# Ontario DRS System Modeling

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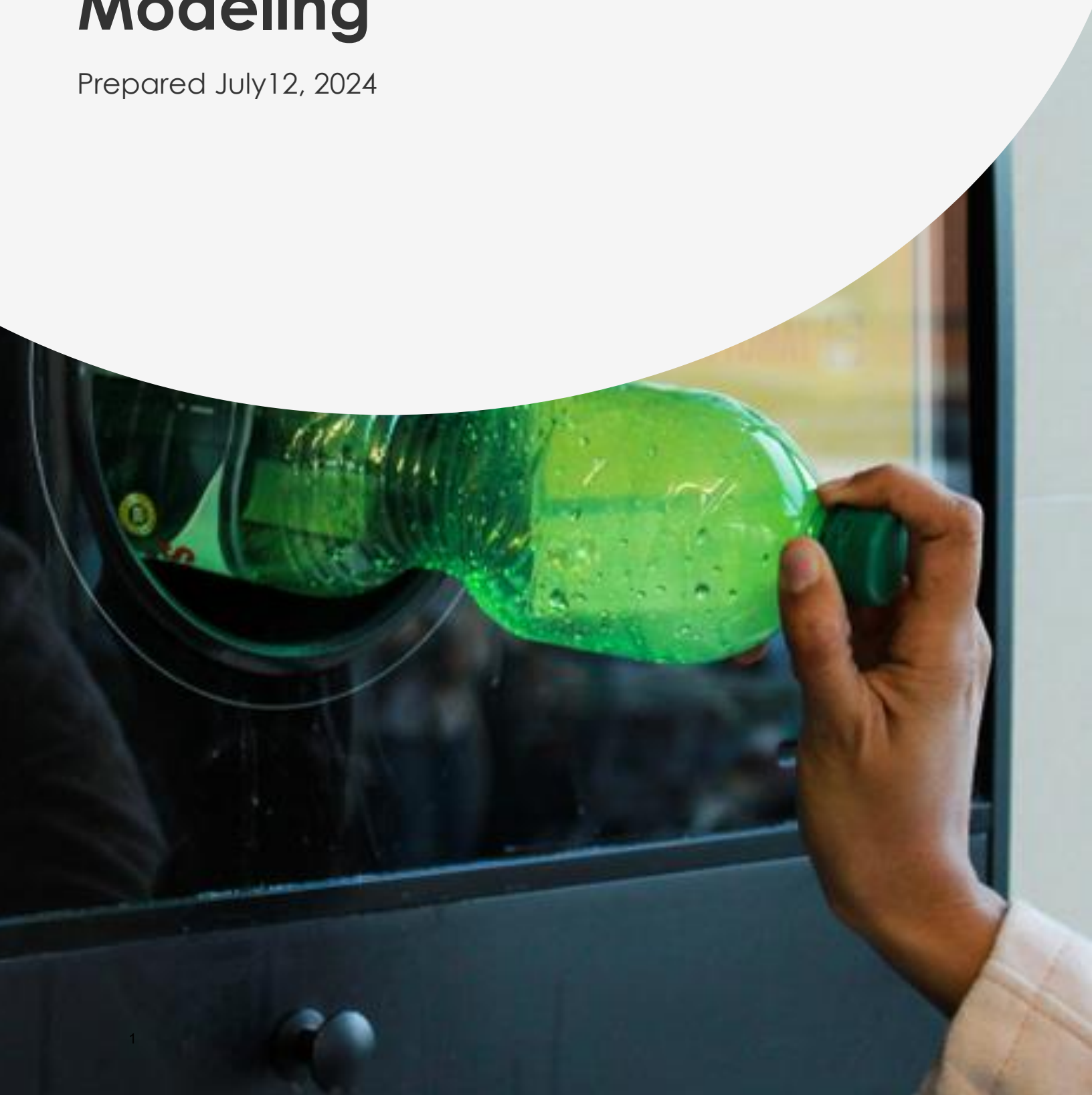

## Report For

Canadian Beverage Association

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# Executive Summary

## Introduction

Ontario is one of only two provinces in Canada without a Deposit Return System (DRS) for non-alcoholic beverage containers. As a result, its beverage recovery rate is estimated as 50% compared to 77% in British Columbia and 84% in Alberta in 2022. The Government has set 2030 recovery targets, as outlined in Ontario Regulation 391/21 under the Resource Recovery and Circular Economy Act, 2016. These targets include an 80% recovery target for non-alcoholic beverage containers.

In 2023, the Government of Ontario convened a cross-sectoral DRS working group. To facilitate discussions within the working group, the Canadian Beverage Association (CBA) commissioned Eunomia Research & Consulting to conduct comparative research on DRS programs and prepare six DRS scenarios to guide the development of an optimized DRS for Ontario. The study leveraged insights and best practices from global DRS programs and apply them to the Ontario context, ensuring an approach that aligns with industry interests and regulatory expectations. Eunomia's research evaluated and compared DRS programs from Lithuania, Norway, Germany, Denmark, Finland, Oregon, British Columbia, and Quebec. Eunomia drew on more than 10 years of experience analyzing and modelling DRS programs globally, as well as in Canada, including:

- Conducting the cost-benefit analysis modelling for Recyc-Quebec, which led to the modernization of the DRS program in Quebec;
- Depot optimization analysis in Alberta; and
- Development of specific equitable access metrics for all stewardship programs, including beverage in British Columbia.

The study's core objectives included assessing inclusion criteria for beverage containers, identifying the most efficient collection systems, and determining best practices for retailer involvement. Additionally, the project sought to propose a handling fee structure based on global benchmarks, develop a sustainable financial model for Ontario's DRS, and consider governance and target-setting within the system's framework.

The CBA developed and consulted with the working group on the following DRS Design Principles, which guided the study:

1. **High performance**: Establish a deposit-return system (DRS) program that can achieve high rates of beverage container collection and recycling.
2. **Cost-efficient:** Design the DRS program to be cost effective and efficient for consumers and stakeholders.
3. **Convenient collection:** Provide Ontarians with convenient and accessible collection locations to support high levels of consumer participation.
4. **Effective implementation:** Develop an implementation plan that will establish the necessary collection network to meet the 2030 target of 80%.
5. **Evidence-Based Decision-Making**: Base decisions about the development of a DRS on evidence, data, and beverage industry expertise.

The evidence-based approach underscored the importance of data and industry expertise in making informed decisions about DRS development.

The information from the jurisdictional scan was used to inform the modelling of the six future systems.

As part of this study Eunomia consulted with the government working group, which comprised representatives of the following organizations and companies:

- Canadian Beverage Association
- Canadian Federation of Independent Grocers
- Coke Canada Bottling
- Costco
- Circular Materials
- Environmental Defence
- Food, Health and Consumer Products of Canada
- GFL Environmental
- Ice River Springs
- Keurig Dr Pepper
- Lassonde
- Loblaw Companies Ltd.
- Metro
- Ministry of the Environment Conservation and Parks (MECP)Ontario Convenience Stores Association
- Nestle Canda
- Retail Council of Canada (RCC)
- Reverse Logistics Group
- Ryse Solutions Inc.
- Saputo
- Sobeys
- Walmart

Although this study includes DRS scenarios for both alcoholic and non-alcoholic beverage containers, representatives of Beer Canada, Spirits Canada, and Ontario Craft Wineries were not included in the working group membership. The CBA consulted with these groups, and The Beer Store was interviewed by Eunomia to help refine data used in DRS modelling for alcohol containers.

- Stakeholders provided important insights and helped refine our approach to modeling and analysis. These included: Feedback on the core design principles in response to the CBA's kick-off presentation to the working group on Nov. 21, 2023.
- Feedback on the return rate methodology, which was presented by Eunomia to the working group on March 28, 2023.
- Feedback in response to Eunomia's presentation to the working group on May 14, 2024, which led to:
    - The development of a sixth scenario; and
    - An adjustment to the average weight of plastic beverage containers, along with a resulting adjustment to the total supplied units.

# Factors Driving an Optimized DRS

The key findings from the jurisdictional review considered in the development of the scenarios were as follows:

- **Covered Beverage Containers:** Align container materials with those covered in B.C. and Quebec for consistency. Include common container sizes and assess the inclusion of containers under 15mL and over 3L, considering the required return infrastructure. Although the modelling in this study includes rigid dairy containers already products could also be phased in over time rather than included at the outset of the program.
- **Financial Sustainability in DRSs:** Producer fees should be based on the actual cost of managing specific materials minus the revenue generated from those materials. Canadian DRSs use unclaimed deposits as a source of revenue to reduce costs.
- **Funding Models for Return-to-Retail Infrastructure**: Handling fees should vary based on space, labour, and investment costs in reverse-vending machines (RVMs) and compaction equipment.
- **Upfront Payment Methods for Automated Collection**: Throughput leases allow retailers to access modern RVMs without upfront costs, with the operator recouping the investment through fees on each redeemed container.
- **Governance & Targets**: Introduce phased targets and uphold transparency with annual progress reports that support rigorous monitoring and verification.
- **DRS Transition Timelines:** Return-to-retail systems can be implemented more quickly, as demonstrated in Lithuania, where the return-to-retail model reached 90% return rates just one year after the program launched and three years after the legislation was passed. By contrast, hybrid or depot-based DRSs require a longer period for implementation due to the need to identify sites and set up new depots in appropriately zones areas. Zoning in Ontario is conducted at a municipal level, and there are often different requirements and processes across municipalities. Finding sites in an appropriately zoned area is difficult, and zone by-law amendments maybe required. Zoning by-law amendments take, on average, 21 months in Ontario. There may also be the need for an Official Plan Amendment, which can take 24 months[1]. For example, in Oregon, U.S, between 2010 and 2018, 25 depots were established, with only one further location added between 2018 and 2022. This can be compared to 44 bag drop locations at retailers that were delivered in just one year between 2019 and 2021. Quebec has only opened a handful of depots since the launch of the first phase of expansion in November 2023.
- **Ensuring Container Traceability in DRS:** Adopt a modernized, automated DRS with universal barcode marking to enhance tracking, minimize fraud, optimize cost-efficiency, and improve transparency.
- **Producer Incentives and Material Access:** Establish a "right of first refusal" for producers to access materials for recycling. This option should be offered to producers, easing the administrative burden of coordination, especially for smaller producers.
- **Verification and Auditing:** Set yearly reporting requirements for producers and require regular RPRA auditing.
- **DRS and Curbside Collection Impacts:** Provide compensation to curbside systems for recovering, sorting, and processing beverage containers that may still be collected through curbside container.

The findings from this analysis informed the development of the six scenarios.

[1] Greater Toronto Area Municipal Benchmarking Study - 2nd Edition, Altus Group 2022

# Cost and Performance System Modeling

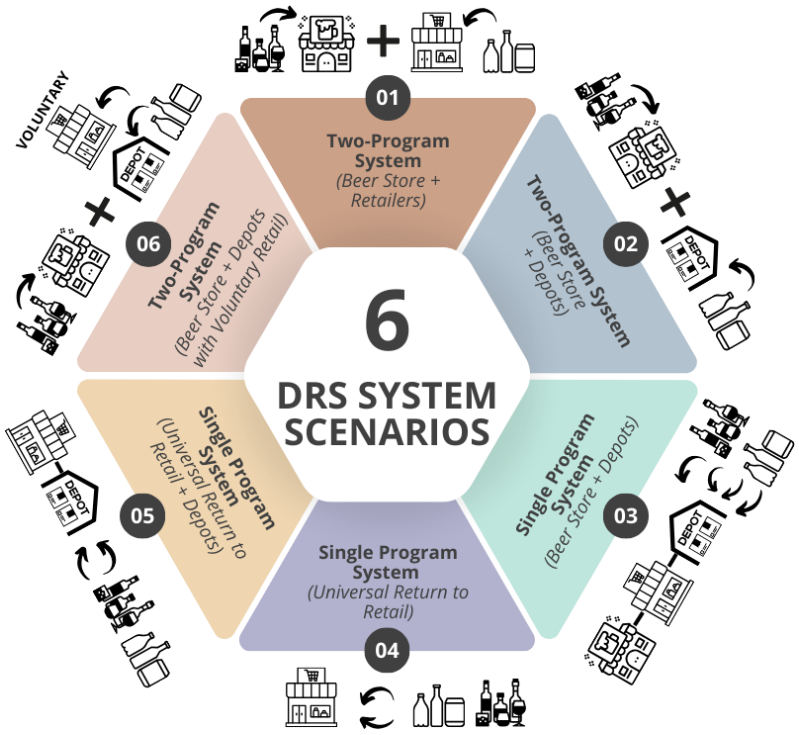
The modeling aimed to provide robust Ontario-specific data to inform the development of an optimized DRS for Ontario. An overview of our approach follows.

**DRS System Scenario Development**

Our team analyzed DRS system performance in 12 global jurisdictions to understand the system components contributing to the program's performance.

Figure 1 below provides the 6 DRS System Scenarios constructed for Ontario, along with a detailed explanation of each.

## Figure 1. Ontario DRS System Scenarios




**DRS Scenario 1:** A two-program system, where The Beer Store takes alcoholic beverage containers through retail locations and other retailers take non-alcoholic beverage containers.
**DRS Scenario 2:** A two-program system where The Beer Store takes alcoholic beverage containers through retail locations and depots take non-alcoholic beverage containers.
**DRS Scenario 3:** A single program system where The Beer Store retail locations + depots take all beverage containers.
**DRS Scenario 4:** A single program system with universal return to retail, no depot for all beverage containers
**DRS Scenario 5:** A single program system with universal return to retail, with some depots for all beverage containers
**DRS Scenario 6:** A two-program system with alcoholic beverage containers returned to The Beer Store retail locations and, non-alcoholic beverage containers to depot, with voluntary retail participation for non-alcoholic containers.

**It is important to note that in scenarios 1, 4 and 5 small retailers do not need to be return points to create an accessible network of return points necessary to achieve high return rates. An accessible network can be provided by retailers over 4,100 sq. ft participating.**

**Statistical prediction model -** Using data from across jurisdictions and statistical analysis and regression modelling our team, estimated return rates by identifying key inputs and applying them to the different scenarios. This analysis considered factors such as deposit levels, convenience, urban proportion, system harmonization, and beverage scope.

**Assessment of costs and revenue -**The Eunomia team evaluated waste flows and inputs, including the volume of materials and consumption patterns. An activity-based costing approach was used to build, from the bottom up, the cost of each system with consideration given to the types of return point, geographical coverage, urban and rural differences. The total calculated annual net system costs included:

- The amortized, annualized cost of capital equipment including RVMs and counting centers;
- Building lease costs, including the cost of retail space and associated services;
- Labour costs at retail location, depots as well as sorting centers, which included factors such as pension contributions;'
- Material processing costs;
- Logistics costs, which considered drive times necessary to collect and transport compacted and uncompacted containers of different bulk densities across Ontario, vehicle costs and other operating costs such as fuel and maintenance;
- The cost for managing the system and regulatory oversight to ensure smooth operation and compliance; and
- Revenue from the sale of materials and consideration of unclaimed deposits in the system.

# Scenario Results and Analysis

The Ontario Blue Box regulations stipulate that producers must achieve an 80% recovery target for beverage containers by 2030. The performance results of the DRS modelling are analysed in context of this target, as well as the federal government's commitment to achieve a 90% plastic beverage container collection target. The study covers rigid plastic beverage containers for all ready to drink beverages, including dairy. A summary of the number of in-scope rigid containers, by material type is shown in Table 1.

### Table 1: Estimated Number of Beverage Containers in Scope (2022)

| Material | Estimated Number of Plastic Beverage Containers Supplied in Ontario (Millions units) |
|---|---|
| Plastic | 3,200 |
| Aluminium | 3,000 |
| Glass | 600 |
| Cartons (gable-top and tetra-pack) | 900 |
| **Total** | **7,600** |

An estimated 7.6 billion rigid beverage containers were supplied into Ontario in 2022.

**Comparison of Scenarios**

Figure 2 and Figure 3 compare the performance and cost of the six scenarios.

**DRS Scenario 1,** a two-program system, requires consumers to return alcoholic containers to a different retail location to non-alcoholic containers, this is less convenient than a one system program as consumers must go to two different locations to return their beverage containers. Despite being the lowest cost system, it is unlikely to deliver on the 80% target in the Blue Box Regulations.

**DRS Scenario 2,** another two-program system, which again would result in consumers having to spend more time returning containers to two different locations. Under this system because all rigid non-alcoholic are returned to depots, the number of depots necessary to provide a network that is likely to be convenient for consumers is estimated to be over 480. This increases the cost of the system. There are also delivery risks and

cost uncertainty associated with identifying and securing site in appropriately zoned areas, finding large number of locations in dense urban areas where there is high competition for space and costs and overcoming the "not-in-my-back-yard" response from neighbours of identified depot sites. In Ontario there is a real risk that identified sites may need to go through zoning changes this can take more than two years after the site in identified. The challenge in finding and siting a depot has been the same in Oregon, U.S. where the system operator has put in place 25 depots over a nine-year period. The potential delays in putting in place depots will impact on the ability of the system to reach an 80% recovery rate within five years.

**DRS Scenario 3,** a single program system which allows consumers to return all rigid plastic beverage containers through both The Beer Store and a depot system, this system is again expensive due to the extensive depot network required to provide the return location coverage seen in high performing systems. Due to the extensive depot network the delivery risks are the same as with DRS Scenario 2.

**DRS Scenario 4,** a single program return-to-retail system where consumers return containers to both The Beer Store and other retail locations. Under this system there is no need for the consumer to separate out alcoholic containers from non-alcoholic and they can return all containers to the same location which is likely to be the point of purchase. This system has the lowest cost and the second highest return rate.

**DRS Scenario 5,** a single program system where The Beer Store participates as well as additional retail locations. Under this scenario there are also additional return locations at depots to accommodate large volume returns. This system is high performing, provides options for both small and large volume returns and has an accessible network. It is low cost and comparable to Scenario 4.

**DRS Scenario 6,** a two-program system that includes for container returns through The Beer Store, depots and grocery retailers that choose to opt into the program. This system provides the greatest level of delivery risk. Not only is there a risk in delivering the depot locations there is no guarantee that retailers other than The Beer Store will participate. Iowa allowed for retailers to opt-into its DRS system and only 10% of retailers signed up to participate under this voluntary retail program.[2] Where systems allow for retailers to opt-in, they also allow them to opt out, this adds an additional layer of delivery and cost uncertainty. The system operator must spend significant time arranging contracts with retailers that may only be for short periods of time. The system is costly and not estimated to reach 80% return rate within a five-year period.

## Figure 2. Estimated Return Rates by Scenario


[2] Cleaner Iowa - Assessing the Impact of Senate File 2378.pdf - Google Drive

Five of the six scenarios are at least within two percentage points of the 80% target, and have the potential, when material collected through the curbside system is included, to reach 90% which is the plastics beverage target that is being discussed by the federal government. Each incremental percentage point of recovery beyond 80% requires system improvements and greater convenience and accessibility to return locations for consumers, thereby ruling out certain scenarios from achieving a higher rate of recovery. Scenario 1 falls short of achieving either the 80% or 90% target, whereas scenarios 2 and 6 are close to the 80% target.

Figure 3 details both the net cost per container redeemed as well as the annual net cost. The per container net cost is the net cost (cost minus material revenue) of the system divided by the number of containers that are returned and management through the system, it is the total cost for handling one container in the system. This is not the handling fee that would be paid to a return point. The net container cost includes all costs associated with managing the container in the system including the return location costs, transport and processing costs net of material revenues. The retailer and/or depot handing fee is included in the total cost of the system. As stated above, the scenarios that are return to retail have the lowest net cost.

