's legislative approach to mandate producer responsibility.

Norway established a producer responsibility organisation, Infinitem, to operate the collection and recycling of plastic waste. Producers are required to have bottle designs certified by the PRO to become a member of Infinitem. The beverage containers require an Infinitem label to indicate that it is eligible for a refund. This standardisation of recycling process has helped to increase the efficiency of the recycling process.

Population size	5.3 million	
Legislative Framework	Mandate	Regulations relating to the Recycling of Waste, in response to the EU Directive for Packaging and Packaging Waste
	Enacted	1997
	Implemented	1999
	Last updated	2018 (Increase in deposit prices)
	Authority	Norwegian Environment Agency
	Target	Norway implemented the Beverage Packaging Tax in 1994 ¹⁸ which was instrumental in ensuring the success of DRS. The Beverage Packaging Tax consists of 2 parts – the first is a basic tax for all single-use packaging; the second is an environmental tax aimed at increasing the return rate of packaging material. The environmental tax rate decreases as return rate increases, and when return rate is above 95%, the tax ceases to apply. ¹⁹

¹⁵ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. Reloop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>

¹⁶ Can Norway help us solve the plastic crisis, one bottle at a time? The Guardian. Retrieved from <https://www.theguardian.com/environment/2018/jul/12/can-norway-help-us-solve-the-plastic-crisis-one-bottle-at-a-time#:~:text=Maldum%20is%20the%20chief%20executive,turned%20back%20into%20drinks%20bottles.>

¹⁷ <https://infinitem.no/producers/>

¹⁸ Nordic regulatory framework and its effect on waste prevention and recycling in the region. Nordic Council of Ministers. Retrieved from <http://norden.diva-portal.org/smash/get/diva2:1304371/FULLTEXT01.pdf>

¹⁹ Nordic regulatory framework and its effect on waste prevention and recycling in the region. Nordic Council of Ministers. Retrieved from <http://norden.diva-portal.org/smash/get/diva2:1304371/FULLTEXT01.pdf>

Programme scope	Material	Plastic (predominantly PET, HDPE), metal (aluminium/tinplate) for beverages (not food or household cleaning)
	Beverage Type	All (the regulation does not regulate the type of beverage product covered by DRS)
	Excluded	Glass

Deposit and Fee Structure

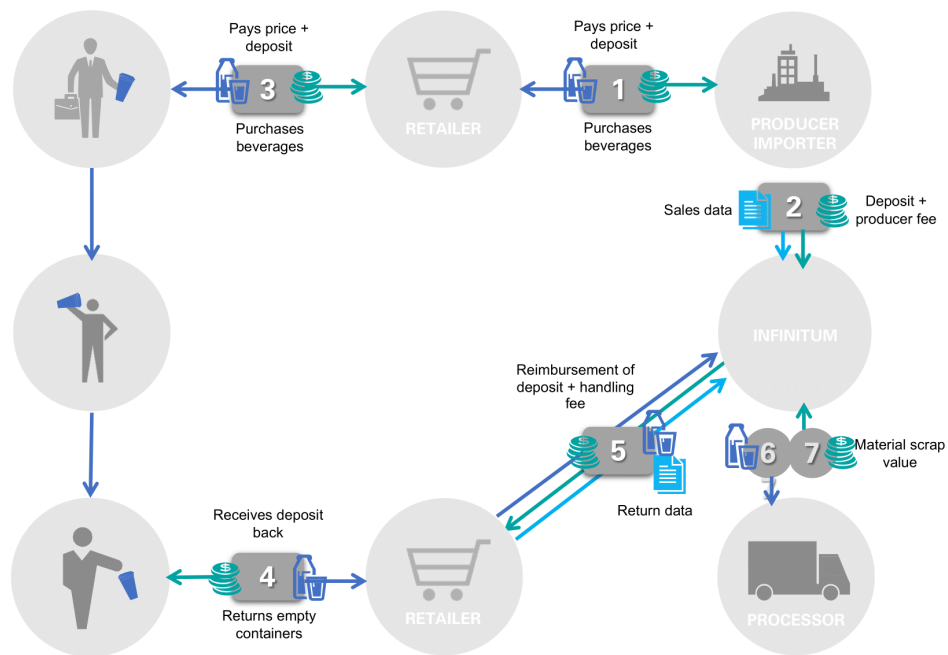


Figure 4: Money Material Flow in Norway's DRS²⁰

Deposit value	Plastic, metal ≤ 0.5 L: 2 NOK, ²¹ SGD\$ 0.31 Plastic, metal > 0.5 L: 3 NOK, SGD\$ 0.46 ²²
Unredeemed deposits	Infinitum

²⁰ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. ReLoop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1-DEC2020.pdf>

²¹ The Norwegian krone (NOK) is the official currency of Norway

²² Chapter 6: Take-back systems for beverage packaging. Norwegian Environment Agency. Retrieved from <https://www.environmentagency.no/legislation/waste-regulations/chapter6-take-back-systems-for-beverage-packaging/>