## Figure 3. Costs per Container and Annual System Costs Net of Material Revenue

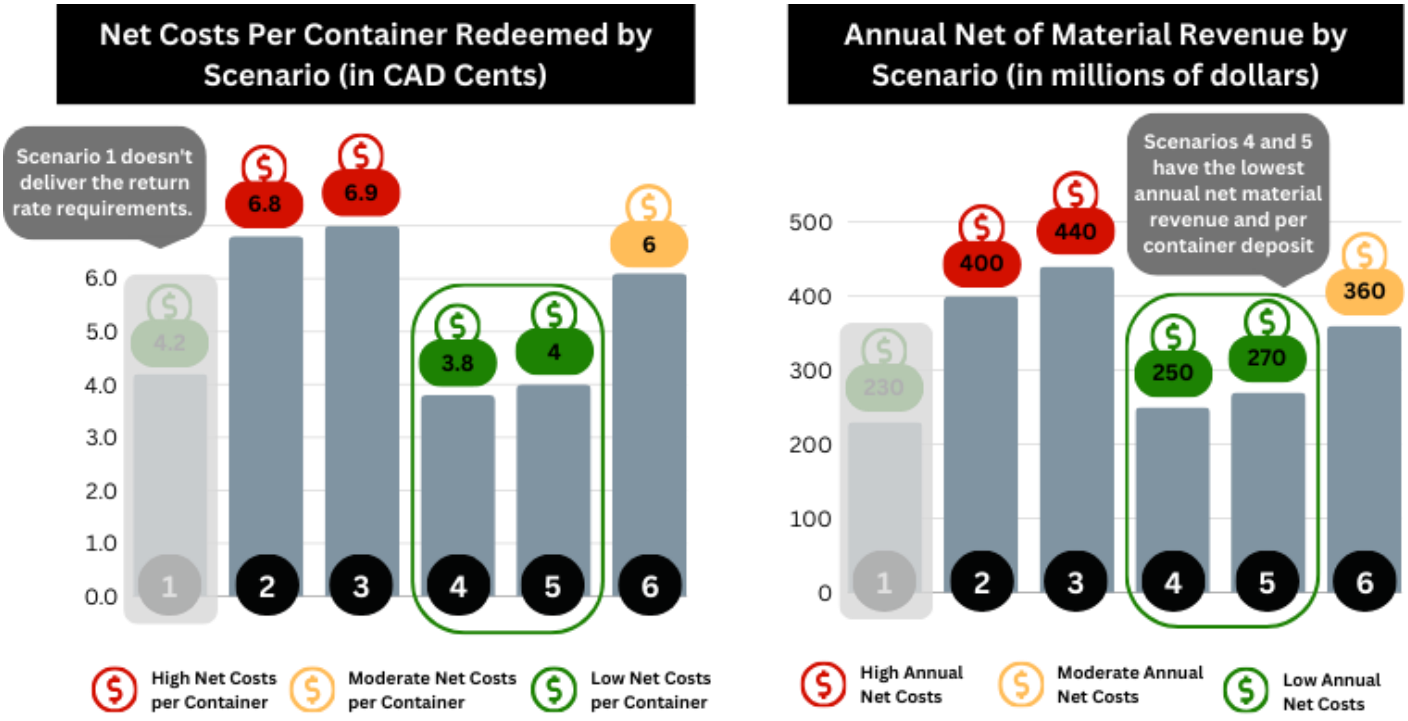



Figure 4 and the commentary below provides a comparison of the six scenarios against the key principles. DRS Scenario 4 is the only scenario that is fully aligned with the key principles.

### Figure 4. Scenario Comparison Against Key Principles


- *Cost-Effectiveness:* Scenarios 4 and 5 are the most cost-effective high-performing DRS options, offering high return rates (88% and 89%, respectively) with moderate total net costs ($250 million and $270 million) and low costs per redeemed container (3.8 cents and 4.0 cents).
- *High Return Rates*: Achieving a high return rate is crucial for the DRS's success. Our findings indicated that harmonized programs achieved higher return rates. Scenarios 4 and 5 provide the best outcomes in terms of consumer participation and return rates.
- *Consumer Participation:* A high-performance system with substantial consumer participation is cost-effective for ensuring consumers receive their deposits back. High return rates in Scenarios 4 and 5 indicate robust consumer participation, ensuring that consumers are effectively reclaiming their deposits.
- *Balancing Costs and Performance:* Scenario 3, while achieving high return rates, is the most expensive. Scenarios 4 and 5 offer a better balance between costs and performance.

# Conclusion

As the most populous province in the country the percentage it also produced the most beverage containers that need end of life management, 38% of plastic beverage bottles sold in Canada are sold into Ontario. Ensuring there is an effective and cost-efficient system in place that:

- Provides a network of return locations to enable consumers to easily return their containers without the need for additional journeys; and
- Compensates operators of return points for managing returned cases which, in the case of retail locations is also the beverages they sell;

is necessary not only to ensure producers can reach the 80% recovery target for beverage containers set out in the Blue Box Regulations but also to enable Canada to reach the 90% plastics bottle recycling goal which is currently being discussed by Environmental and Climate Change Canada.

Ontarians already use a return-to-retail DRS system for alcoholic beverage containers and a recent Abacus poll revealed that 81% of Ontarians support a comprehensive DRS, with a majority favouring the convenience of return-to-retail options. This strong public support underscores the urgency and necessity of implementing an effective DRS in Ontario[3].

Adopting DRS Systems 4, or 5 would see Ontarians surpass other Canadian DRS systems in part because they would be provided with a larger network of locations, allowing them to return containers and collect their deposit as part of their everyday activities. Scenarios 4 and 5 stand out for their cost-effectiveness, high return rate as well as providing consumers with return locations which coincide with where the beverage is purchased mitigating the need for consumers to make additional journeys to return empty containers and collect their deposit. These systems also do not rely on large numbers of depots. There is a real delivery risk as well as cost uncertainty with all scenarios that rely on the deployment of an extensive depot network. No recently implemented DRS system globally has been implemented based only on a return to depot network. One of the primary reasons for this is that it is hard to identify and secure enough sites in a timely manner such that the system operator can provide the level of access that is needed to achieve high return rates. Challenges faced by system operators in jurisdictions that are reliant on depots when seeking to add new depots, for example in Alberta and British Columbia as well as Oregon, US include:

- Inability to identify sites that are appropriately zoned;
- Inability to find significant number of sites that can serve dense urban centers where space is limited and the cost of, and competition for, space is high;
- Managing the 'not in my back yard" opposition.

These challenges are amplified if there is a need to deploy a whole network of depots rather than just supplement an existing network. Oregon, U.S. established 25 depots in 9 years. The number of depots necessary to provide sufficient return locations to support and high performing accessible DRS would be over 450, based on experience in other jurisdictions this would present a significant delivery, performance and cost risk to the system operator and to producers in meeting targets both in Ontario and being discussed at a federal level.

[3] https://globalnews.ca/news/10479812/most-ontarians-want-deposit-return/

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# Ontario DRS – Research Findings

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# Introduction

## Purpose

Review international Deposit Return Systems (DRS) and derive insights that will guide the development of an optimal DRS for Ontario.

## Objectives

1. Evaluate the inclusion criteria for beverage containers and understand the rationale behind these decisions.
2. Compare collection systems and pinpoint the most efficient models.
3. Determine best practices for retailer involvement in DRS.
4. Suggest a handling fee structure informed by global benchmarks.
5. Propose a sustainable financial model for Ontario's DRS.
6. Consider governance and target-setting as part of the system's framework.
7. Review implementation timelines and phase-in strategies, highlighting potential challenges.
8. Recommend approaches for material access and system traceability that align with Ontario's needs.
9. Assess the interaction between DRS and curbside collection, ensuring the financial and operational viability of both systems.

## Methodology

- Desktop research across eight DRSs: Lithuania, Norway, Germany, Denmark, Finland, Oregon, British Columbia (BC), and Quebec*.
- Analysis of legislative, operational, and participation aspects.
- Synthesis of findings into actionable insights and recommendations.

## Outcome

- Strategic recommendations for designing a "best-in-class" DRS tailored to Ontario's unique landscape.
- Aims to inform policy decisions and operational approaches that align with global best practices while addressing local nuances.

** This deck is accompanied by an Excel sheet titled "Ontario DRS Jurisdiction Research v1". It contains detailed information about each jurisdiction's DRSs overview, collection system, handling fees, financial model, governance and targets, timing and transition timelines, access to materials, traceability systems, and curbside collection.*



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# Covered Beverage Containers

## Materials Covered

- Of the eight jurisdictions studied, all cover PET bottles and aluminum cans.
- Seven jurisdictions cover glass containers and 6 cover steel containers.
- Only two jurisdictions cover cartons (BC and Quebec).

## Size of Containers

- Seven jurisdictions have a minimum and maximum size of containers covered. Median minimum is 100mL and median maximum is 3L.
- BC has no size exclusion.

## Reuse/Refill

- All eight jurisdictions cover reusable/refillable containers.

## Excluded Beverages

- Milk and dairy products are excluded in 50% of the studied jurisdictions (Lithuania, Oregon, Denmark, Finland). This exclusion avoids challenges of processing expired milk products and associated sanitary concerns.
- BC, Quebec, and Germany have expanded the scope of containers covered to include milk. The expansion in BC resulted from a regulatory change implemented by the government. In Germany only milk in plastic or cans (not cartons).

## Recommendation

Align the container materials covered with BC and Quebec for consistency.
Include common container sizes and assess the incorporation of containers under 15mL and over 3L, considering the required return infrastructure. Note that the inclusion of small containers can help mitigate a significant source of littering.
Consider phasing in dairy products, aligning with BC and Quebec practices. Europe is also moving towards including dairy.

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# Collection Systems

## Return-to-Retail vs. Return-to-Depot

| DRS Scheme | Return-to-Retail* | Return-to-Depot |
|---|---|---|
| Definition | Retailers are responsible for the points of return of empty containers* | Consumers return empty containers to a collection center |
| Median Collection Rate[1] | 90% | 69% |
| Benefits | • Convenient for consumers<br>• Can be advantageous for retailers (increased foot traffic) | • Lower costs<br>• Can facilitate larger return volumes for commercial/ HORECA sectors |
| Challenges | • Can limit high volume returns, especially from Hotel/Restaurant/ Café's (HORECA) | • Can be less convenient for consumers<br>• Depots in dense urban areas can be more expensive |

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## Logistics for Return-to-Retail

### Mandatory Retailer Participation

Seven of the DRSs are hybrid systems requiring retailers selling covered containers to accept them for redemption. BC is primarily a return to depot system, with limited return to retail.

### Exemptions

DRSs can provide exemptions for smaller retailers (Quebec, Oregon, Lithuania).

### Retailer Compensation

- Six jurisdictions offer financial or operational assistance to contribute to the upfront cost of equipment. Additionally, six DRSs' compensate retailers with a handling fee. Exemptions:
  - Oregon: Requires retailers to accept containers and pay 50% of redemption center costs.
  - Germany: No handling fees. Retailers own materials and keep the revenue from the sale of material.

**Most return-to-retail systems have some depots.*

[1] *Median rate across all jurisdictions with DRS. Reloop Platform, "Global Deposit Book 2022",* RELOOP_Global_Deposit_Book_11I2022_P1.pdf (reloopplatform.org)

# Requirement for Return-to-Retail

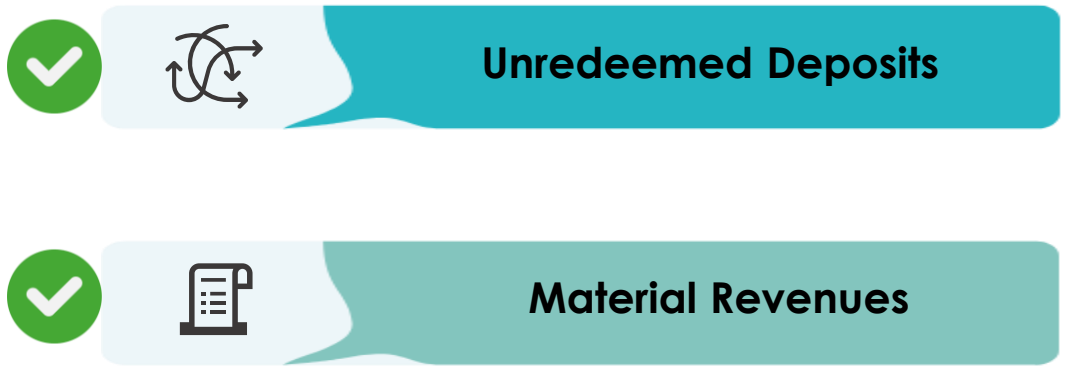
Each jurisdiction has tailored its approach to reflect local priorities and infrastructure capabilities. The following table details the specific requirements and obligations placed upon retailers within these systems.

| Jurisdiction | Are retailers required to accept containers? | Regulatory Language | Exemptions |
|---|---|---|---|
| **Lithuania** | Yes, with exemptions | Sellers must accept the packaging of products they sell covered by a deposit system. | Retailers occupying less than 300 sq. m as well as marketplaces, kiosks, fuel stations and public catering institutions. |
| **Germany** | Yes, with exemptions | Retailers of one-way drinks packaging filled with drinks are obliged to take back empty one-way drinks packaging free of charge at the place of actual delivery or in its immediate vicinity during normal business hours and to refund the deposit. | For retailers occupying less than 200 square meters, the take-back is limited to single-use beverage packaging of the brands that the distributor carries in its product range. |
| **Norway** | Yes | All retailers that sell beverages eligible for the scheme are required to act as a collection point. | None |
| **Oregon** | Yes, with exemptions | A retailer may not refuse to accept from any person any empty beverage containers that sold by the retailer or refuse to pay to that person the refund value of a beverage container. | Retailers occupying less than 5,000 square feet in a single area may refuse to accept from empty beverage containers of the kind, size and brand that the retailer does not sell |
| **Quebec** | Yes, with exemptions | Establishment where products are offered for sale in a redeemable container, accept the redeemable containers that are returned to the retailer. | Establishments equal to or less than 375 square meters |
| **Denmark** | Yes | Retailers are obliged to take back all types of single-use packaging. | None |
| **Finland** | Yes | A distributor of beverages sold in containers with a deposit shall accept empty beverage containers belonging to the same return system. | None |

# Financial Sustainability in DRSs

The main financing mechanisms for DRS are unredeemed deposits and the revenue from the sale of material. Producer fees can fill the gap when market fluctuations decrease material sales revenue.

## Main Funding Sources




## Producer Fees

To ensure financial stability, systems charge additional producer fees to offset the total cost of the system and to ensure that there are reserves.

- **Fees vary** by material type to reflect the cost of managing the container type in the system. For example, aluminum incurs a lower fee and, in certain instances, no fee. This is because, in efficient systems, aluminum has a high return rate, can be readily collected and transported, and possesses a high material value that counterbalances these costs. Lithuania, Finland, Germany, and British Columbia vary fees based on these factors.
- Fees can further be **eco-modulated** to apply charges to materials that pose greater recycling challenges or have lower value. This approach sends a pricing signal to producers, encouraging them to consider design changes, such as transitioning from a green PET bottle to a clear one. Denmark and Finland have eco-modulated fees.

**Recommendation:**

Producer fees should be based on the actual cost of managing the specific materials,[19] minus the material revenues generated from them.

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# Funding Models for Return-to-Retail Infrastructure

Handling fees are a per unit fee paid to redemption centers or retailers as a compensation mechanism to offset the cost of collecting, processing, and storing containers. Higher handling fees can serve as an incentive for investments in equipment and infrastructure.

## Handling Fees

Handling fees are set to offset the operational costs of the return process:

- Compensation for labor and management costs
- Investments (acquisition/leasing) in RVMs for automated collection, operational costs.
- Space utilization, overhead costs, electricity, purchase of bins, and other related expenses.

**Recommendation:**
Determine and vary handling fees based on costs of space, labor, investment in RVMs, and compaction equipment.

## Variations of Handling fees

Handling fees in the eight jurisdictions studied vary based on container material, whether the collection is carried out manually or automatically through RVMs, and whether containers are compacted:

| Lower Handling Fees | Higher Handling Fees |
|---|---|
| • Manual Collection<br>• No compaction<br>• Metal, plastic | • Automated Collection<br>• Compaction<br>• Glass |

Lithuania, Norway, Denmark, Finland have variable handling fees which are regularly updated and vary based on the mode of recovery and the cost. While it may be more expensive for retailers to invest in and utilize a RVM, the cost benefits it brings by counting and compacting reduces stream costs providing greater overall efficiencies.
Fixed- fee systems may not fully cover retailers' costs, particularly retailers with RVMs.

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# Upfront payment methods for automated collection

Handling fees can contribute to covering the operational expenses of RVMs; however, per unit handling fee do not cover, at the point of purchase, the upfront capital costs. Jurisdictional research revealed various payment schemes aimed at funding RVMs.

## Payment for Automated Collection

Automated collection systems are supported through various funding methods:

**Throughput Lease:** RVMs provided to retailers at no upfront cost. Paid off over time with a small amount for each accepted container.

**Operator-Owned Equipment:** Operators own the RVMs, offering flexible arrangements like loaning or leasing to retailers.

**Retailer-Operator Contracts:** Contractual approach where retailers agree on the cost-sharing of equipment installation, maintenance, and operation.

**Lithuania**: System operator purchased RVMs through competitive bid which received free. Reimbursement for the investment comes from a fee per collected container.

**Denmark**: Operator can lease, rent, or loan RVMs

**Oregon**: System Operator leases and services RVMs to help retailers access and maintain return equipment.

**Quebec**: The law requires contracts between retailers and the operator to address handling fees as well as upfront and installation cost of return infrastructure.

**Recommendation:** Throughput leases enable retailers to access modern RVMs with no upfront cost. Moreover, retailers avoid the drawbacks of owning and servicing RVMs, as this is handled by the RVM owner. The operator can recoup its investment gradually through a fee on each redeemed container.

# Governance & Targets

Best-in-class DRSs focus on outcomes, providing producers sufficient control to meet targets while ensuring proper regulatory oversight:

**Targets** — Set and enforce targets **for redemption and recycling** (all jurisdictions have targets, mandatory in six).

**Ongoing Improvement Mechanisms** — Incorporate mechanisms to **adjust deposits or fees if targets are not achieved** for an agreed-upon number of consecutive years (Oregon, Norway).

**Reporting** — Mandate **yearly reports on program achievements and compliance** with financial, legal, environmental, and social goals using a variety of key performance indicators.

**Recommendation:**
Introduce phased targets to encourage gradual system enhancement and uphold transparency with annual progress reports that support rigorous monitoring and verification. All high-performing systems are operated by non-profits and have a producer-led governance model that includes stakeholders throughout the value chain, including retailers.



## System Operators

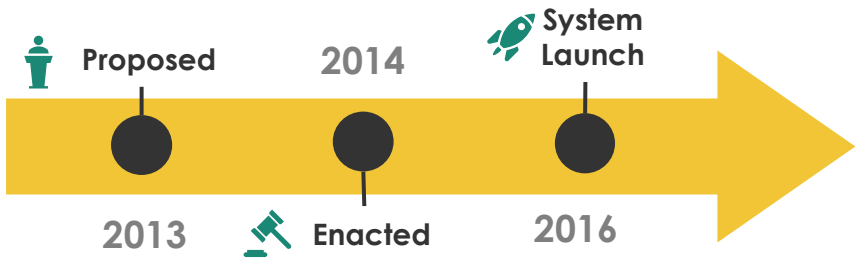
| Jurisdiction | System Operator | Governance Model | Is the Producer Organization a Non-Profit? | Board Representation |
|---|---|---|---|---|
| Lithuania | USAD | Producer-led | Yes | The PRO Board has 2 seats for beverage producers and 1 seat for retailers. |
| Germany | DPG Deutsche Pfandsystem GmbH | Producer-led | Yes | The PRO board has eight members from industry, trade, and material/packaging. The ownership of the PRO is equally shared (50%) by the German Retail Association (HDE) and the Federation of German Food and Drink Industries (BVE) |
| Norway | INFINITUM | Producer-led | Yes | The PRO Board has 4 seats held by beverage producers and 2 held by retailers. |
| Oregon | OBRC | Producer-led | Yes | The Board is made up of beverage producers. The OBRC bylaws do not permit retailers to hold position on the Board. |
| British Columbia | Return-It | Producer-led | Yes | The PRO Board has 5 seats held by beverage producers and 2 seats held by retailers. |
| Quebec | QBCRA | Producer-led | Yes | The legislation requires that the Board be composed of at least 10 seats, 7 of which must be beverage producers. The PRO has 11 seats held by beverage producers, 2 held by retailers, and one held by a trade group. |
| Denmark | DANSK RETUR SYSTEM | Producer-led | Yes | The PRO Board has 8 seats held by beverage producers, 3 seats held by retailers, and 1 held by the Danish Chamber of Commerce. |
| Finland | PALPA | Producer-led | Yes | The PRO Board has 4 seats held by beverage producers and 2 held by retailers. |

# DRS Transition Timelines: Insights and Recommendations

Case studies from Lithuania and Quebec provide crucial insights for effective DRS transition timelines.

## Lithuania (DRS established)

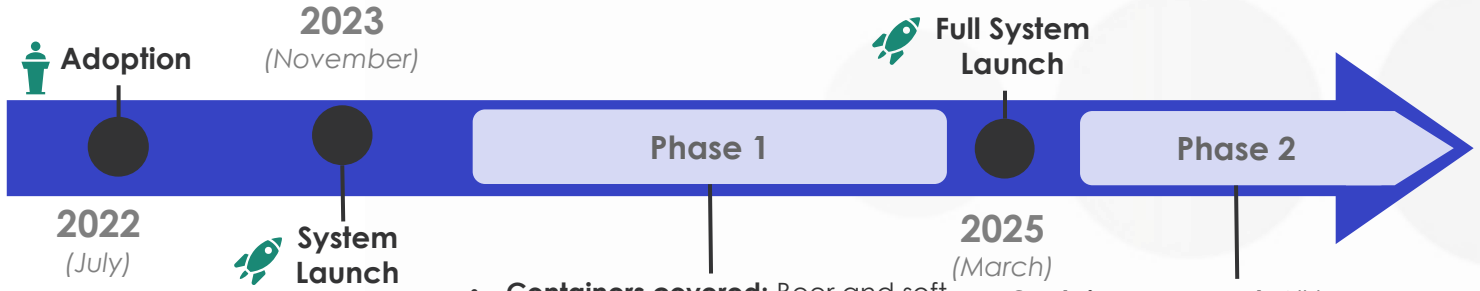
**Rapid implementation phase:** TOMRA's 100-day delivery timeframe post-selection realized through a return-to-retail mode.




- Lithuania's DRS had a compressed timeline for procuring and setting up the redemption equipment.
- TOMRA has indicated that current timeframes for delivery of RVMs are 3-6 months.
- The implementation of DRS involved an intensive schedule for stakeholders, but it did not impede the implementation and success of Lithuania's DRS.
- The system aimed to achieve a 90% return rate by 2020, a goal that was achieved in 2017, just one year after implementation.

## Quebec (Modernized DRS)

**Extended timeline:** Implementation is divided into two phases over a 16-month period.




- **Containers covered:** Beer and soft drink containers, all aluminum containers.
- **Return locations**: 1,200
- **Mandatory collection:** establishment with a seating capacity over 75

- **Containers covered:** All beverage containers (100ml to 2L).
- **Return locations**: 1,500
- **Mandatory collection:** establishments with a seating capacity of 20 or more

### Recommendation:

Return to retail may be quicker to implement, whereas hybrid or depot-based DRS may require a longer implementation period to accommodate the construction of new depot locations.

ABRC estimates that establishing a new depot location can take **up to 5 years**, factoring in permitting and operational setup.
23 A phased implementation approach, as seen in Quebec, may mitigate the challenges that can arise from a condensed timeline, including in terms of procuring and delivering equipment such as RVMs, leading to smoother system integration.

# Ensuring Container Traceability in DRS

A robust data registry is vital for tracking beverage containers and upholding the integrity of the DRS.

## Essential Information in Container Registry

- **Supplier information**
- **Product Information (product name, color of container, beverage flavor)**
- **Container dimensions (volume, height, diameter)**
- **Material type**
- **Barcode (which could be country/region specific (e.g. Germany)**

## System Tracking Comparison

### Manual Systems

- Implement and manage recycling processes through **sorting and counting**.
- **Employ destruction measures** like crushing glass and compacting metals to prevent containers from being redeemed multiple times.
- Maintain precise reporting with a **mass balance approach.**

### Automated Systems

- **Utilize a centralized database** with barcode information submitted by producers to the system operator.
- **Verify unique markings** on containers with for automated collection and counting equipment  accurate identification.

**Recommendation:**
Adopt a modernized, automated DRS. Utilize universal barcode marking to enhance tracking, minimize fraud, optimize cost-efficiency, and improve transparency.

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# Producer Incentives and Material Access

Of the eight DRSs studies, only **Norway** provides producers with a right of first refusal for recycled content. Other jurisdictions such as **Ireland, Slovakia, and the Netherlands** also give producers ownership and access to material.

## Norway

- Infinitum includes a right of first refusal in its sales agreement with producers.
- Infinitum has developed a fair share model for splitting the available material among producers and importers.
- The system provided 55% of rPET to producers in 2023 and expects it to increase to 80% in the next few years.

## Netherlands

- Producers and importers are entitled to an equivalent of the weight of the material.
- **Large volumes**: The producer/importer can trade the material itself. Statiegeld Nederland (system operator) coordinates the transport to the specified destination, with transport costs to be borne by the producer/importer.
- **Smaller volumes**: The operator trades the material. Revenues (after deduction of transport costs) are then settled with the producer/importer.
- As much as possible, the operator trades the material parties that can melt down the material according to the can2can principle.

## Slovakia

- Slovakia provides producers "**fair access**". This gives them the right to the proportionate (%) amount of material they placed on the market.
- Condition: Material must be used for bottle-to-bottle recycling.

## Ireland

- Ireland has stated that producers will have a **right of first refusal**, where producers will have first right on processed material purchases that will be sold at commodity market rates.

# Producer Incentives and Material Access

Jurisdictions with DRS are looking towards giving preferential access to material to increase bottle-to-bottle recycling

**Recommendation**: Establish a 'right of first refusal' to grant producers the option to access materials, giving participating producers the choice of purchasing materials for container-to-container recycling.

Norway, Slovakia, Ireland, and the Netherlands do not mandate this provision; instead, they offer it as an option for producers.

In the Netherlands, this is granted to producers with larger volumes, while smaller producers are directly given the revenue from material sale proportional to the material they placed on market. Implementing this may alleviate the administrative burden of coordinating with all producers, including smaller ones.

# Ensuring Integrity: Verification and Auditing

High performing DRSs have legislated verification and auditing mechanisms.

| Legislated Mechanisms | Example Countries |
| --- | --- |
| System **operator** are required to report recovered containers by size and beverage type as well as recycling data in **annual reports**. | Lithuania, Germany, BC, Oregon, Norway, Quebec, Denmark |
| Mandatory **independent third-party or government** auditors to validate reported data and return locations. | Oregon, Quebec, Denmark, Norway |

**Recommendation:**
Set yearly reporting requirements for producers.
Require regular RPRA auditing.

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# DRS and Curbside Collection Impacts

Sorting facilities may face revenue loss from the diversion of high-value materials due to DRS implementation. Establishing mechanisms that adequately compensate MRF operators has historically proven challenging:

- In Alberta, containers are manually picked off the line, which can be labor-intensive.
- In California, volume returned through curbside recycling is assessed by auditing facilities and calculating the average number of containers in a bale, often resulting in overestimation and subsequent overpayment.

The MRF sampling approach in Ontario, implemented as part of the Blue Box program, could provide greater transparency.

**Recommendation:**

- Provide handling fees for MRFs to cover sorting and processing costs. Adopt a per-unit payment structure calculated based on the cost of managing the container in the system.

# Appendix

# Overview & Collection Systems

| Jurisdiction | Start Date | Plastic | Cartons | Glass | Aluminum | Steel | Reuse/ Refill | Collection System | Requirements | Funding of Equipment/Infrastructure | Operational Impact | Financial Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  Lithuania | 2016 | X | | X | X | X | X | Return to Retail | Stores >300m² and rural must participate; optional for smaller stores. | USAD tenders RVMs to retailers at no cost, fee per collected container. | Retailers >60m² manage returns; larger retailers provided with different RVM models. | No direct RVM investment; handling fees cover costs. |
|  Germany | 2003 | X | | X | X | X | X | Return to Retail | Stores >200m² must accept returns; smaller stores for brands they sell. | Collaborative funding; annual fees by "first distributors." | Documentation, reporting, RVM maintenance. | Profit from unreturned bottles; sale of recyclable materials. |
|  Norway | 1997 | X | | | X | X | X | Return to Retail | All retailers selling eligible beverages must collect; take-back system approval by Norwegian Environment Agency. | Initial funding by beverage/retail industries; costs covered by unredeemed deposits, material sales, EPR fee. | Mandatory collection points; participation in circular economy; RVMs at retailer locations. | Environmental tax relief; revenue from unredeemed deposits and material sales; handling fees and EPR costs. |
|  Oregon | 1972 | X | | X | X | X | X | Hybrid | Dealers cannot refuse accepted container types; <5,000ft² dealers may refuse non-sold brands/sizes. | OBRC responsible for infrastructure setup and maintenance. | Different obligations based on location; acceptance of containers as per brand/size. | OBRC leases services RVMs; reimburses retailers for customer refunds. |
|  British Columbia | 1970 | X | X | X | X | X | X | Depot (+ some retail) | Accept containers for return and provide refunds. | Handling fees fund equipment for return locations. | | |
|  Quebec | 1984 | X | X | X | X | X | X | Return to Retail, becoming hybrid | Retailers with sales area >375m² must accept returns; clear posting of return site address. | Costs shared between producers/retailers; covered by contracts. | Adequate space for returns; personnel training; temperature control at return sites. | Handling fees and contracts designed to mitigate costs. |
|  Denmark | 2002 | X | | X | X | | X | Return to Retail (+ depots) | Retailers must accept all single-use packaging and pay deposits; centralized control unit required. | Equipment lease/rental by Dansk Retursystem; return recipients follow set terms for equipment use. | Operation and financial support from Dansk Retursystem; higher handling fees for improved equipment. | Retailers lease/rent collection equipment; higher handling fees for improved equipment. |
|  Finland | 1994 | X | | X | X | | X | Return to Retail (+ depots) | Retailers must accept containers and pay deposits; quantity deemed reasonable for sales volume. | Palpa oversees system but doesn't own operative equipment. | Retailers must have space for returns; small retailers can refuse disproportionate volumes. | Profit from unreturned bottles; sale of recyclable materials. |

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# Handling Fees & Financial Model

| Jurisdiction | Handling Fees | Financial Model | Producer-specific costs |
|---|---|---|---|
| Lithuania | • **Manual/RVM without compaction:** PET €0.0197, Metal €0.0162, Glass €0.0214.<br>• **RVM with compaction:** PET €0.0223, Metal €0.0163, Glass €0.0214. | Subsidies (50%), sold materials (30%), unredeemed deposits (20%) | 2023: PET €0.027 - €0.044, Alu €0.00 - €0.019, Steel €0.05 - €0.049, Glass €0.05 - €0.055; Refundable Deposit: €0.10 |
| Germany | • **Container deposit:** €0.25 for single-use, €0.08-€0.50 for refillable plus €0.75 or €1.50 for crates. | Beverage industry finance | 2023: PET €0.027 - €0.044, Alu €0.00 - €0.019, Steel €0.05 - €0.049, Glass €0.05 - €0.055; Fees for reusable containers set by producers, ranging from €0.08 to €0.25. |
| Norway | • **Manual/RVM without compaction:** Plastic €0.0087, Metal €0.0043.<br>• **RVM with compaction:** Plastic €0.021, Metal €0.017. | Funded by producers, infrastructural reinvestment | Tax: NOK 1.27, EPR fees, Deposit: 2 - 3 NOK |
| Oregon | • No handling fee to retailers | Unredeemed deposits and fees by OBRC members | 50% of redemption centre costs shared by distributors/retailers |
| British Columbia | • Confidential handling fees | Unredeemed deposits, material revenues, CRF | CRF varies, additional per-dozen fee for refillable alcoholic beverage manufacturers |
| Quebec | • Refillable beer bottles: CAD$0.005<br>• All other containers: CAD$0.02 | Unredeemed Deposits | |
| Denmark | • **Manual/RVM without compaction:** Metal €0.0046, Plastic < 1L €0.0076, Plastic > 1L €0.011, Glass €0.015.<br>• **RVM with compaction:** Metal €0.0026, Plastic < 1L €0.0031, Plastic > 1L €0.0034, Glass €0.0079. | Material revenues, unredeemed deposits, producer fees with additional fees for hard-to-recycle materials | One-time fee of 2,000 DKK + tax, operating fee varies, responsible for deposit labels |
| Finland | • **Manual/RVM without compaction:** €0.01974.<br>• **RVM with compaction:** Metal €0.02347, Glass €0.01974, Plastic €0.02901. | Material revenues, unredeemed deposits, packaging recycling fees | Membership fee, recycling fees vary by material, increased fees due to market changes |

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# Governance Model & Traceability

| Jurisdiction | System Operator | Targets | Is Achieving the Targets Mandatory? | Transition Timelines | Material Tracking Systems | Verification and Auditing |
|---|---|---|---|---|---|---|
| Lithuania | USAD | Legislated collection targets for PET, metal (90%), and glass (85%) | Yes | System rolled out within 2.5 years after initiation | EAN barcode on packaging | Open tender process for recyclers, no detailed verification process found |
| Germany | DPG Deutsche Pfandsystem GmbH | Recycling targets for glass, paper board, board, aluminum (90%), beverage cartons (80%), other composite packaging (70%), plastics (63%) | Yes | Expanded in January 2022 to include more container types | Retailers enter data into DPG's database; LUCID Packaging Register | LUCID and DPG databases ensure compliance; producers must report volumes, audited declaration of completeness |
| Norway | INFINITUM | Incentivized financial system for high return rates (>95%) | No (incentivized) | No specific transition timeline | EAN or UPC barcode system with GS1 | Infinitum tracks and confirms material recyclability and sells to recyclers like Veolia |
| Oregon | OBRC | No legislated targets. Deposit increase if redemption falls below 80% | Yes | Deposit increased from 5 cents to 10 cents in 2017 | Smart Count AI Technology; Streamlined Sorting and Processing | OBRC annual report and audit by Oregon Liquor Control Commission |
| British Columbia | Return-It | 75% packaging recycling rate; specific targets by Encorp and BRCCC | Yes (voluntary targets) | No specific transition timeline | Barcode tracking where automated, predominantly manual system | Recycling Regulation requires producers to report how collected product was managed |
| Quebec | RECYC-QUÉBEC Québec | Recovery targets for various container types aiming for a continuous increase to 90% | Yes | Modernized DRS adopted July 2022, effective November 2023 with phased rollout | Barcode tracking for all containers | Third party audit required, annual and five-year auditing cycle |
| Denmark | DANSK RETUR SYSTEM | Minimum 90% recycling rate for collected packaging | Yes | DRS established in 1890, modern system started in 1996, implemented in 2002 | European Article Number (EAN) and Global Trade Item Number (GTIN) barcodes required | RVMs and manual procedures for counting; independent operator transmits data for audit |
| Finland | PALPA | 90% by weight reuse or recycle target | Yes | DRS created in 1950, expanded in 1996 and 2008 | Barcode tracking for automated returns | Manual returns directed to an automatic calculation line at processing plant |

# Ontario DRS Modelling

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# 1

# Introduction

# Introduction

## Purpose

The CBA seeks to take a proactive stance in influencing the direction of the Ontario DRS model. The CBA recognizes the need to conduct a comprehensive examination of existing DRS systems from around the world, seeking to draw insights and best practices that can be applied to the Ontario context. Additionally, the CBA aims to model various system configurations to determine the most efficient and environmentally responsible approach that aligns with industry interests and regulatory expectations.

## Objectives

1. Evaluate the inclusion criteria for beverage containers and understand the rationale behind these decisions.
2. Compare collection systems and pinpoint the most efficient models.
3. Determine best practices for retailer involvement in DRS.
4. Suggest a handling fee structure informed by global benchmarks.
5. Propose a sustainable financial model for Ontario's DRS.
6. Consider governance and target-setting as part of the system's framework.
7. Review implementation timelines and phase-in strategies, highlighting potential challenges.
8. Recommend approaches for material access and system traceability that align with Ontario's needs.
9. Assess the interaction between DRS and curbside collection, ensuring the financial and operational viability of both systems.
10. Develop and model different DRS scenarios to analyze costs, benefits, and drawbacks, considering convenience, recycling performance, and stakeholder impacts.

## Methodology

- Desktop research across eight DRSs: Lithuania, Norway, Germany, Denmark, Finland, Oregon, British Columbia (BC), and Quebec*.
- Analysis of legislative, operational, and participating aspects.
- Synthesis of findings into actionable insights and recommendations.

## Outcome

- Strategic recommendations for designing a high performing DRS tailored to meet Ontarian's needs and their local conditions.
- Aims to inform policy decisions and operational approaches that align with Canadian and global best practices while addressing local nuances.

** This deck is accompanied by an Excel sheet titled "Ontario DRS Jurisdiction Research v1". It contains detailed information about each jurisdiction's DRSs overview, collection system, handling fees, financial model, governance and targets, timing and transition timelines, access to materials, traceability systems, and curbside collection.*



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# Beverage Scope

The scope of containers included in this study are **single use rigid beverage containers, including alcoholic and non-alcoholic containers.** The study does not examine the reuse system in Ontario, nor does it include flexible beverage containers.

The study examines an expansion of a single-use deposit system in isolation, it does not suggest that there is no reusable program also in place. The table below shows the number of single-use containers in scope for this study.

| | Plastic | Glass | Aluminum | Cartons | Steel | Total |
|---|---|---|---|---|---|---|
| Containers Supplied into the Market (# of Containers, Millions) | 3,200 | 600 | 3,000 | 900 | 35 | **7,600** |



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# 2

# Scenarios

# CBA Core Research Design Principles

Six DRS systems were designed in collaboration with the CBA according to the following design principles:

**High Performance**

Establish a deposit-return system (DRS) program that will achieve high rates of beverage container collection and recycling

**Convenient Collection**

Provide Ontarians with convenient and accessible collection locations to facilitate high levels of consumer participation

**Cost-efficient**

Design the DRS program to be cost effective and efficient for stakeholders

**Effective Implementation**

Develop an implementation plan that will establish the necessary collection network to meet a target of 80% collection within five years

**Evidence-based**

Base decisions about the development of a DRS on evidence, data, and beverage industry expertise.

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# Return Systems: Two-System vs. Universal

Ontario currently operates a deposit return system (DRS) through the Beer Store for alcoholic beverage containers. While this system is effective, it is limited to approximately 70% of the total tonnage of beverage containers sold onto the market provincewide.