	Handling fees (2020)	<p>RVM with compaction:</p> <ul style="list-style-type: none"> • Plastic: 0.25 NOK • Metal: 0.20 NOK <p>Manual or RVM without compaction:</p> <ul style="list-style-type: none"> • Plastic: 0.10 NOK • Metal: 0.05 NOK
	Producer fees (2020)	<ul style="list-style-type: none"> • Aluminium: 0.00 NOK • Steel: 0.21 NOK • PET: 0.18 NOK • HDPE: 0.18 NOK <p>In addition to the fee above, producers interested to join the Infinitum system are required to pay a one-time registration fee and a fee for each new packaged product placed in the market.</p>
System operator	Clearing system	Centralised
	System Operator & Administrator	Infinitum
	System finance	Material revenues, unredeemed deposits, producer fees Established in 1996 under the name of Norsk Resirk, Infinitum began operations three years later and is owned by the beverage producers and Norwegian grocery producers.
Redemption system	Return-to-Retail	All retailers selling deposit-bearing beverages (i.e. with the deposit mark) are required to take-back empty containers from consumers and return the deposit in cash. ²³ Retailers must register with Infinitum but can decide on how to organise the collection on their premises – either through RVMs or manual collection. There are approximately 3,700 RVM collection points in Norway (97% of total collection) and 12,000 manual collection points (3% of total collection)
	Material owner	Infinitum

²³ Chapter 6: Take-back systems for beverage packaging. Norwegian Environment Agency. Retrieved from <https://www.environmentagency.no/legislation/waste-regulations/chapter6-take-back-systems-forbeverage-packaging/>

Key learning points:

Governance

Apart from mandating producer responsibility through legislative acts, Norway implements an environmental tax on packaging that has a return rate of below 95%.²⁴ This incentivizes producers to continuously promote the recycling of their beverages. While other schemes like the one in Finland also have a beverage packaging tax in place, exemptions are provided to producers that register for the schemes, notwithstanding return rates.

Tax on packaging applies to all beverage containers produced (including unsold goods), thereby incentivizing producers to produce more appropriate quantities and reduce waste.²⁵

Take-back policy of stores

Mandating stores to collect their empty containers for cash in the store itself further incentivize consumers to participate in the DRS. This is because of the immediate cash consumers receive and the convenient placement of the RVMs.

GERMANY



Among the many initiatives that have been implemented across the world, Germany²⁶ has one of the largest and most successful DRSs in the world with a 98% total return rate, 99% for metals, and 97% for PET in 2019.²⁷

In 2003, Germany implemented a DRS with Deutsche Pfand System GmbH (DPG) as the main operator of packaging return. Producers and importers of beverages, which are called first distributors, are required to register with DPG. Before the sale of compulsory-deposit drinks packaging, a deposit marking “DPG Marking” and an article number (GTIN) for exclusive use on the German

market must be on the packaging. For each packaging, the first distributors enter the article number into the database of the system operator.²⁸ When the beverages are distributed on the market, retailers are obliged to impose a deposit on them. The deposit cost is usually passed down to consumers by the retailers. First distributors retain that deposit and refund it back to the retailers after consumers return the packaging to the retail shops.

Population size

83.7 million²⁹

Legislative Framework

Mandate

German Packaging Act (VerpackG)
(replaced the Packaging Ordinance, VerpackV)

²⁴ Beverage Packaging. The Norwegian Tax Administration. Retrieved from <https://www.skatteetaten.no/en/business-and-organisation/vat-and-duties/excise-duties/about-the-excise-duties/beverage-packaging/>

²⁵ Spørsmål om pant. Infnitum. Retrieved from <http://infnitum.no/sporsmal-om-pant/>

²⁶ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. Reloop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>

²⁷ Deposit Return Program. Plastic Smart Cities. Retrieved from <https://plasticsmartcities.org/products/deposit-return-program>

²⁸ Tasks and obligations. DPG. Retrieved from <https://dpg-pfandsystem.de/index.php/en/function-of-the-dpg-system/drinks-manufacturers-and-importers/tasks-and-obligations.html>

²⁹ Germany Population. Worldometers. Retrieved from <https://www.worldometers.info/world-population/germany-population/>

Legislative Framework	Enacted	1991
	Implemented	2003
	Last updated	2019
	Authority	Ministry of Environment
	Target	<p>In February 2020, the city of Tübingen decided to introduce a packaging tax. The tax will apply from January 2021 to disposable packaging, disposable dishes and disposable cutlery for food and drinks intended for immediate consumption, either on-the-spot or take-away.</p> <p>Mandatory deposit: From 2022, a deposit will also be mandatory on all disposable plastic beverage bottles as well as on all beverage cans. A deposit will then also apply to all beverage cans. Only milk or milk products will be subject to a transitional period until 2024.</p> <p>Recycling quota: From 2025, PET beverage bottles will have to consist of at least 25 per cent recycled plastic. From 2030, this quota will increase to at least 30 per cent and will then apply to all single-use plastic bottles, except for one-way plastic beverage bottles where the body of the bottle is made of glass or metal and only the caps, lids, labels, stickers or wrappers are made of plastic. Producers can choose between meeting the quota for each individual bottle or achieve the quota on an aggregate basis over a year³⁰</p>
Programme Scope	Material	Plastic (predominantly PET), metal (aluminium), glass
	Beverage Type	Containers 100 ml to 3 L Water, beer and mixed drinks containing beer (including alcohol-free beer), carbonated/non-carbonated soft drinks, mixed alcohol drinks
	Excluded	Milk products (>50% milk content), fruit and vegetable juices, products intended for child/baby consumption, wines, liquors, containers smaller than 100 ml or larger than 3 L, cartons, stand-up pouches

³⁰ Plastics and packaging laws in Germany. CMS. Retrieved from <https://cms.law/en/int/expert-guides/plastics-and-packaging-laws/germany>

Deposit and Fee Structure

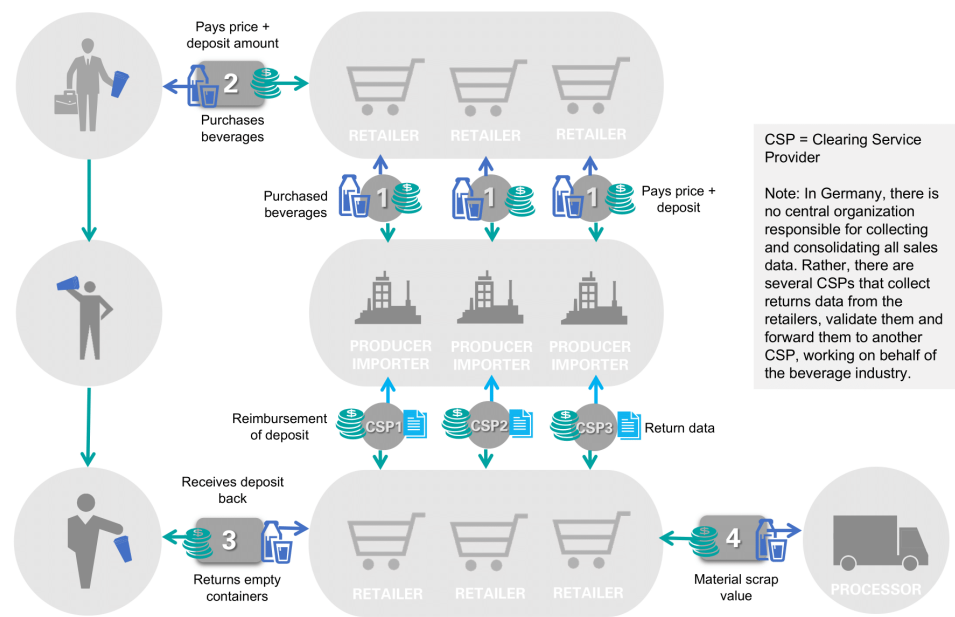


Figure 5: Money Material Flow in Germany's DRS

Deposit value	Plastic, aluminium: €0.25 ³¹ Glass: €0.08-€0.15 ³² The price discrepancy is in place to help make single-use containers (i.e. plastic bottles, aluminium cans) more expensive and less attractive, while promoting containers that can be reused (i.e. glass bottles)
Unredeemed deposits	Unredeemed deposits are kept by producers and retailers to use on their own brands (i.e. private/ white label)
Handling fees	None
Producer fees	-
Clearing system	Centralised
System Operator	Industry and retailers (in the case of private labels)

³¹ Deposit return program. Plastic Smart Cities. Retrieved from <https://plasticsmartcities.org/products/deposit-return-program>

³² Has Germany hit the jackpot of recycling? The jury's still out. The Guardian. Retrieved from <https://www.theguardian.com/world/2018/mar/30/has-germany-hit-the-jackpot-of-recycling-the-jurys-still-out>

	System Administrator	Deutsche Pfandsystem GmbH (DPG) ³³
	System finance	Unredeemed deposits, material revenues, membership fees (every member of the DPG is required to pay a small annual fee which is dependent on the size of its operations).
Redemption system	Return-to-Retail	<p>Retailers and other final distributors of beverage containers are obliged to accept the returned beverage containers from consumers. However, the retailers and distributors are only required to collect the same type of beverages that they sell, regardless of whether the packaging in question was sold by them or by another retailer (i.e. a retailer that only sells PET bottles is not obliged to take back aluminium or glass containers, but must accept all PET bottles regardless of their size or brand).</p> <p>Retailers with shops of a surface area of less than 200 m² are exempted from this obligation. They are only required to take back the packages of the products they are selling.³⁴</p> <p>Retailers have the option of accepting containers via RVMs or manually (collection is approximately 85% automated and 15%³⁵ manual). There are approximately 135,000 collection locations.</p> <p>The RVM scans the deposit return and produces a receipt that can be exchanged for cash or used for future purchases.³⁶</p>
	Material owner	Retailers

Key learning points:

Unclaimed deposits

Retailers and the beverage industry bear the costs of the scheme and in return can keep any unclaimed deposits. They are able to make a profit from the 1-3% unreturned and/or non-recyclable bottles. Since the introduction of the scheme, it is estimated that producers have profited more than €3 billion from bottles that were thrown away and not returned into the system.³⁷ As a result, manufacturers and drink producers are not sufficiently incentivised to improve the recyclability of their products.