In collaboration with the CBA, the six modernized systems modeled fall into the following categories:

| | |
|---|---|
| **Two-System** | The Beer Store manages alcoholic containers; other retailers/depots handle non-alcoholic. |
| **Universal System** | Integrates the Beer Store into a new system that includes collection of both alcoholic and non-alcoholic beverage containers. These scenarios aim to harmonize collection processes for all beverage containers. |

*Details on each scenario will be presented in the subsequent slides.*

*The Beer Store is assumed to have a similar number of return locations as it currently has now, as there is no analysis from The Beer Store of how the new Master Framework Agreement will impact the number of locations.*



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# Purpose of 6 Scenarios Modelled

Within the modelling of a one system versus two system exercise, six total scenarios were developed to assess the cost-effectiveness and performance of different systems, each varying by:

- Type of infrastructure
- Levels of convenience
- Universal versus two-systems

The six scenarios modelled are outlined below, along with their purpose. In each scenario, it should be noted that the modelling exercise is meant to examine the return infrastructure costs and benefits, however an optimized DRS will also provide support for the curbside system as well:

1. **Beer Store take Alcoholic Beverages + Other Retailers Take Non-alcoholic Beverages:** This scenario sees The Beer Store continuing to be the sole return location for alcoholic beverage containers, while introducing another collection system for retailers to collect non-alcoholic containers. Beer Stores rely solely on manual collection, and containers received are transported to counting centers for counting, verification, and sorting (post-collection management). Non-Beer Store medium and large (greater than 4,100 sqft) retail stores participate and have RVMs on-site for automated returns of containers. Approximately 1% of retailers smaller than 4,100 sqft are needed in this scenario to achieve high-performing access, operating manual collections only in the same way as Beer Stores.
2. **Beer Store Take Alcoholic Beverages + Depots Take Non-alcoholic Beverages:** This scenario sees The Beer Store continuing to be the sole return location for alcoholic beverage containers, while introducing a depot collection system for the collection of non-alcoholic containers. Counting and baling centers can process HoReCa (hotels, restaurants and cafes) returns. Beer Stores continue to have the same infrastructure as in Scenario 1. Small depot sites act only as a return location, with all containers received being transported to large depot sites for post-collection management.
3. **Beer Store + Depots Take All Beverages:** This scenario sees harmonized returns of all container types to Beer Stores and depot sites. Beer Stores and small depots continue to function in the same way however Beer Stores are anticipated to see a higher volume of returns as return customers begin to take their non-alcoholic containers with them. This scenario measures a universal, depot-oriented model.
4. **Universal Return to Retail:** This scenario sees harmonized returns of all container types to retail stores only. This includes Beer Stores which continue to function in the same way as in other scenarios. Medium and large retail stores have RVMs on-site for automated returns of containers. Approximately 1% of retailers smaller than 4,100 sqft are needed in this scenario to achieve high-performing access, operating manual collections only in the same way as Beer Stores. This system models a universal, retail only scenario.
5. **Universal Return to Retail* + Depots:** This scenario sees harmonized returns of all container types to retail stores and depot sites. Beer Stores, retailers, and combined depot and bag drop sites function in the same way as other scenarios, however all locations are optimized to manage the highest volume of returned beverage containers. This scenario models a universal, hybrid (retail and depot) scenario.
6. **Beer Store Takes Alcoholic, Non-alcoholic to Depot and Voluntary Retail.** This is a non-harmonized scenario where alcoholic and non-alcoholic containers are taken to different return locations. Non-Beer Store retailers can participate on a voluntary basis. In the modelling, it is assumed that 10% of retailers in scope that are above 4000 square feet participate in the deposit return system. This is similar to surveys done for Iowa, a system which recently expanded its opt out provisions for retailers.*



*Iowa exemption law: Gov. Kim Reynolds signs into law changes to Iowa's recycling law | The Gazette
** Survey of Iowa businesses: Cleaner Iowa - Assessing the Impact of Senate File 2378.pdf - Google Drive

# Two-System Scenarios

| Scenario | Description | Comparable System | High Recovery Performance? | Convenient Collection? |
|---|---|---|---|---|
| 1 | **Beer Store take alcoholic beverages + other retailers take non-alcoholic beverages:**<br>Alcoholic beverages → Beer Store<br>Non-alcoholic beverages → Retailers*<br>(No depots) | • **No true comparison.**<br>• Some **similarities to Connecticut, Massachusetts and the Netherlands** where retailers can reject containers from brands they do not sell. | • CT 46% return rate<br>• MA 38% return rate<br>• **Two lowest performing DRS states in the US** | • Two systems – **less convenient** for consumers. |
| 2 | **Beer Store take alcoholic beverages + Depots take non-alcoholic beverages:**<br>Alcoholic beverages → Beer Store<br>Non-alcoholic beverages → Depots<br>(No return to other retailers*) | • **No true comparison.**<br>• Some **similarities to BC**, which has a separate system for domestic beer and cider (through Brewers Distributor) and all other beverages (wine, spirits, imported beer, non-alcoholic; through Encorp). | • BC **80% return rate** overall.<br>• Brewers Distributor return rate: 91.8% (2022)<br>• Encorp return rate: 76.6% (2022) | • Two systems – **less convenient** for consumers.<br>• More Brewers' locations than Encorp. |
| 6 | **Beer Store takes alcoholic, non-alcoholic goes to depot and voluntary retail.**<br>Alcoholic Beverage Containers → Beer Store<br>Non Alcoholic Beverage containers -> depots and voluntary retail | • **No true comparison.**<br>• Some **similarities to BC (as with Scenario 2)**, which has a separate system for domestic beer and cider (through Brewers Distributor) and all other beverages (wine, spirits, imported beer, non-alcoholic; through Encorp). | • BC **80% return rate** overall.<br>• Brewers Distributor return rate: 91.8% (2022)<br>• Encorp return rate: 76.6% (2022) | • Two systems – **less convenient** for consumers.<br>• More Brewers' locations than Encorp. |

* Retailers means rigid beverage selling business, see slide 76 for list of retailers included.

Return rates are not inclusive of curbside material.

All return rates are from the Global Deposit Book 2022 https://www.reloopplatform.org/resources/global-deposit-book-2022/



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# Universal System Scenarios

| Scenario | Description | Comparable System | High Recovery Performance? | Convenient Collection? |
|---|---|---|---|---|
| **3** | **Beer Store + Depots take all beverages:**<br>All beverages → Beer Store<br>All beverages → Depots<br>(No return to other retailers) | • **Comparable to California, Iowa, Saskatchewan, Alberta – harmonized but lower convenience than other programs,**<br>• CA poor performance due to: low deposit level of 5 cents on most containers, continued closures of recycling centers, retailers can opt out of accepting containers. | • CA **68% return rate**<br>• AB **84% return rate**<br>• IA **64% return rate**<br>• SK **82% return rate** | • **Yes**<br>• **Less convenient** than being able to take to more retailers*. |
| **4** | **Universal Return to Retail*:**<br>All beverages → Beer Store<br>All beverages → Other retailers*<br>No depots | • Comparable to **Michigan, Quebec, Croatia** which are return to retail only.<br>• NB: Before COVID-19, in 2019, Michigan's redemption rate was at 89%, the highest of all U.S. deposit return programs. | • MI 75% return rate (previously **89%**, the highest of all US DRSs)<br>• Finland **96% - with specific HORECA** | • **Yes**<br>• But without depots, large returns, e.g. from bottle drives, are a challenge. |
| **5** | **Universal Return to Retail* + Depots:**<br>All beverages → Beer Store<br>All beverages → Other retailers*<br>All beverages → Depots | Comparable to **Oregon, Denmark** which have return to retail and depots accepting all beverage containers. | • Oregon **81%**<br>• Denmark **93%** | • **Most convenient**<br>• Depots provide an option for large volume redeemers. |

* Retailers means large supermarkets and grocery stores.

Return rates are not inclusive of curbside material.

All return rates are from the Global Deposit Book 2022 https://www.reloopplatform.org/resources/global-deposit-book-2022/



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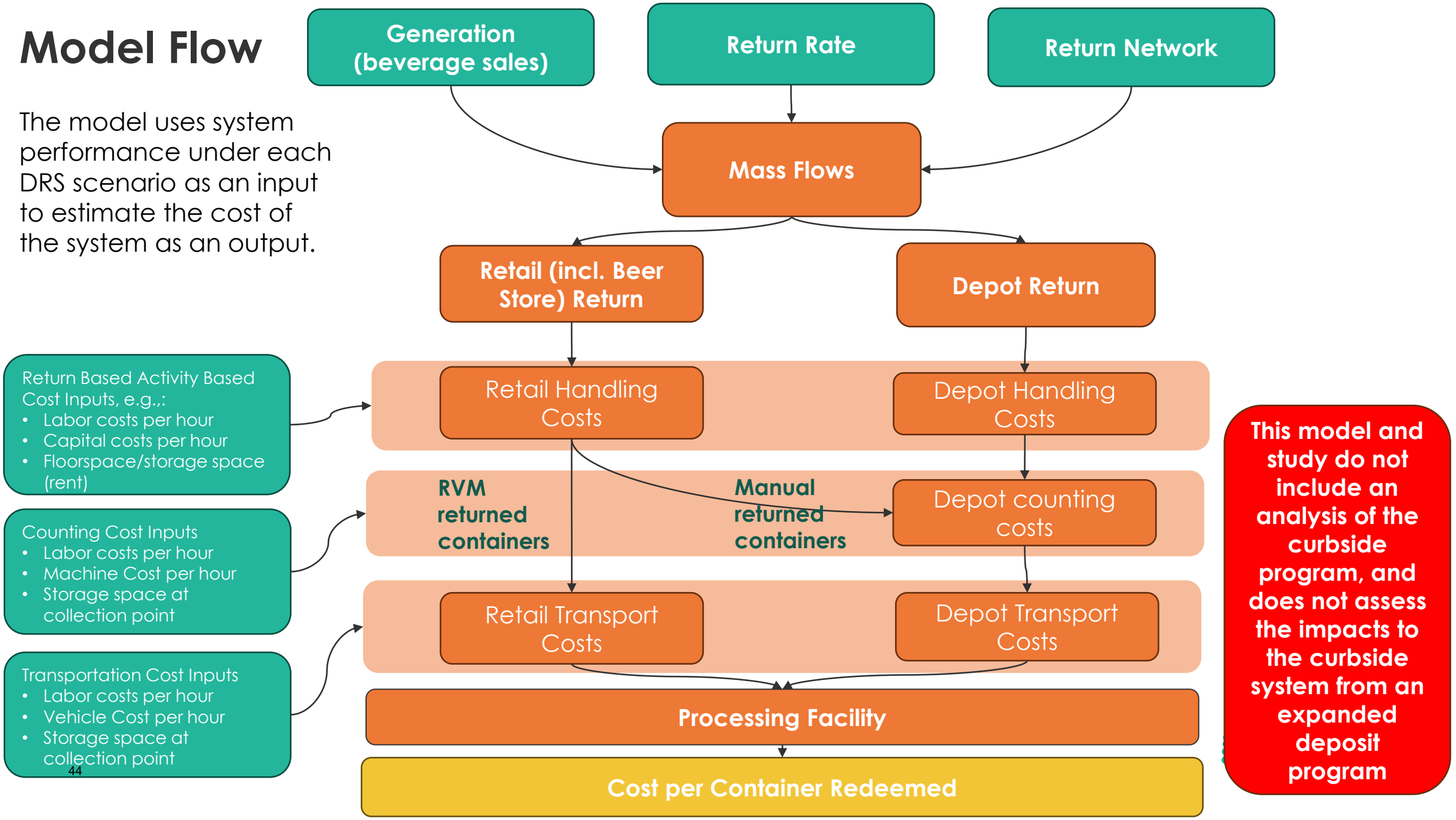
# Model Flow

The model uses system performance under each DRS scenario as an input to estimate the cost of the system as an output.



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# System Performance

3

# Return Rates

The model utilizes system return rates as an input to estimate the cost of the scenario. To estimate the return rates of the developed scenarios, the follow two methods were used:

## Case Studies

A case study method using other jurisdictions (12 total) as case studies for each system – used for their similarities to the modeled scenarios

## Statistical Prediction

A statistical prediction method using a larger universe of jurisdictions and DRS systems

*The following two sections illustrate this analysis.*



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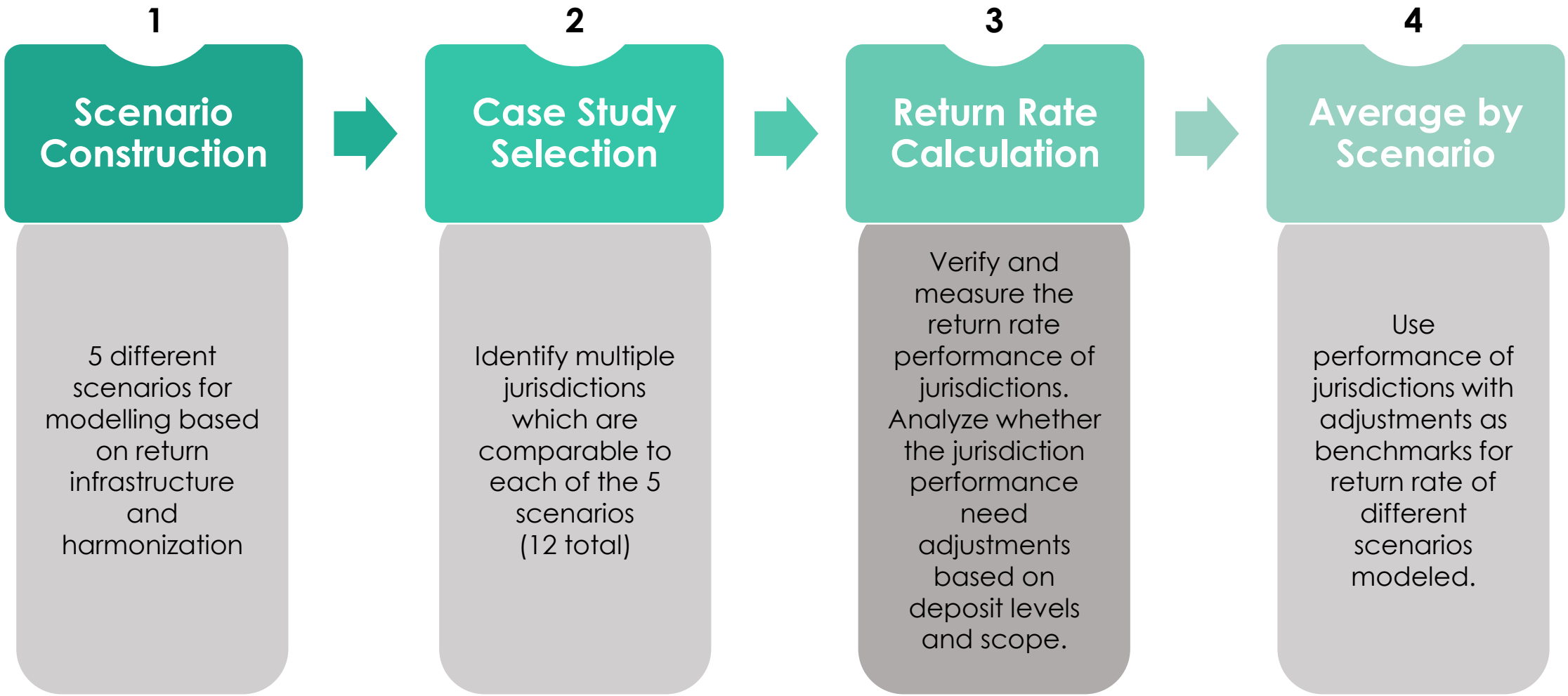
# Jurisdictional Analysis Method

# Estimated Return Rate Method 1: Jurisdictional Scan



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# Example of Jurisdiction Analysis Return Rate Calculation: Scenario 1 (1/2)

This slide shows how the reported return rate for a jurisdiction was adjusted to be useable as an example for Scenario 1. All programs had a reported return rate, However, this was adjusted upward based on deposit level and scope such that the comparison would be one to one with a modernized Ontario deposit system that has at least a 10-cent deposit and a full beverage scope. This is similar to saying what we estimate each system would achieve if they raised both their deposit level and scope only.

| Jurisdictions Studied as Examples of Scenario 1 | Reported Return Rate | Deposit Level (CAD, cents) | Beverage Scope |
|---|---|---|---|
| Massachusetts | 38% | 7 | Low (no water, no wine/sprits) |
| Connecticut (pre-modernization) | 48% | 7 | Low (no non-carbonated beverages except water) |
| Netherlands (pre-modernization) | 70% | 21 | Low (no wine, liquor, cans) |

Research suggests going from 7 CAD to at least 10 CAD is equivalent to a 10% increase in return rate, so 10% would be added to Massachusetts and Connecticut

Research suggests going from a low scope to a higher scope is equivalent to a 5-10% increase, so a conservative 5% would be added to each scenario



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# Example of Jurisdiction Analysis Return Rate Calculation: Scenario 1 (2/2)

This is the work through the adjustments:

| Jurisdictions Studied as Examples of Scenario 1 | Reported Return Rate | Percentage points added based on Deposit Level | Percentage points added based on Scope | Adjusted Return Rate |
|---|---|---|---|---|
| Massachusetts | 38% | +10 | + 5 | 38%+10%+5% = 53% |
| Connecticut (pre-modernization) | 48% | +10 | + 5 | 48% + 10% + 5% = 63% |
| Netherlands (pre-modernization) | 70% | 0 | + 5 | 70% + 0% +5% = 75% |
| **Average – Scenario 1** | **52%** | - | - | **64%** |

**Average reported return rate**

**Average adjusted return rate –** used as case study for Ontario modelling

**64% would then be considered the "representative" return rate for Scenario 1 under this method**



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# Return Rate Setting: Case Study – All Scenarios

| | Associated Scenario | Jurisdiction | Return Rate of Jurisdiction | Deposit Level Lower than 10 cents? | Scope includes nearly all beverages? | Add return rate percentage points based on scope and deposit level | Adjusted Return Rate | Average Scenario Return Rate – based on adjusted return rate |
|---|---|---|---|---|---|---|---|---|
| **Two System** | 1 | Connecticut | 46% | Y | N | Add 15 points | 61% | 63% |
| | | Massachusetts | 38% | Y | N | Add 15 points | 53% | |
| | | Netherlands | 70% | N | N | Add 5 points | 75% | |
| | 2 | British Columbia | 80%** | N | Y | No points added | 80% | 80% |
| **One System** | 3 | Alberta | 84% | N | Y | No points added | 84% | 81% |
| | | California | 68%* | Y | N | Add 15 points | 83% | |
| | | Saskatchewan | 82% | N | Y | No points added | 82% | |
| | | Iowa | 64% | Y | N | Add 15 points | 79% | |
| | 4 | Quebec – (5 cent CAD) | 71% | Y | N | Add 15 points | 86% | 88% |
| | | Croatia | 91% | N | Y | No points added | 91% | |
| | 5 | Oregon | 86% | N | Y | No points added | 86% | 89% |
| | | Denmark | 93% | N | Y | No points added | 93% | |

*California return rate includes containers returned through curbside system

**BC return rate is an average of performance under Encorp and BRCCC.

The performance for Scenario 6 was seen as a similar scenario to Scenario 2, as the system is mainly return to depot

- Y = Add 10%
- N = Add 5%

Research suggests going from 5 to 10 cents CAD and having a wider beverage scope could increase the redemption rate by 15-20 points. However, 10 CAD cents is not enough to ensure a 90% return rate, as seen in B.C. other factors are bringing the overall return rate down.