³³ DPG is more of a standard setting organisation than a system administrator. Established in 2005, Deutsche Pfandsystem GmbH (DPG) is a not-for-profit company that was founded to implement and organize the legally prescribed obligation of the DRS for one-way beverage containers. Its responsibilities involve operating a central database for deposit clearing and the management of the marking standards related to the deposit label (DPG security mark and barcode identification number). The company's shareholders include the German Retail Federation (50 %) and the Federation of German Food and Drink Industries (50 %).

³⁴ Smaller shops do not need to take back the packaging that they do not sell.

³⁵ How the deposit return scheme was introduced in Germany. ECoNomia. Retrieved from <https://www.economia.rs/how-the-drs-for-packaging-was-introduced-in-germany/>

³⁶ Has Germany hit the jackpot of recycling? The jury's still out. The Guardian. Retrieved from <https://www.theguardian.com/world/2018/mar/30/has-germany-hit-the-jackpot-of-recycling-the-jurys-still-out>

³⁷ Has Germany hit the jackpot of recycling? The jury's still out. The Guardian. Retrieved from <https://www.theguardian.com/world/2018/mar/30/has-germany-hit-the-jackpot-of-recycling-the-jurys-still-out>

Importance of stakeholder buy-in

The German model has shown that the implementation of DRS requires the buy-in from many stakeholders and not just the government. Producers, retailers, and consumers all play a key role for the success of the system. There needs to be an ecosystem in place for the continuous flow of bottles in the system.³⁸

FINLAND



Finland³⁹ has consistently achieved high rates of return for its deposit refund schemes at 95% for cans, 90% for PET-bottles, and 87% for glass bottles in 2019.⁴⁰

In 1952, DRS was introduced in Finland with voluntary participation by producers and importers. Suomen Palautuspakkaus Oy (PALPA) was established in 1996 to administer the return system.⁴¹ PALPA is 50% owned by retailers and 50% owned by the beverage industry.⁴² PALPA is a non-profit and fees are set at a rate equal to the costs of running the system. Participation in the return system is not mandatory, however the packaging tax for certain

beverages are exempted if the company or the products are registered in the return system. Manufacturers and importers of beverage packages participating in the PALPA return system pay a membership fee and package-specific recycling fee. The fees finance the reverse vending machines and administration of the system, as well as the transport and sorting costs of the materials.

Consumers identify deposits under PALPA by the deposit marking on the package, which also indicated the deposit value (except for glass bottles that do not have a marking, which can be checked from the purchase receipt, shelf marking in the store, or a tool to check the deposit of a product on PALPA's website). Consumers can return their beverages at stores and RVMs which would then pay the deposit to the consumer.

Population size	5.5 million	
Legislative Framework	Mandate	Decree 526/2013 (Government Decree on a return system for beverage containers), Waste Act 646/2011, and Act on Excise Duty on Certain Beverage Packaging 2037/2004

³⁸ Germany's pioneering bottle deposit scheme has lessons for the EU. Euractiv. Retrieved from <https://www.euractiv.com/section/circular-materials/news/germanys-pioneering-bottle-deposit-scheme-has-lessons-for-the-eu/>

³⁹ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. ReLoop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>

⁴⁰ Global deposit book 2020. An overview of deposit systems for one-way beverage containers. ReLoop Platform. Retrieved from <https://www.reloopplatform.org/wp-content/uploads/2020/12/2020-Global-Deposit-Book-WEB-version-1DEC2020.pdf>

⁴¹ The Finnish Deposit-Refund System: Environmental Economics A. Retrieved from <https://canvas.disabroad.org/courses/4391/pages/the-finnish-deposit-refund-system>

⁴² Deposit Refund System (and Packaging Tax) in Finland. Eonomia. Retrieved from <https://ieep.eu/uploads/articles/attachments/9d526526-d22b-4350-a590-6ff71d058add/FI%20Deposit%20Refund%20Scheme%20final.pdf?v=63680923242>

Legislative Framework	Enacted	1994
	Implemented	Cans: 1996 PET: 2008 Glass: 2011
	Last updated	2021
	Authority	Ministry of Environment
	Target	Recycling of 90% by weight

Programme Scope	Material	Plastic (predominantly PET), metal (aluminium), glass
	Beverage Type	Almost all soft drinks; water; beer; cider; sport drinks; juice and beverage concentrates; liquor / spirits / wine sold by Alko
	Excluded	Milk