# Statistical Method

# Method 2: Statistical approach

**1 Identify Key Inputs**

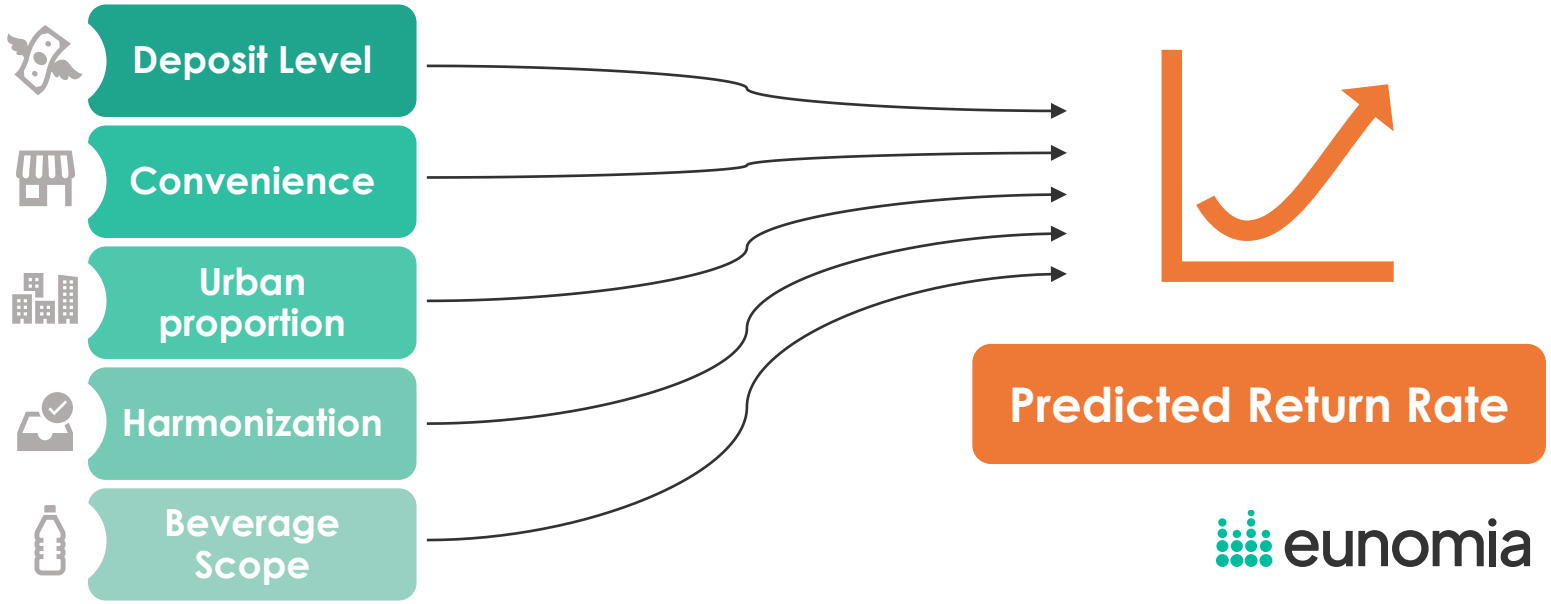
Using data from a broader range of systems, estimate return rate based on key inputs (e.g., deposit, convenience) which are significant at 5 and 10% levels. The dependent variable is the return rate of eligible containers – this means that the independent variables only impact in-scope containers to be independent of one another. They do not relate to *all* beverage containers sold in a jurisdiction.

**2 Plug Key Inputs by Scenario**

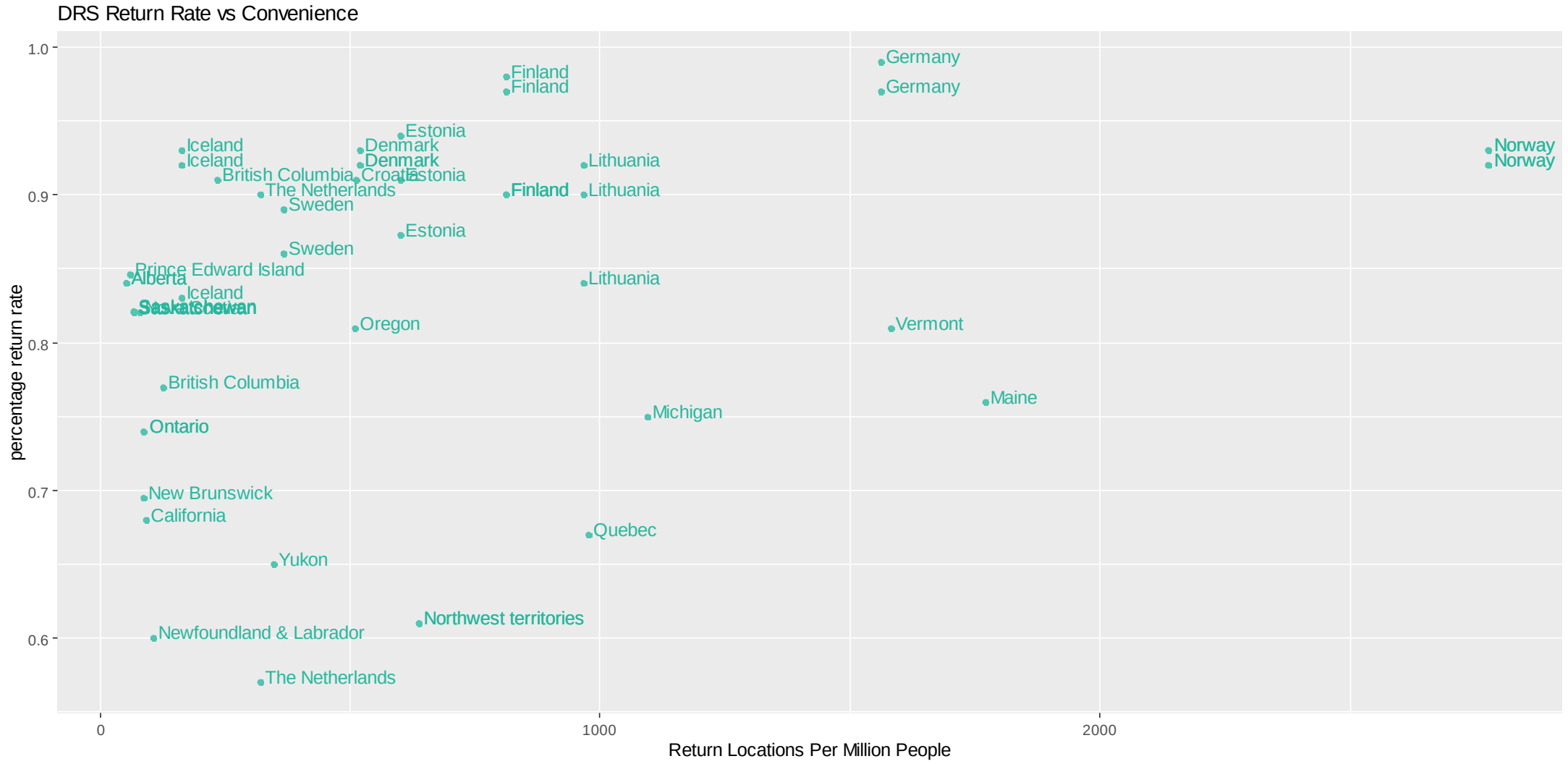
Plug in key inputs from scenarios 1-5, which the statistical model will then read and give a predicted return rate

## Statistical Model Results

| | Impact on Return Rate | P-value of Effect on Predicted Return Rate |
|---|---|---|
| | | |
| **Medium Deposit Level (10-25 CAD cents)** | + | (p = 0.00) |
| | | |
| **High Deposit Level (>25 CAD cents)** | + | (p = 0.00) |
| | | |
| **Return Point per Million People** | + | (p = 0.01) |
| | | |
| **Harmonized System** | + | (p = 0.05) |
| | | |
| **% of Population in Urban Areas** | + | (p = 0.08) |
| | | |
| **Low Scope** | - | (p = 0.00) |
| | | |
| Number of Observations | | 68 |
| r.squared | | 0.53 |
| adj.r.squared | | 0.48 |



# Plotting Universe of Known Return Rates for DRS Programs




54 Multiple points for one country are containers under different deposit levels

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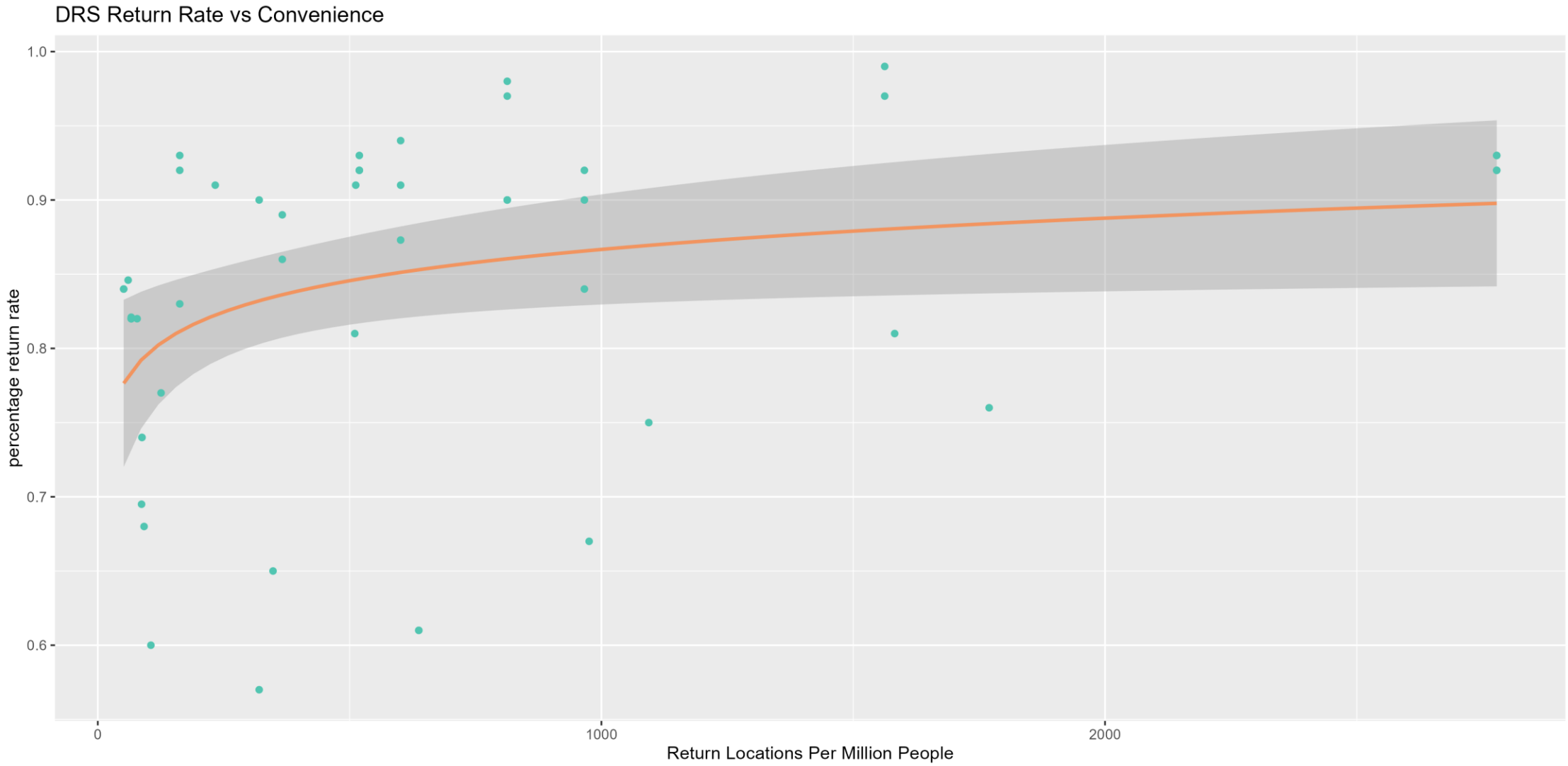
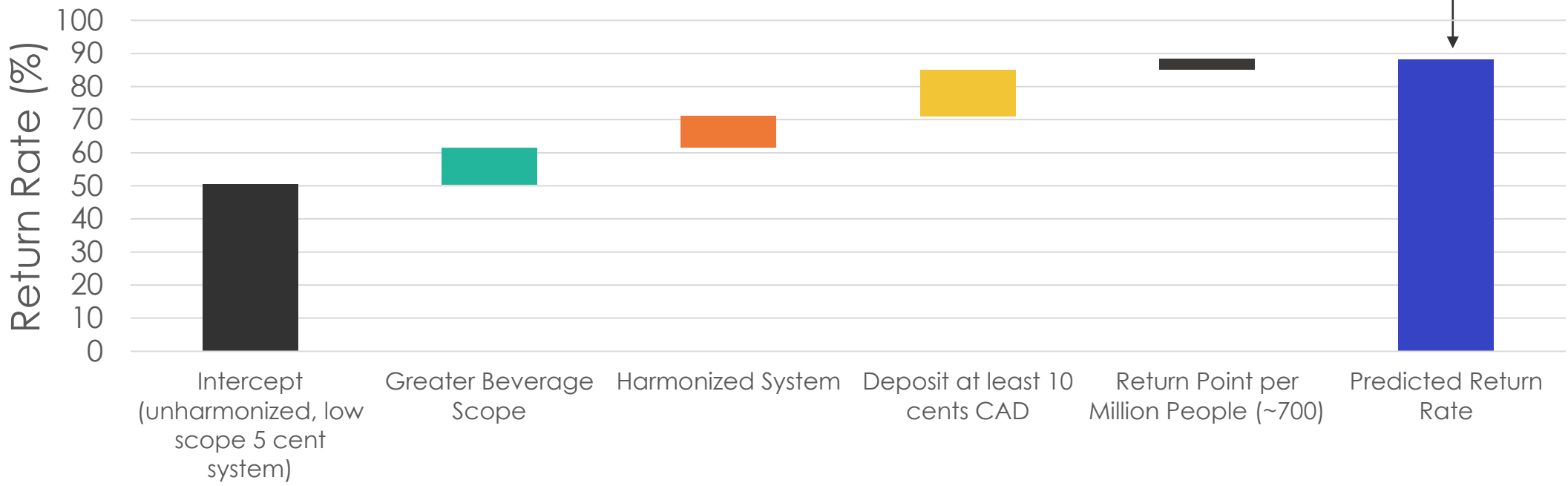
# Example of Convenience as One Variable Modelled



# Setting Predicted Return Rate – Example of Scenario 5

**Key Scenario Inputs**

- **Starting point (intercept)**
- **Full beverage scope**
- **A harmonized system**
- **At least a 10 Cent Deposit**
- **Convenience level of about 700 return points per million people**
- **Predicted Return Rate**



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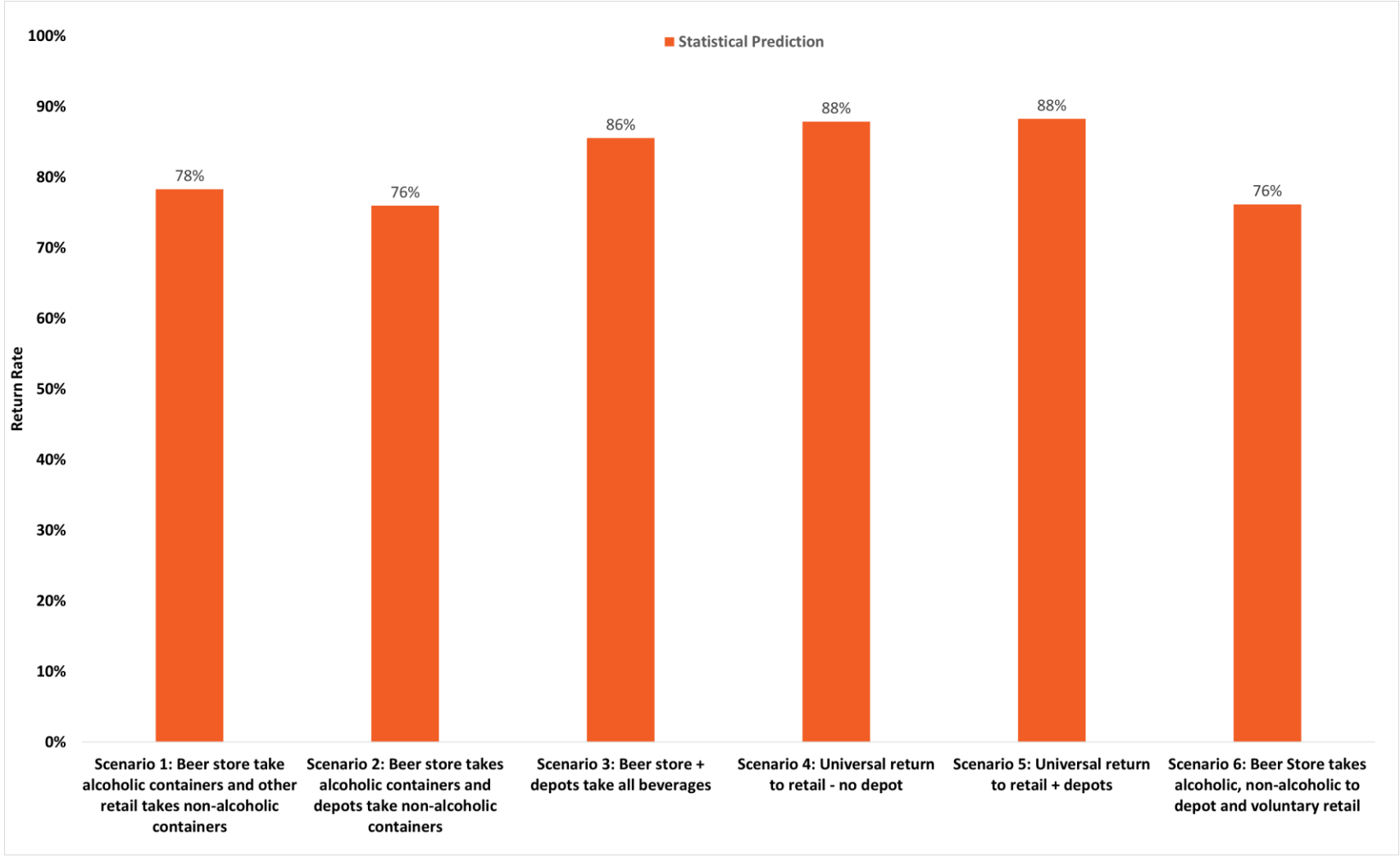
# Predicted Return Rates Based on Statistical Model

1. Harmonized scenarios (3,4,5) have higher return rates than non-harmonized (1,2), this may be a result of less consumer confusion and ease of return

2. Highest performers have the most return locations (Scenarios 4 and 5)

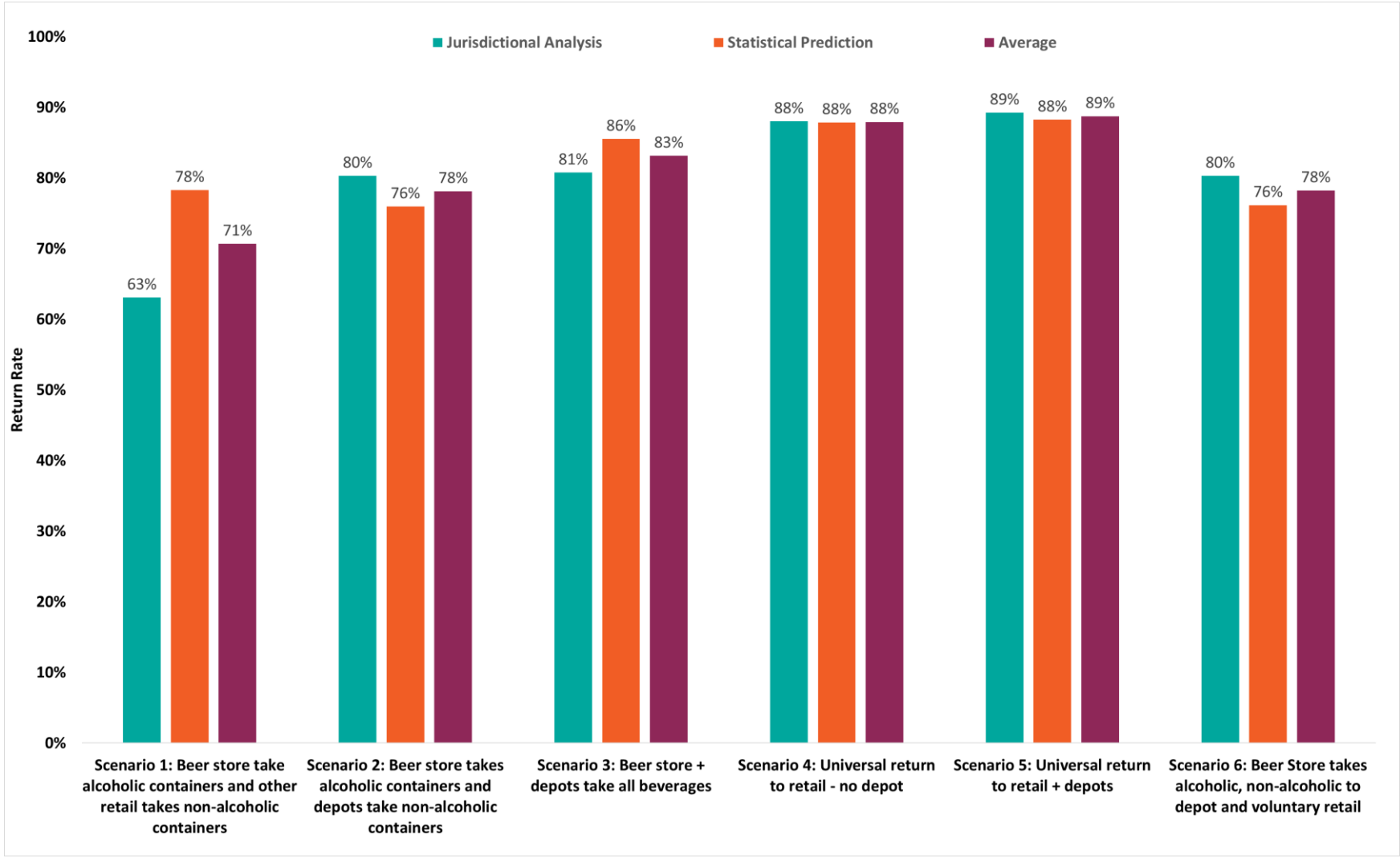
3. Predicted rates can reach close to 90% with high levels of convenience and a sufficiently high deposit level