Deposit and Fee Structure

How the recycling system works – circulating deposit⁴³

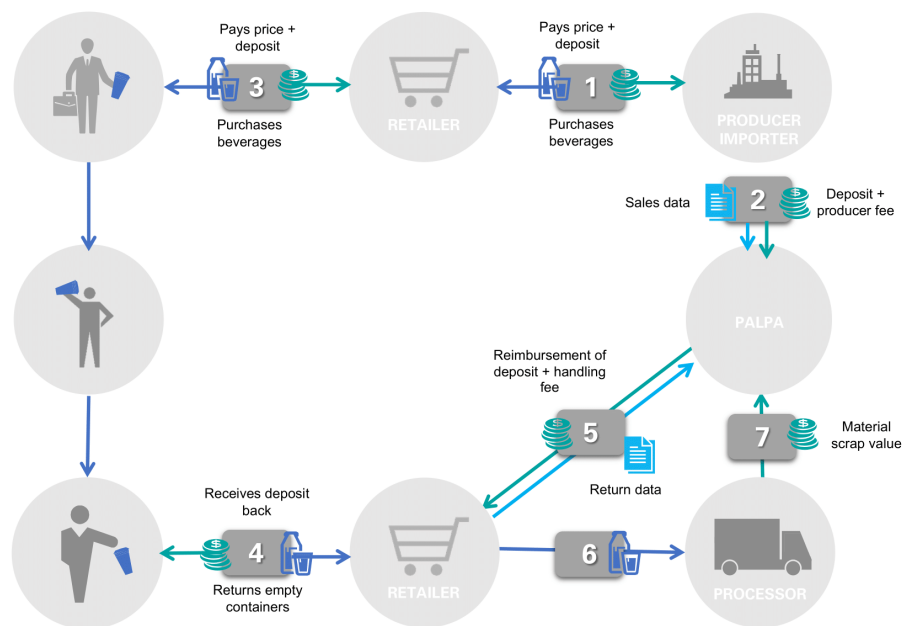


Figure 6: Recycling system by PALPA

⁴³ <https://www.palpa.fi/beverage-container-recycling/deposit-refund-system/#return-rates>

Deposit and Fee Structure	<ol style="list-style-type: none"> 1. The manufacturer or importer of the beverage pays PALPA the deposit for the product delivered for sales 2. The manufacturer or importer of the beverage delivers the product for sales in a shop which pays the deposit to the manufacturer or importer of the beverage 3. The consumer pays the deposit when buying the product and receives it back when returning the empty package to a returning point 4. The return point and the processing plant report the number of returned packages transported to PALPA 5. PALPA pays the deposits to the return points in accordance with the number of reported returned packages 	
	Deposit value	Plastic < 350 ml: Euros 0.10 Plastic 350 ml to 999 ml: Euros 0.20 Plastic ≥1L: Euros 0.40 Metal: Euros 0.15 Glass: Euros 0.10
	Unredeemed deposits	Suomen Palautuspakkaus Oy (PALPA)
	Handling fees (2020)	Manual collection or RVM without compaction: Plastic and Metal: Euros 0.01930 RVM with compaction: Plastic: Euros 0.02850 Metal: Euros 0.023 One-way Glass: 0.01930
	Producer fees (2020)	Plastic: Euros 0.017 Metal: Euros 0.005 Glass: Euros 0.09 – 0.14
System Operator	Clearing system	Centralised
	System Operator and Administrator	PALPA is a not-for-profit company responsible for managing the DRS. Its responsibilities include the collection, recycling and/or reuse of the packaging covered by the system, managing the administration of the deposits, the development of different return systems for different packaging types and any communications concerning their operations. The company is owned by retailers (50%) and beverage producers (50%).

	System finance	Material revenues, unredeemed deposits, producer fees
Redemption system	Return-to-Retail	Any retailer selling deposit-bearing beverage containers is obliged to take back the empty containers. The law includes an exemption, whereby small retailers can refuse to accept beverage packaging if the volume is disproportionately high in relation to its size. As of 2016, around 4,000 RVMs were in operation with 5,000 retail collection points, and an additional 9,000 HORECA recycling points. Collection system is 95% automated and 5% manual.
	Material owner	PALPA

Key learning points

Recycling of packaging

When the materials of beverage packages are efficiently recycled and reused to make new products, we can conserve natural resources and keep our environment clean. For instance, the energy required to make an aluminium can from recycled material is only 5% that of making a can from new materials.

Phased implementation of DRS

The Finnish DRS consisted of many key developments across 20 years. In 1994, packaging tax was introduced, one-way cans DRS was launched in 1996, one-way PET bottles scheme was launched in 2008 and one-way glass bottles programme was launched in 2011. This gradual increase in DRS scope over the years has helped to ease the introduction of the system for the beverage industry and retailers.

Stakeholder engagement

The DRS in Finland is not a state-run programme. Instead, it is implemented almost entirely by civil society, with close co-operation between the beverage industry and retailers. Before the introduction of packaging tax in 1994, the government issued consultation on packaging tax in 1992. Retailers and industry were heavily involved in the conversations around the design and details of the DRS by PALPA. Academics, reverse vending machine manufacturers and the Government were also involved in the discussions at all stages, and their involvement has helped to obtain their buy-in to the system.⁴⁴

⁴⁴ Deposit Refund System (and Packaging Tax) in Finland. Eonomia. Retrieved from <https://ieep.eu/uploads/articles/attachments/9d526526-d22b-4350-a590-6ff71d058add/FI%20Deposit%20Refund%20Scheme%20final.pdf?v=63680923242>

OUTLOOK ON DRS' IMPACTS ON EUROPEAN BUSINESSES IN SINGAPORE

(input based on email interviews)

In the following interview analysis, we evaluate the practices of EuroCham member companies with operations in Singapore, drawing insights from their relevant industry experiences with DRS in other jurisdictions outside of Singapore. This analysis further provides an examination of the DRS' impacts on their business. While DRSs around the world have seen a lot of support, the schemes also have a lot of detractors. Therefore, it is important to consider these insights and recommendations when implementing the system in Singapore.

Email and virtual interviews were carried out from September to October 2021, with European businesses across the beverage industry (including the Beer and Wine & Spirits industry).