# Comparison of case study and statistical methods

# Comparison and Average of Statistical Prediction and Case Study Return Rates

1. Similar rates for scenarios 2,4 and 5
2. Slight disagreement between scenarios 1 and 3
3. Harmonized programs on average have higher return rate



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# Cost Model System Design

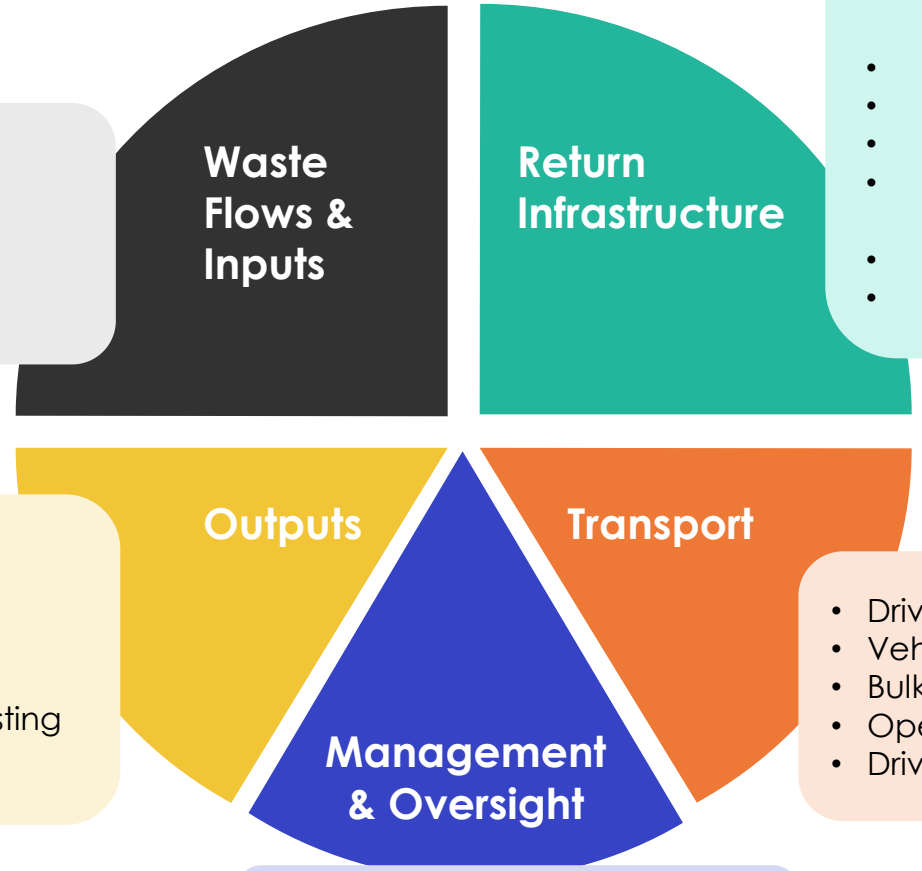
4

# Design Factors Impacting Cost

# DRS Model

The DRS model is designed to consider the following factors in estimating cost:

- Placed on market
- Residential vs away from home
- Target return rate
- DRS vs curbside returns




- Types of return and return volume through different types
- Geographical coverage
- Urban/rural considerations
- Colocation
- RVM, bag drop specifications, costs (capital and operating)
- Counting centers
- Property costs and space requirements

- Current cost & future cost
  - Total cost
  - By material
  - By unit
- Benefits: Recycling
- Impact: Retailer, manufactures, existing service providers
- Handling Fees

- Drive times for households
- Vehicle specifications and costs
- Bulk density consideration
- Operating costs
- Drive times for collection network

- Centralized management
- Oversight

Key Assumptions for the cost modelling are in the appendix starting on slide 54

Out of Scope Costs:
- Curbside program
- HoReCa vehicle collection
- Reuseable system
- Flexible beverages

# DRS Model Input ("levers")

To model a high performing DRS, principles and systems are further defined as inputs for the model.

**WASTE FLOW**

- Volume of material placed on the market
- Home consumption vs away from home vs on site consumption (HoReCa)
- Redemption rate by container types
- Curbside vs DRS (depot and return-to-retail)
- Deposit level
- Levels of Fraud

**CONVENIENCE**

- Population per return point – total number of return locations – based on achieving high performing convenience and retail size thresholds

**INFRASTRUCTURE**

- Obligated points of return (e.g., depot, retail) – including what type of return point takes which containers
- Space requirement for retailers
- Costs for labor and technology
- Proportion of returned volume that goes through different return points
- Counting, sorting and baling equipment

**LOGISTICS**

- Collection required based on storage space and levels of compaction
- Vehicle specifications and costs
- Operating costs



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# Containers Placed on Market/Sold

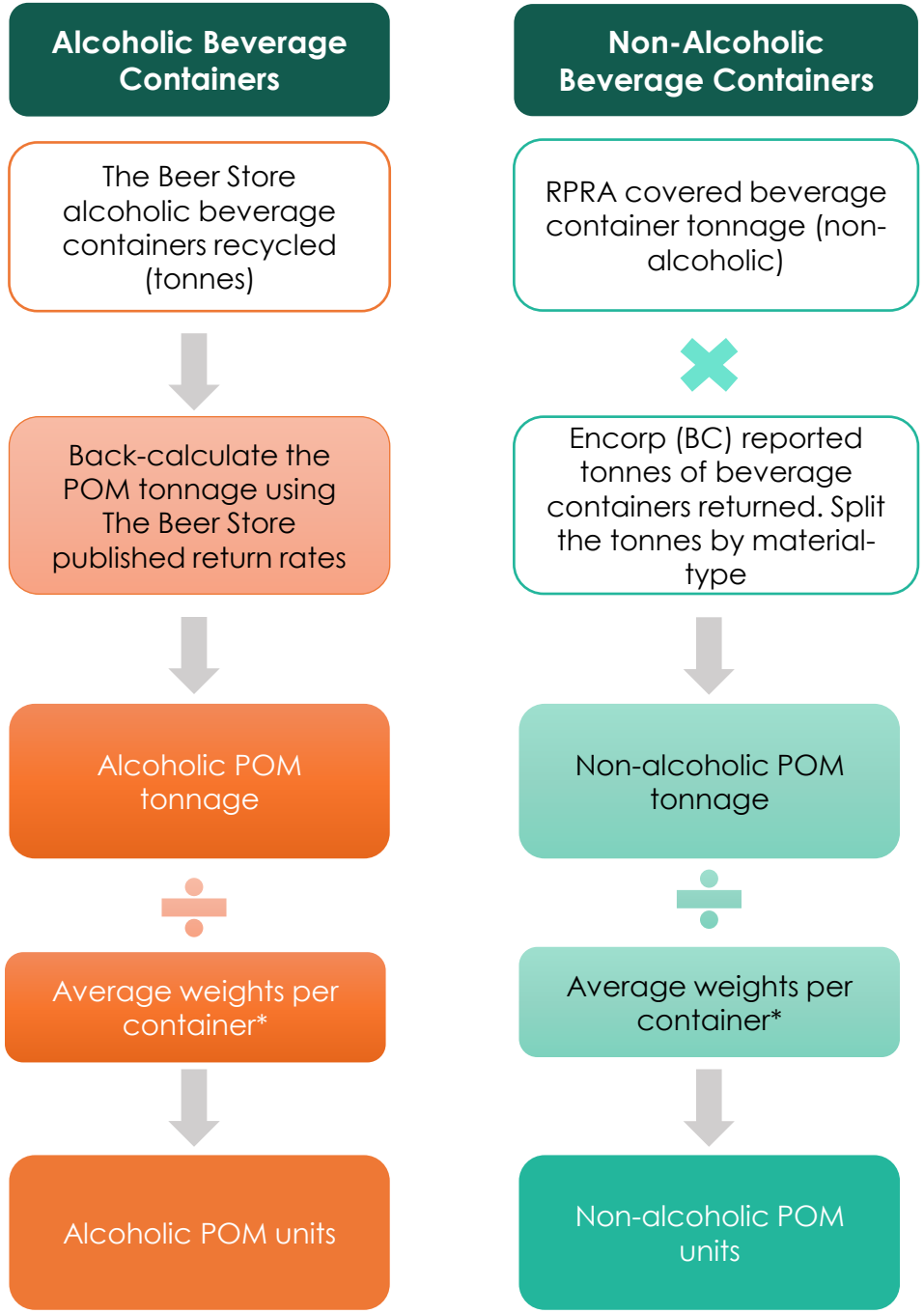
An integral part of determining the system costs as well assessing the environmental and social impacts is the assumptions of how containers flow through the system. To determine this the number of containers that are sold into a province is needed. Another way to phrase this is the containers placed on the market (POM).

**This was estimated according to alcoholic beverage containers and non-alcoholic beverage containers. Non-alcoholic beverage containers represent approximately 70% of POM units.**

**Containers Placed on the Market (Millions of Containers)**

| Glass | Plastic | Aluminum | Beverage Cartons | Steel | Total |
|---|---|---|---|---|---|
| 575 | 3,170 | 2,950 | 880 | 35 | **7,610** |

Source: Eunomia calculation using the Beer Store Responsible Stewardship 2022, supported with British Columbia Encorp data and average beverage weight per container from NAPCOR, TOMRA, and other industry data. Plastic includes PET, HDPE and PP.



# Return Infrastructure

# Return Infrastructure

The modeled return locations in the scenarios include:


Large and medium retailers fully participate in the retail-based scenarios, while only a fraction (3%-10%) of the small retailers participate in some of scenarios that have return to retail.

Manual collection is utilized exclusively at Beer Stores and small retailers, while large retailers, medium retailers, and large depot sites are equipped with Reverse Vending Machines (RVMs) for automated returns. Depots also receive bulk bags for return for automated sorting and counting. Secondary packaging return is not modelled.

The following slides depict the return locations for beverage containers and the corresponding collection methods employed in each modeled scenario.



**Refer to the appendix from slide 54 for model assumptions*

# Scenario 1 – Alcoholic to Beer Store and Non-Alcoholic to Other Retail Return Design Inputs

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| Large Retailer | X | Y | Y | X | Y | X |
| Medium Retailer | X | Y | Y | X | Y | X |
| Small Retailer | X | Y | X | Y | X | X |
| Beer Store | Y | X | X | Y | X | X |
| Depot | X | X | X | X | X | X* |

Y = Yes in this Scenario
X = Not in this Scenario

* ***In this Scenario, depots act as counting centers for uncompacted containers, rather than return points***



*Refer to the appendix from slide 57 for model assumptions

# Scenario 2 – Alcoholic to Beer Store and Non-Alcoholic to Depot Return Design Inputs

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| Large Retailer | X | X | X | X | X | X |
| Medium Retailer | X | X | X | X | X | X |
| Small Retailer | X | X | X | X | X | X |
| Beer Store | Y | X | X | Y | X | X |
| Depot | X | Y | Y | Y | Y | Y |

Y = Yes in this Scenario
X = Not in this Scenario



**Refer to the appendix from slide 57 for model assumptions*

# Scenario 3 – Depots and Beer Store Take All Containers Return Design Inputs

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| **Large Retailer** | X | X | X | X | X | X |
| **Medium Retailer** | X | X | X | X | X | X |
| **Small Retailer** | X | X | X | X | X | X |
| **Beer Store** | Y | Y | X | Y | X | X |
| **Depot** | Y | Y | Y | Y | Y | Y |

Y = Yes in this Scenario
X = Not in this Scenario



**Refer to the appendix from slide 57 for model assumptions*

# Scenario 4 – Universal Return to Retail Return Design Inputs

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| **Large Retailer** | Y | Y | Y | X | Y | X |
| **Medium Retailer** | Y | Y | Y | X | Y | X |
| **Small Retailer** | Y | Y | X | Y | X | X |
| **Beer Store** | Y | Y | X | Y | X | X |
| **Depot** | X | X | X | X | X | X* |

Y = Yes in this Scenario
X = Not in this Scenario

* ***In this Scenario, depots act as counting centers for uncompacted containers, rather than return points***



**Refer to the appendix from slide 57 for model assumptions*

# Scenario 5 – Universal Return to Depot and Retail Design Inputs

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| Large Retailer | Y | Y | Y | X | Y | X |
| Medium Retailer | Y | Y | Y | X | Y | X |
| Small Retailer | Y | Y | X | Y | X | X |
| Beer Store | Y | Y | X | Y | X | X |
| Depot | Y | Y | Y | Y | Y | Y |

Y = Yes in this Scenario
X = Not in this Scenario



**Refer to the appendix from slide 57 for model assumptions*

# Scenario 6 – Alcoholic to Beer Store and Non-Alcoholic to Depot and Voluntary Retail

| Infrastructure | Accepts Alcoholic Beverage Containers | Accepts Non-Alcoholic Beverage Containers | RVM | Manual Collection | Compaction on-site | Bulk Returns |
|---|---|---|---|---|---|---|
| Large Retailer | X | Y | Y | X | Y | X |
| Medium Retailer | X | Y | Y | X | Y | X |
| Small Retailer | X | Y | X | Y | X | X |
| Beer Store | Y | X | X | Y | X | X |
| Depot | X | Y | Y | Y | Y | Y |

Y = Yes in this Scenario
X = Not in this Scenario



**Refer to the appendix from slide 57 for model assumptions*

# Scenario Modelling Design Executive Summary

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Level of Harmonization** | Two System | Two System | Universal System | Universal System | Universal System | Two System |
| **Return Points** | ODRP and other retail | ODRP and Depot | ODRP and Depot | ODRP and Other Retail | ODRP, Other Retail, Depot | ODRP, Other Retail, Depot |
| **Method of Return** | 1) ODRP – manual<br>2) Other retail – RVM at retail > 4000 sq ft, manual at smaller | 1) ODRP – manual<br>2) Depot – bag bulk return and RVM | 1) ODRP – manual<br>2) Depot – bag bulk return and RVM | 1) ODRP – manual<br>2) Other retail – RVM at retail > 4000 sq ft, manual at smaller | 1) ODRP – manual<br>2) Other retail – RVM at retail > 4000 sq ft, manual at smaller<br>3) Depot – bag bulk return and RVM | 1) ODRP – manual<br>2) Other retail – RVM at participating retailers<br>3) Depot – bag bulk return and RVM |
| **Number of Participating Retailers (incl. Beer store)** | 8,000 | 810 | 810 | 8,000 | 9,000 | 1410 (600 non-Beer Store/LCBO) |
| **Percent of Retailers above 4100 square feet which are Participating (non-beer store/lcbo)** | 100% | 0% | 0% | 100% | 100% | 10% |
| **Total Number of RVMs at Retailers** | 8,180 | 0 | 0 | 9,170 | 9,170 | 890 |
| **Annual Retail RVM Costs ($M) – Purchase and Maintenance** | 100 | 0 | 0 | 110 | 110 | 10 |



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# Scenario Modelling Results Executive Summary

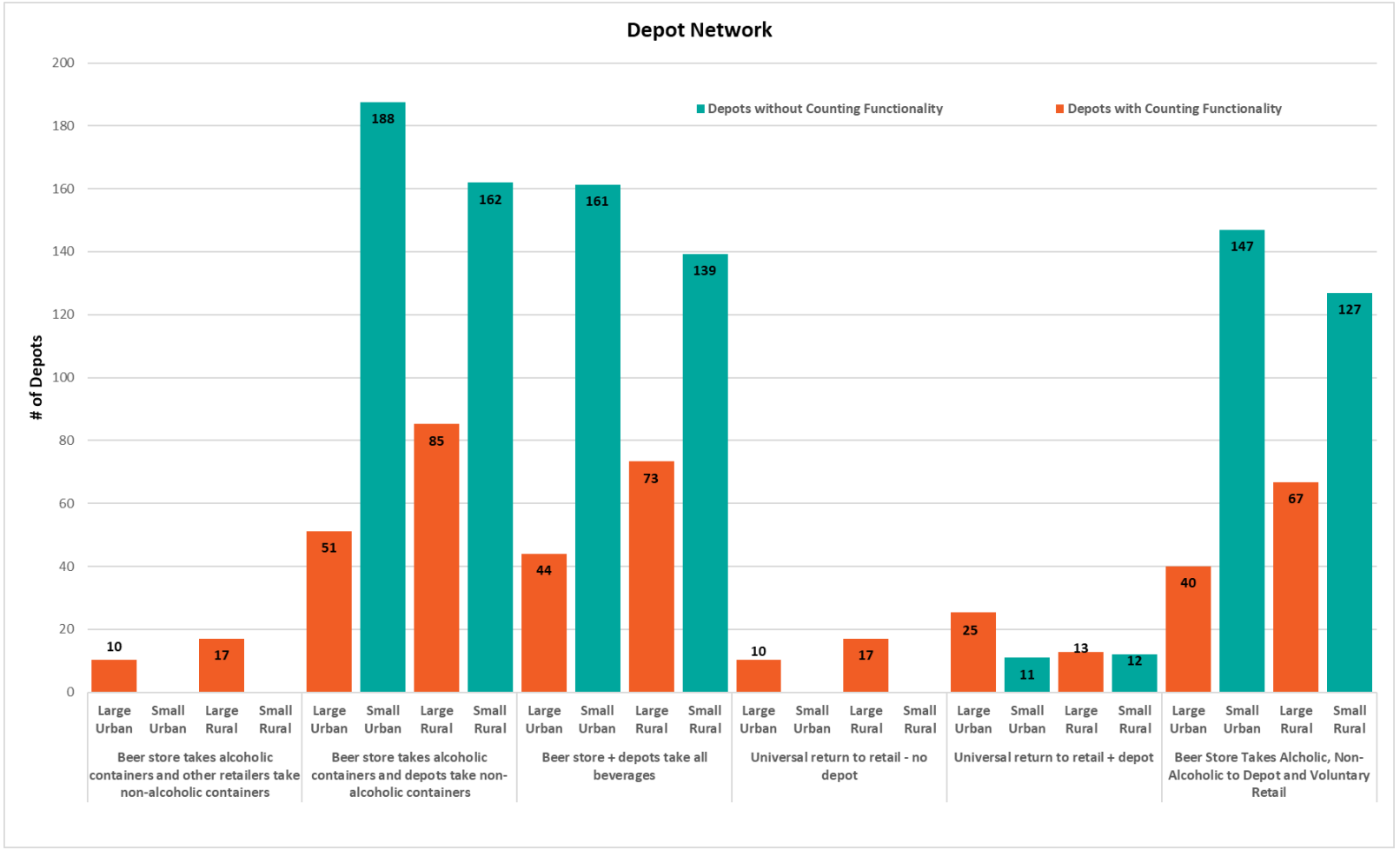
| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Level of Harmonization** | Two System | Two System | Universal System | Universal System | Universal System | Two System |
| **Return Points** | ODRP and other retail | ODRP and Depot | ODRP and Depot | ODRP and Other Retail | ODRP, Other Retail, Depot | ODRP, Other Retail, Depot |
| **Number of Counting, Verification, Baling – under hybrid scenarios can also accept returns** | 27 | 136 | 117 | 27 | 38 | 107 |
| **Number of Depots – Return Only** | 0 | 349 | 301 | 0 | 23 | 274 |
| **Population per Return Point** | 1,773 | 10,976 | 10,976 | 1,773 | 1,577 | 7,500 |
| **Return Rate** | 71% | 78% | 83% | 88% | 89% | 78% |
| **Total Gross Cost per Year ($M)** | **310** | **490** | **530** | **350** | **370** | **445** |
| **Total Net Cost per Year ($M, gross minus material revenues)** | **230** | **400** | **440** | **250** | **270** | **360** |
| **Total Minus Unredeemed Deposits** | **10** | **240** | **320** | **170** | **190** | **200** |
| **Net Cost per Container Redeemed (CAD Cents) – Excluding Unclaimed Deposits** | 4.2 | 6.8 | 6.9 | 3.8 | 4.0 | 6.0 |

# Depot Network

The jurisdictional research informed the estimation process for the number of depots needed, focusing on providing population-per-depot estimates. To ensure convenient access to return locations for Ontarians, the model targeted an average of approximately 29,000 people per depot, aligning with British Columbia and Alberta standards. The number of depots were also tested to ensure their throughput was in line with depots see in other jurisdictions.