The questions include the following:

- Relevant experiences with deposit refund schemes for beverage containers in other jurisdictions outside Singapore
- Business impact, scope, and cost that comes with DRS
- Operational management of the scheme, including measures in place to inform the relevant stakeholders
- Anticipated opportunities and challenges for DRS in Singapore
- The company's container data, broken down by container size and type of beverage.

All virtual interview questionnaires were analysed sequentially; however, both the structure and length of the interview lend themselves to a thematic analysis of findings. Presented below are the key findings from the summary of responses analysed, ordered by theme.

1. Respondents agreed that the proposed principles of a DRS would have a positive impact in Singapore. For instance, a DRS would incentivise consumers to recycle containers. In Singapore, where packaging waste (including plastics) has been identified as one of the nation's three priority waste streams, implementing the scheme has the potential to generate high recycling rates, as well as reduce littering and waste production.
2. While introducing a DRS would lead to a reduction in waste, respondents also agreed that there is inadequate expertise knowledge and practical experiences among Singapore companies within the industry to ensure an effective setup and management of a DRS. There may be a need to bring in expertise from overseas
3. There is an urgency to educate consumers on the costs and benefits of the scheme, as well as the types of materials and containers which could be recycled as part of the scheme. If these topics are not communicated clearly, it could lead to consumer confusion and the lack of buy-in, which may adversely impact recycling rates.
4. A key focus of implementing the scheme would be on ensuring regulatory consistency and oversight, which would include monitoring the scheme's contribution to recycling rates and performance against other key measures.
5. Industry players are concerned with the costs of implementing the DRS which mandates producers to pay membership fees and subscription fees. The cost to producers may include registration fees, handling fees, and packaging fees. It is important to obtain producers/industry players' support and buy-in, as well as have an adequate process in place to prepare industry players when implementing a DRS.



RECOMMENDATIONS AND CONSIDERATIONS FOR SINGAPORE

The results of the email interview echo the key learning points from the global case studies. To help develop and support a successful DRS scheme, the Singapore government should consider the following:

1. The PRO should be beverage industry-led and non-profit to meet the aim of producer responsibility

The PRO should be beverage-led and non-profit as they are inherently incentivised to administer the DRS efficiently and effectively. The beverage industry consortium should be responsible for managing the entire scheme such as:

- Procurement and contracting with all scheme participants
- Operational oversight of the scheme
- Managing scheme liquidity and payment flows
- Auditing and reporting; and

A single PRO is likely the optimal solution for Singapore, given the size of the local market, the ability to deliver operational efficiencies, and the inherent challenges associated with multiple PRS Operators operating within a single jurisdiction.

2. Alleviating the costs of implementing the DRS ecosystem

The implementation of DRS would incur a huge financial cost for the industry to handle alone; the government would have to consider this as a joint project and co-contribute to setup costs. Upon implementation, the cost of the beverage will inflate due to the deposit fee and the operational costs of running the scheme. For example, the collection points are often reverse-vending machines that can cost more than SGD 23,000 (an estimated €15,000⁴⁵ or more) to install.

DRS will impose a burden on the beverage industry, and in particular, smaller beverage industry players. Opportunities should be sought to lessen this burden wherever possible (e.g. simplified reporting and payment arrangement for these smaller beverage industry players). Furthermore, careful consideration in terms of affordability across the value chain is important. Government support could be considered to support the beverage industry in the initial years.

As Singapore imports most of its plastic bottles and aluminium cans from overseas, the costs of implementing the DRS will primarily affect importers. An impact assessment to arrive at a fair estimation of the cost and any cost pass-through would be important. Similar concerns around funding and financial modeling were brought up during the email interviews as a means to establish the scope and implementation of DRS. This would be a critical factor to market players such as producers who are concerned about the costs incurred for product labelling and product registry.

3. Sensitivity analysis should be done to analyse the optimal DRS fee structure

A detailed study, including extensive stakeholder engagement, needs to be undertaken to determine the optimal DRS fee structure. The selected fee structure should be transparent and fair for all scheme participants. A self-sustaining system based on volume taking into consideration economies of scale needs to be designed.



⁴⁵ A Load of Rubbish? Introducing a Deposit Return Scheme to the UK. Institute of Economic Affairs. Retrieved from <https://iea.org.uk/wp-content/uploads/2019/04/SNOWDON-bottle-deposit-scheme-ED-1.pdf>



The sensitivity analysis should also look at the appropriate deposit fees as it is critical in determining the success of the scheme (i.e. too low, may not be attractive enough for consumers to participate; and too high, and it may cause a lowered demand for the beverage which will impact the beverage industry negatively). The implication of the rate needs to be studied in detail and assessed through pilots to understand the impact on recycling rates and the beverage industry to Singapore.

While case examples in Europe have seen high collection and recycling rates between 80 – 95 percent over time, this is contingent on key factors such as deposit price point, accessibility of the deposit points, sufficient education and marketing of the scheme, etc. Therefore, in the initial implementation stage, the collection target rate should be reasonable and account for a transition period. Subsequently, the targets can be revised at appropriate intervals to achieve higher recycling rates over time.