Containers returned to small depots are consolidated and transferred to larger depots for counting as they will not have a high enough throughput and space to justify purchasing a bulk counting machine

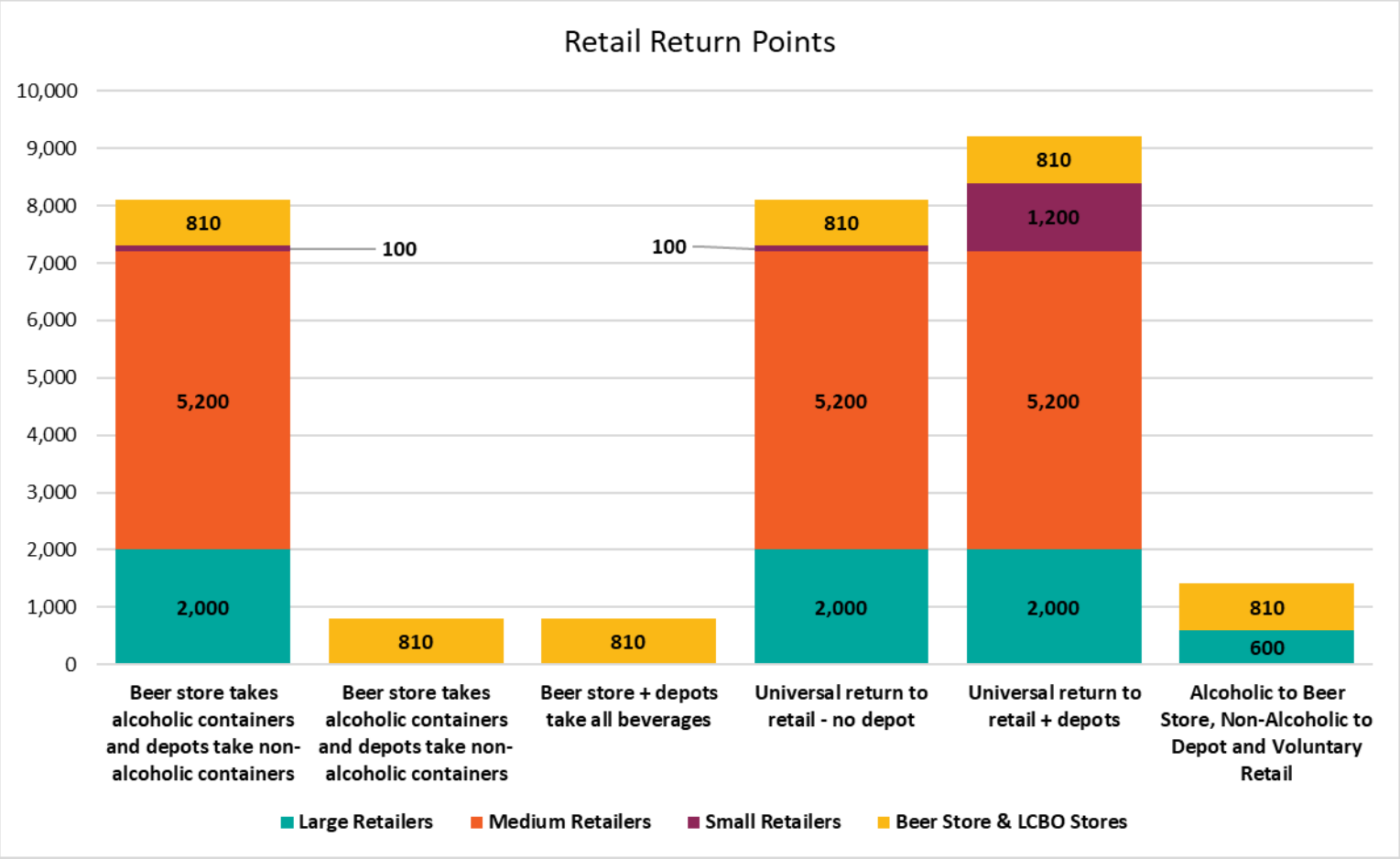
In Scenario's 1 and 4, depots do not serve as return locations but instead function as counting centers for uncompacted containers collected at retail and from HoReCa. Consequently, the required number of depots is estimated based on capacity to count the volume of HoReCa returned containers.






**Refer to the appendix from slide 57 for model assumptions*

# Retail Network




*Source: Business count data provided by the Ontario Ministry of Environment, Conservation and Parks.*

**Refer to the appendix from slide 57 for model assumptions*

The jurisdictional research informed global estimates for population-per-retailer. Medium and large Retailers with an estimated space of 4,100 sqft or greater will be required to participate as a return location under the systems. Under Scenarios 1, 4, and 5 however this quantity of retail locations does not achieve access levels for Ontarians as seen in other high performing systems.

Consequently, with the aim of ensuring widespread access to return locations for Ontarians, projections were made for the required number of retailers smaller than 4,100 sqft to serve as return points in various return-to-retail scenarios. High performing Return to retail only jurisdictions researched for this study showed an average of 1,500 people per return point. In Scenario 1 and 4, this translated to approximately 1% of these retailers, while in Scenario 5, it is 10%.

To reach high performing levels for Scenario 5, 1,500 people per return point are modelled as the depot network is assumed to allow for some additional smaller retailers (whore are manual return only) to come into the system. Meanwhile scenario 1 and 4 achieve population per retail return point of 1,950 people. Both scenarios 4 and 5 achieve accessibility rates that surpass other high performing systems like Oregon's, which typically offer approximately 1 return location per 2,000 people.

# Scenario Results

# Total System Costs

## Total system costs annually, in millions*

| | Beer store takes alcoholic containers and other retailers take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|
| Gross Cost | 310 | 490 | 530 | 350 | 370 | 445 |
| Total Material Revenues | -80 | -90 | -95 | -100 | -100 | -90 |
| **Total Net Cost** | **230** | **400** | **440** | **250** | **270** | **360** |
| ***Total Minus Unredeemed Deposits*** | ***10*** | ***240*** | ***320*** | ***170*** | ***190*** | ***200*** |
| ***Return Rate (excl. curbside)*** | ***71%*** | ***78%*** | ***83%*** | ***88%*** | ***89%*** | ***79%*** |

## System performance comparison

| | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail | Alberta | Quebec | British Columbia |
|---|---|---|---|---|---|---|---|---|---|
| ***Return Rate (excl. curbside)*** | ***71%*** | ***78%*** | ***83%*** | ***88%*** | ***89%*** | ***79%*** | ***84%*** | ***71%*** | ***80%*** |

** These are annualized costs for a fully implemented system. The capital costs are depreciated over time and treated as operational costs. Note rounding, see appendix from slide 57 for detailed costs.*

Adopting Scenarios 3, 4, or 5 would see Ontarian's surpass other Canadian DRS systems.

- **Scenario 1** has the lowest net cost but also receives the lowest volume of containers returned and only achieves a 71% return rate. This scenario achieves comparable return rate to Quebec's current system.
- **Scenario 2** costs an additional $170M compared to Scenario 1 and receives an additional 570 million beverage containers returned. Costs are driven by an accessible depot network which accepts only non-alcoholic containers.
- **Scenario 3** is the most expensive of the scenarios at $440 million a year. This system sees an estimated 6.3 billion containers returned annually, a return rate that surpasses British Columbia's current system performance. Depot and manual returns from the Beer Store result in this scenario having the highest cost.
- **Scenario 4** introduces universal return to retail, almost halving the cost of the system from Scenario 3 while still increasing containers returned 360 million over Scenario 3.
- **Scenario 5** costs an additional $20 million more than Scenario 4 but would achieve close to 90% return rate. This would see Ontario's DRS system aligning with global high performing examples and surpass Alberta's current system performance.
- **Scenario 6** Is in the middle of the other two non-harmonized scenarios in terms of costs, however it has the highest return rate of the non-harmonized scenarios at 79%

# Types of System Costs

Total system costs have been categorized into the following:

| Cost Type | Definition |
|---|---|
| Reception | This includes all costs associated with the reception of returned beverages. For instance, cost of the return point space, labor to manually receive at a return point, the cost of installing and maintaining RVMs and any container costs. |
| Transportation | This is the cost of collecting materials from return locations and transporting them to depot sites for post-collection management. |
| Post-collection | This includes the cost of counting, verification, sorting, and processing of containers as well as the depot overhead and labor costs. This is further broken into counting and verification costs versus sorting costs. |
| Admin | This is the central administrative overhead costs of running the DRS system. This includes staff salaries, office space, IT, utilities etc. |
| Material Revenues | This is the estimated value of returned beverage containers on the secondary market. Note that these values are estimated based on the latest 5 years estimated bale prices in Ontario. |
| Net Cost | This is the summation of all above costs. |



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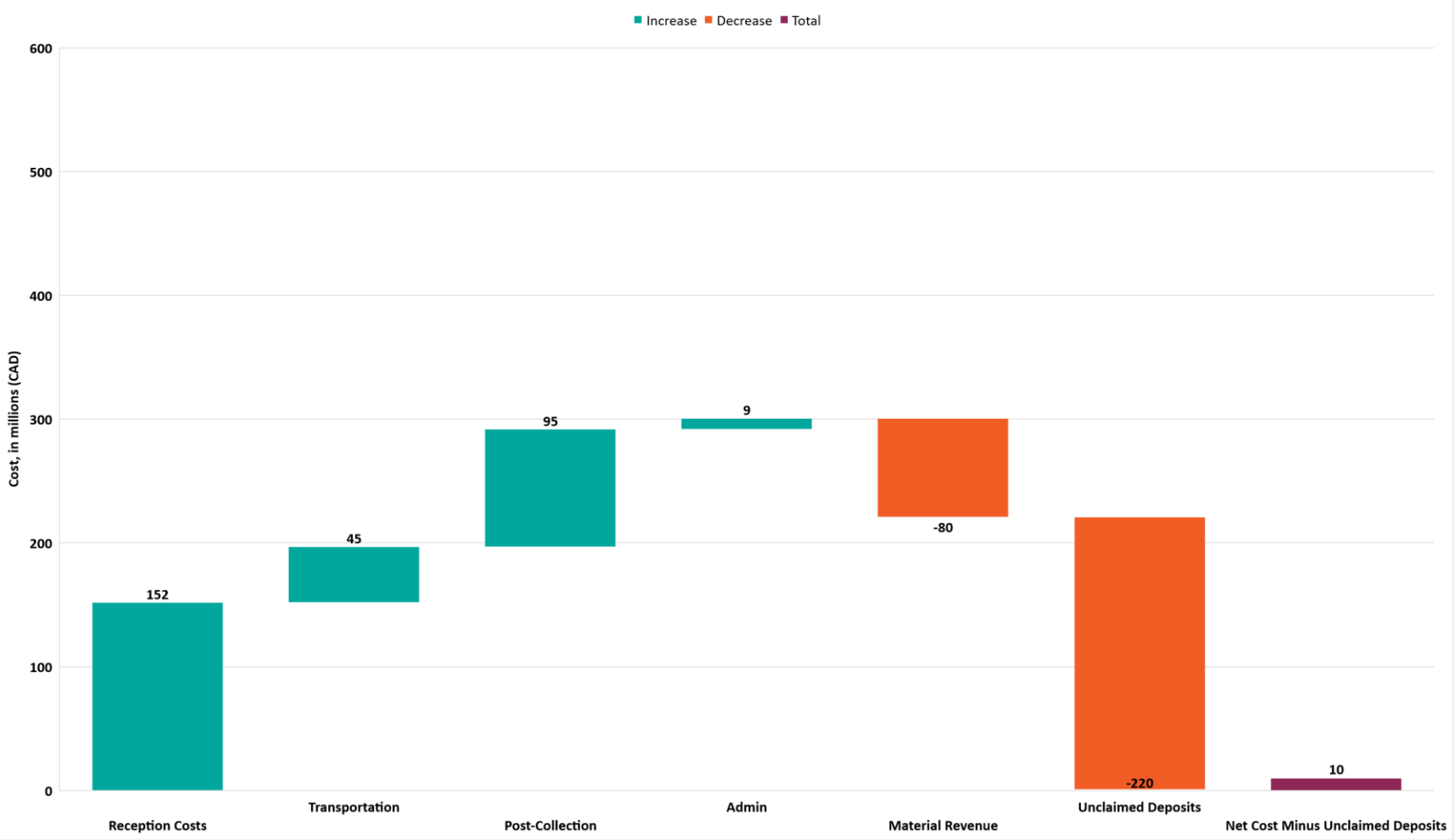
# Scenario 1 Results

**Beer Store take alcoholic and other retailers take non-alcoholic**




Scenario 1 is a two-system scenario with non-alcoholic beverage containers returned through other retailers while alcoholic containers continue to be returned through the Beer Store. The gross cost of this system is estimated to be $310M.

This scenario reflects a combination of manual and automated returns which result in higher reception costs and transportation costs compared to Scenario 2, which is also a two-system scenario. Reception costs represent approximately 49% of gross costs and reflect the cost of installing and maintaining RVM's at retailers to introduce automated returns.

Transportation costs reflect the uncompacted material collected manually, largely from the Beer Store, that needs to be transported to counting centers for post-collection management. It also includes collection from RVM retailers to recyclers. Post-collection includes counting & verification (for uncompacted containers), and sorting of containers. Post collection costs represent 31% of gross costs.

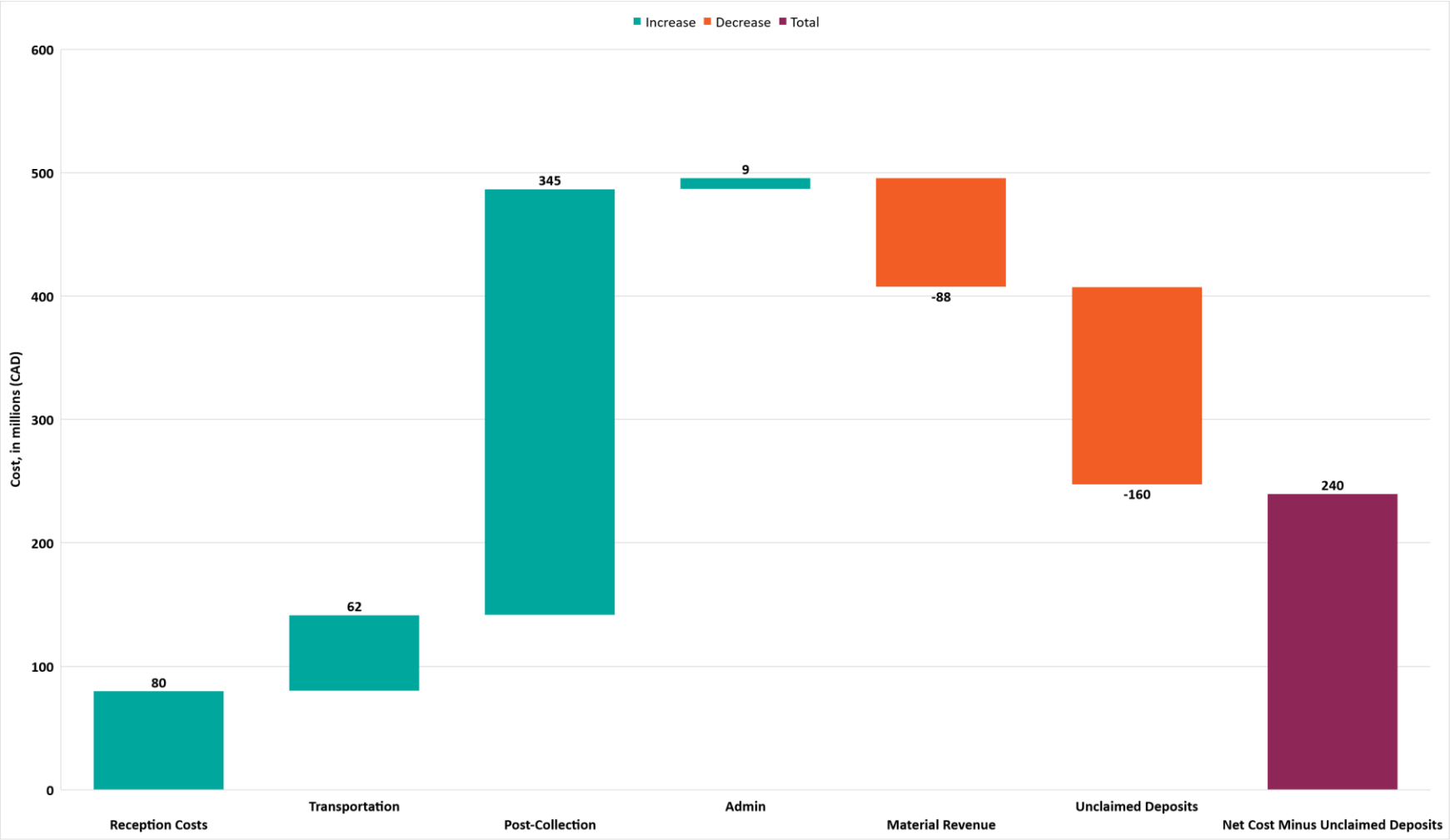
Counting and sorting costs from the Beer Store are particularly high owing to manual returns only at these locations.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Scenario 2 Results

## Beer Store take alcoholic and depot take non-alcoholic




Scenario 2 is a two-system scenario with non-alcoholic containers being collected through depot while alcoholic continue to be collected at Beer Stores. The gross cost of this system is estimated to be $490M.

This scenario is more reliant on manual collections compared to Scenario 1, with marginal automation of collection seen at large depot sites. Consequently, reception costs are lower without the need to install and maintain RVMs at retail locations as compared to Scenario1.

With significantly less automation, the post-collection costs are much larger and represent 70% of gross costs. This covers the counting, verification, and sorting costs from material that is manually collected at Beer Store and depot sites. This cost also includes the depot overhead costs to run and maintain depot sites under this scenario.