4. Unclaimed deposits should be used in supporting the scheme

With the aim of ensuring that manufacturers and drink producers are sufficiently incentivised to improve the recyclability of their beverage containers, for any unclaimed deposits which arise when consumers does not return empty containers, it should be channelled into awareness campaigns to support the success of the scheme or the overall objective of the scheme (i.e. improving the recycling rate in Singapore).

For example, in the German DRS, as retailers and the beverage industry bear the cost of the scheme and therefore can keep any unclaimed deposits. Therefore, the German retailers and beverage industry have profited more than €3 billion from bottles that were thrown away and not returned into the system.

To reduce this leakage and ensure the objective of the scheme, any unclaimed deposit should be used in supporting the scheme.

5. Phased implementation of the DRS should be considered

Through the experience of the global case studies like the Finnish DRS, there are advantages to a phased system approach that gradually expands the scope of beverage containers included in the DRS.

A study to quantify the amount and recyclability of the types of beverage containers would be imperative in deciding the scope of the DRS. This gradual increase in DRS scope over the years will help ease the introduction of the system for the beverage industry and retailers.

6. Convenient location of deposit points would be critical to the success of DRS

This could involve installing enough collection points to ensure the collection of beverage containers are available and accessible in as many locations as possible. The convenience of accessing collection points can serve as an incentive for consumers to promptly return their used containers.

During the email interviews, similar points on convenience factors were highlighted to facilitate citizens' and residential participation on the DRS to maintain a steady supply of returned beverage containers. This can be achieved by expanding our network of collection points across Singapore, coupled with Reverse Vending Machines (RVMs) already available in community centers and supermarkets.

7. Educating consumers of the purpose and the scope of the DRS

A successful DRS must consider country-specific requirements. Therefore, proposing an effective Deposit Refund Scheme is an intricate and long-term process. Introducing this concept will take time and requires an extensive awareness and education campaign, which will increase consumer and industry buy-in. To avoid public confusion, there should be consistency in the containers that are included within the scope of the DRS and sufficient consumer education.

However, before implementing a DRS, it is necessary to expand education on selective waste collection approach so that consumers are able to specifically distinguish between different types of waste to dispose of (i.e. single-use packaging items) or to recycle (i.e. returning their used beverage containers at designated collection points for the purposes of DRS).

As consumers represent the final link in the supply chain and have the responsibility of bringing the beverage containers back, the success of DRS will require the participation and involvement of consumers. Hence, it is crucial that adequate consumer awareness and education initiatives are in place to help drive home the value of raw materials, recycling, and effective waste management through the DRS.

Similar discussion points were brought up during the email interviews around educating consumers on their awareness of proper recycling methods and the operational scope of the scheme so as to ensure the sorting and recycling of materials and drink containers suitable for DRS collection.

8. Accountability of the results of the DRS is important to measure the success of the DRS – using technology to manage imported beverage products and interregional arbitrage

It is important to monitor the DRS' contribution to recycling rates and performance against other recycling and waste minimisation efforts in Singapore to track if the scheme is meeting its objective. Furthermore, managing imported beverage products and interregional arbitrage is a common challenge faced across all DRS.

For example, system operators can gather information on the number of non-returned containers through barcodes or other technology solutions on the containers, and in turn understand the impact of the DRS on Singapore's recycling rates. Having a barcode or other technology solutions system will also allow the operators to collate information about the brand, volume, material composition, and deposit value for the product,⁴⁶ providing the scheme administrator and other stakeholders the relevant data to scale the DRS and deter fraud.

⁴⁶ Making empties count: deposit return schemes across the world. Renewable Matter. Retrieved from <http://www.renewablematter.eu/articles/article/making-empties-count-deposit-return-schemes-across-the-world>

CONCLUSION

The adoption of eco-modulation schemes like EPR and DRS would be useful in targeting and increasing Singapore's waste recovery rates (i.e. reuse and recycling). With proper assessment, design, and implementation of EPR and DRS, plastic recycling (and by extension, the recycling of other materials) in Singapore could be greatly enhanced. The collaborative efforts between the Singapore government and industry players are key factors to capture the value of recycling in the most efficient and effective way. As the implementation process of DRS would require rounds of improvement and iteration, citizens' buy-in and participation allows room for ideation, co-creation, and most importantly, feedback.

Despite the spatial and geographical differences between the European case studies and Singapore, there are many learning points that Singapore can glean from the overseas schemes when developing Singapore's DRS.

A sustainable and lasting model for Singapore requires careful consideration of different organisational aspects – including the design and implementation covered by the various stakeholders, improving understanding across the industry and consumers, level of involvement by authorities to effectively manage the scheme itself, and most importantly, the design, location and type of collection systems for used containers. These are critical decisive factors in the success of DRS in Singapore.



GLOSSARY

Term	Definition
Deposit Refund Scheme (DRS)	Deposit refund schemes are systems where consumers pay a small amount of money upfront, to be reimbursed to them when they bring the container to a collection point once they have finished using it. The container can then be recycled and transformed into secondary raw materials.
Beverage Container Return Scheme (BCRS)	Known internationally as a Deposit Refund Scheme (DRS), BCRS is a scheme to encourage people to recycle their used beverage containers such as plastic bottles and aluminium cans; generally involving having producers to finance the take-back of used beverage containers with rebates extended to consumer when they return them at designated collection points.
Extended Producer Responsibility (EPR)	Extended Producer Responsibility (EPR) is a policy approach under which producers are given a significant responsibility – financial and/ or physical – for the treatment or disposal of post-consumer products.
Circular economy	The circular economy is a model of production and consumption, which focuses on maximising the value of resources by keeping them in use for as long as possible.
Semakau landfill	The Semakau Landfill is Singapore’s first and only landfill situated offshore among the southern island of Singapore.
Deposit Refund Scheme (DRS)	Deposit refund schemes are systems where consumers pay a small amount of money upfront, to be reimbursed to them when they bring the container to a collection point once they have finished using it. The container can then be recycled and transformed into secondary raw materials.
‘Take, make, dispose’	The “take, make, dispose” linear economy is a traditional model of linear economic growth such that raw materials are used to make a product, and after its use, any waste (e.g., packaging) is thrown away.
Closed loop system	A closed-loop system in circular economy is an economic model based on reusing, repurposing, repairing, and recycling products and materials such that minimal to no waste is generated.
Export-led growth	An export-led growth occurs when countries seek economic development by engaging in international trade. Its growth is often accelerated as a result of rapid urbanisation and industrialisation.

3R (“Reduce, Reduce, Recycling”)	The 3R concept is based on a sequence of steps on how to manage waste properly and prevent waste generation at its source – the top priority is to reduce waste generation, followed by reuse, and then recycle.
Zero Waste Masterplan	Singapore’s strategies towards being a zero-waste nation by adopting a circular economy approach and shifting towards more sustainable production and consumption.
Three priority waste streams	As part of Singapore’s vision towards a Zero Waste Nation and closing the resource loop, Singapore has identified its three priority waste streams as food, electronic, and packaging (including plastics).
Resource Sustainability Act	The Resource Sustainability Act is a landmark legislation introduced in 2019 to support the proper management of Singapore’s three priority waste streams through a regulatory framework to promote resource sustainability.
PET	PET, which stands for polyethylene terephthalate, is a form of polyester that is extruded or moulded into plastic bottles and containers for packaging foods and beverages, personal care products, and many other consumer products.
‘Ready-to-drink’ market	The Ready-to-drink market refers to the products or beverages that are sold in ready-to-consume form.
Producer Responsibility Organisation (PRO)	Not-for-profit firm jointly owned by firms in the industry, a private profit-making company, or a public agency, which handles the product collection and process end-of-life products from retailers who have collected them from the consumers ⁴⁷
Refund Point Operators	Refund point operators are responsible for returning the refund back to consumers who deposit their empty containers. This can be done over the counter or using a reverse vending machine (RVM).
Beverage Packaging Tax	Beverage Packaging Tax implemented in Norway consists of 2 parts, the basic tax for all single use packaging and an environmental tax aimed at increasing the return rate of packaging material and decreases with higher return rates, and when return rate is above 95%, the tax ceases to apply.
Take-back policy	Policy for the return of deposits back to the deposit refund schemes through the collection point.
IWSR	The IWSR is the leading source of data and analysis on the beverage alcohol market.

47 Creating incentives for Greener Products - Home Page – OECD. Retrieved from <https://www.oecd.org/environment/outreach/Creating%20Incentives%20for%20Greener%20Products.pdf>.

Reverse Vending Machines (RVMs)	RVMs are machines which are able to identify, sort, and collect empty plastic drink bottles and aluminium drink cans and reward users when the containers have been accepted by the machines.
#RecycleRight Citizen's Workgroup	The #RecycleRight Citizens' Workgroup was part of the movement to seek ideas from the public in implementing the circular economy approach to Singapore's Zero Waste management plans.
F&N	Fraser and Neave (F&N) Limited is one of Singapore's most established and successful homegrown companies with expertise and prominent standing in the food and beverage industries.
Recycle N Save	Recycle N Save is a joint initiative by F&N and NEA to place 50 smart reverse-vending machines across Singapore to encourage recycling of used plastic drink bottles and aluminium drink cans amongst Singaporeans.
Chemical recycling	Chemical recycling is any process by which a polymer is chemically reduced to its original monomer form so that it can eventually be processed (re-polymerized) and remade into new plastic materials that go on to be new plastic products.
Return-to-retail	The 'return-to-retail' model makes use of a hybrid system featuring some retailer participation and requiring stores selling beverage containers to collect them for recycling after use.

ABBREVIATIONS

ASEAN	-	Association of Southeast Asian Nations
BCRS	-	Beverage Container Return Scheme
DPG	-	Deutsche Pfandesystem GmbH
DRS	-	Deposit Refund Scheme
EPR	-	Extended Producer Responsibility
GTIN	-	Article number for exclusive use on the German market
HDPE	-	High-density polyethylene
NEA	-	National Environment Agency Singapore
NOK	-	Norwegian krone (currency in Norway)
PALPA	-	Suomen Palautuspakkaus Og
PET	-	Polyethylene terephthalate plastic
PP	-	Polypropylene
PRO	-	Producer Responsibility Organisation
RVM	-	Reverse Vending Machine
SGD	-	Singapore Dollars (currency in Singapore)

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