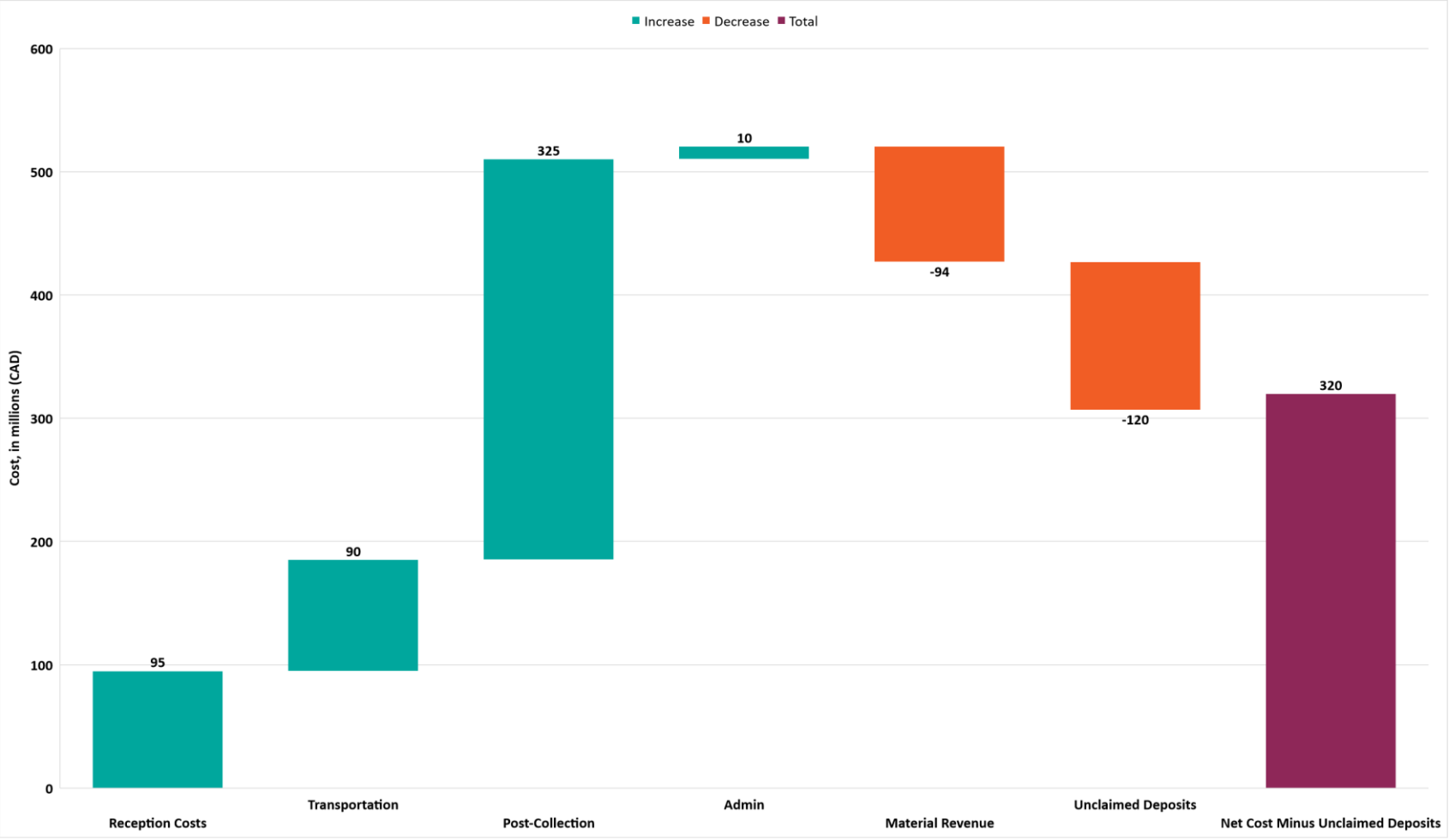
Consequently, this system is anticipated to cost $180M more annually than scenario 1.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Scenario 3 Results

**Beer Store and depot take all beverage containers**




Scenario 3 is a universal system with Beer Store and depots accepting all beverage containers. The gross cost of this system is estimated to be $530M.

In contrast to the previous two-system scenarios, this scenario reflects the cost of collection for all containers at the Beer Store and at Depot sites. This is expected to lead to a higher proportion of beverage containers returned to Beer Stores because:

- This is more convenient for the urban population
- Ontarian's currently returning their alcoholic containers to Beer Stores would likely choose to continue doing so while also returning non-alcoholic containers.

The exclusion of collection at retailers means Reception costs remain similar to Scenario 2, as there is no need for installation and maintenance of RVMs at these sites.

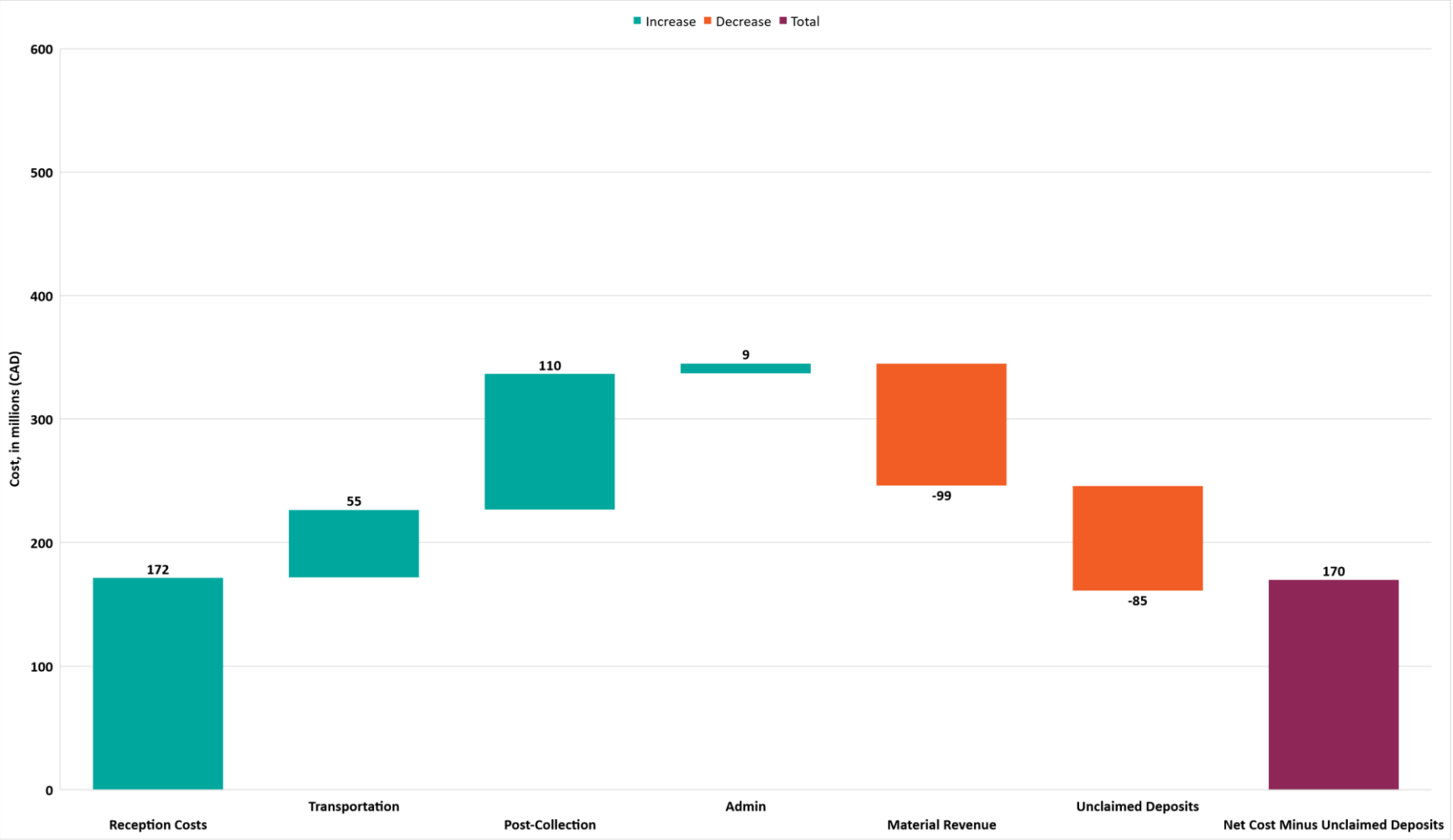
However, the increase in returns to the Beer Store sees a system-wide increase in uncompacted containers collected. This results in a greater cost to transport these containers for post-collection management, incurring a higher overall cost compared to Scenarios 1 and 2.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Scenario 4 Results

## Universal return to retail, no depot




Scenario 4 is a universal system all beverage containers being accepted at retail locations. This include Beer Store locations. The gross cost of this system is estimated to be $350M.

The exclusive reliance on return-to-retail locations shifts much of system costs to investment in installation and maintenance of RVMs to receive this large volume. This results in higher Reception costs than preceding scenarios, representing 49% of gross costs.

This increase in automation reduces the need for transportation within the system to manage manually collected containers. Consequently, transportation cost make up only 16% of gross costs in this scenario. This is the lowest transportation cost of the six scenarios.

A small quantity of depot sites remain active under this scenario to accept bulk returns from HoReCa sites and to run post-collection management tasks of counting, verification, and sorting.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Scenario 5 Results

## Universal return to retail and depot


Scenario 5 is a universal system with all beverage containers being accepted at retailers and depot. The gross cost of this system is estimated to be $370M.

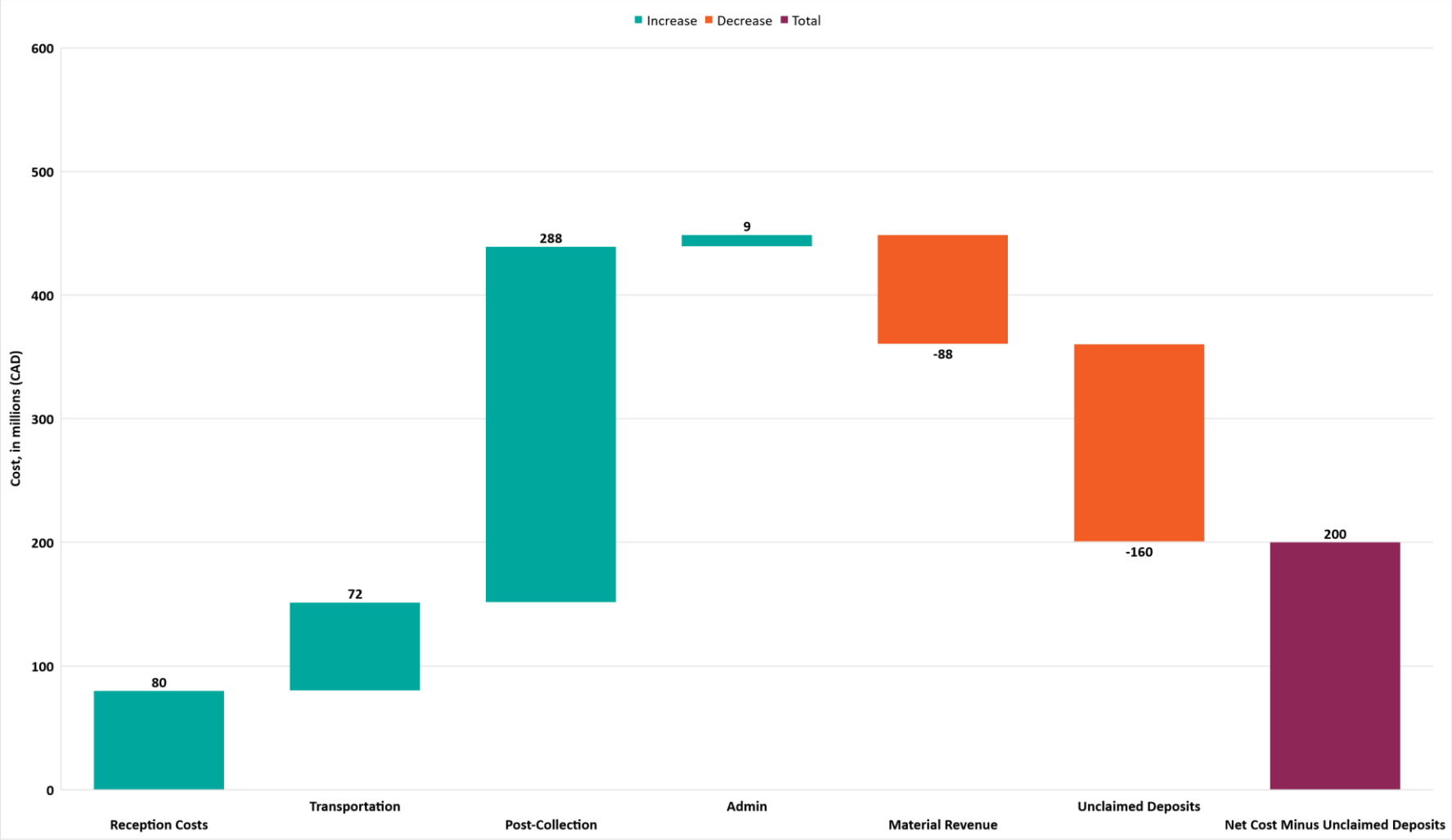
This scenario reflects the cost of efficient collection for all containers at retail locations and depot sites. The addition of depot sites as return locations sees a small shift in Reception costs to transportation costs (approximately $3-4M) to account for a greater volume of material manually collected at depots as well as some small retailers.

Material revenues are highest in this Scenario as this scenario sees the highest volume of returns, with a return rate of 89%. This places it in close alignment with global high performing examples of Deposit Return Systems (DRS), which typically boast a return rate of 90%. The combination of high performing access, return rates, and automation results in a system that is high performing and a similar cost to Scenario 4.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Scenario 6 Results




Scenario 6 resembles Scenario 2 in its cost breakdown and is $45M less costly. Scenario 6 and Scenario 2 each are heavily reliant on depot collection for non-alcoholic containers. As a result, the largest cost in this scenario is for the depot counting, sorting and verification of uncompacted containers. The total gross cost of this scenario is estimated to be $445M per year.

There is voluntary retail in this scenario, and therefore the reception costs (including RVM purchases) are slightly higher in this scenario than in Scenario 2. Because there are RVMs in some locations, the post-collection costs are also slightly lower in this scenario than in Scenario 2, as RVMs will have already counted, verified and compacted returned containers. In Scenario 2, there is no RVM return.

This scenario costs $75M more than Scenario 5,and $95M more than Scenario 4.



**Refer to the appendix from slide 57 for greater detail. Note rounding*

# Cost per Redeemed Container Comparison

**Cost per redeemed container (cents)**

| | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|
| Reception Costs | 3.2 | 1.5 | 1.6 | 3.0 | 2.9 | 1.6 |
| Transportation | 1.3 | 1.3 | 1.8 | 1.0 | 1.0 | 1.3 |
| Post-Collection | 2.0 | 6.8 | 6.2 | 1.9 | 2.2 | 5.7 |
| Admin | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Material Revenue | -1.8 | -1.8 | -1.8 | -1.8 | -1.8 | -1.8 |
| **Total Net Cost** | **4.2** | **6.8** | **6.9** | **3.8** | **4.0** | **6.0** |
| Unclaimed Deposits | -4.0 | -2.7 | -1.9 | -1.3 | -1.2 | -2.7 |
| **Total Net Cost Minus Unclaimed Deposits** | **0.2** | **4.1** | **5.0** | **2.5** | **2.8** | **3.3** |
| **Depot Handling Cost** | **N/A** | **6.9** | **5.6** | **N/A** | **4.9** | **5.8** |
| **RVM Handling Cost** | **4.4** | **N/A** | **N/A** | **4.0** | **4.3** | **5.4** |



**See appendix from slide 57 for cost per container Placed on Market/Supplied and for model assumptions*

As the DRS systems become more optimized from Scenario 1 to 5, the cost per redeemed container decreases.

This happens because the two-system scenarios must ensure convenient access for alcoholic and non-alcoholic beverage containers at retail and depot sites. However, due to the smaller scope of accepted returns these systems typically get fewer returns. Consequently, the cost per container ends up being higher compared to universal systems. The exception is scenario 5, which has a small number of depots and thus a high throughput, allowing for cost optimization.

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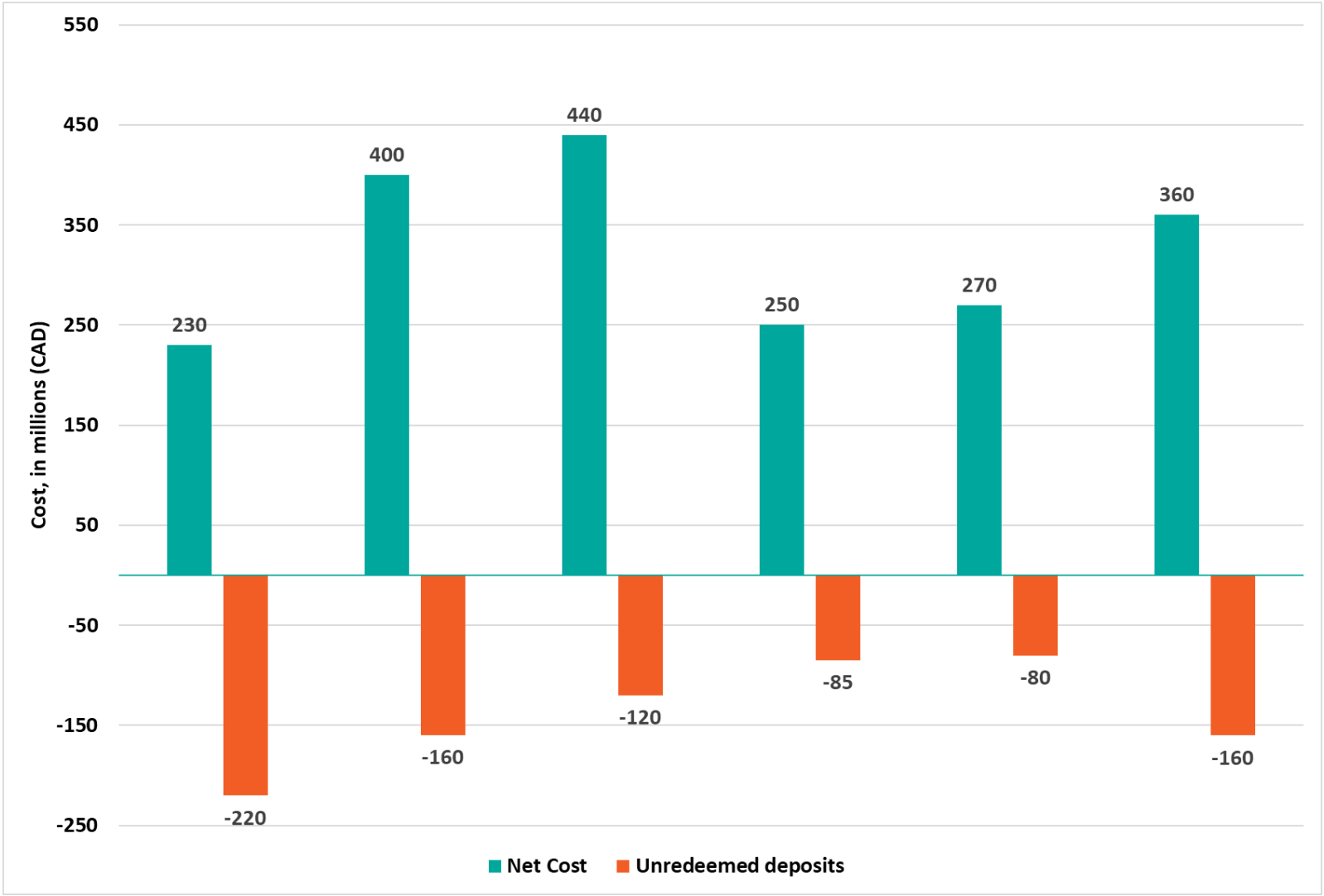
# Unredeemed Deposits vs Net Cost of DRS System




As system efficiency improves, the volume of unredeemed deposits decreases, with Scenario 5 demonstrating the lowest quantity of unredeemed deposits.

These unredeemed deposits represent potential reinvestment into the system, helping to offset the capital costs associated with installation and maintenance of RVMs at retail locations and larger depots. Furthermore, re-investing into the system would see the overall cost per container reduce.

Under Scenarios 1, 2, 3, and 6 the reinvestment would entirely cover the capital expenses of RVMs. In Scenario 4, it would cover approximately 76% of the RVM capital costs, and in Scenario 5, around 71%.

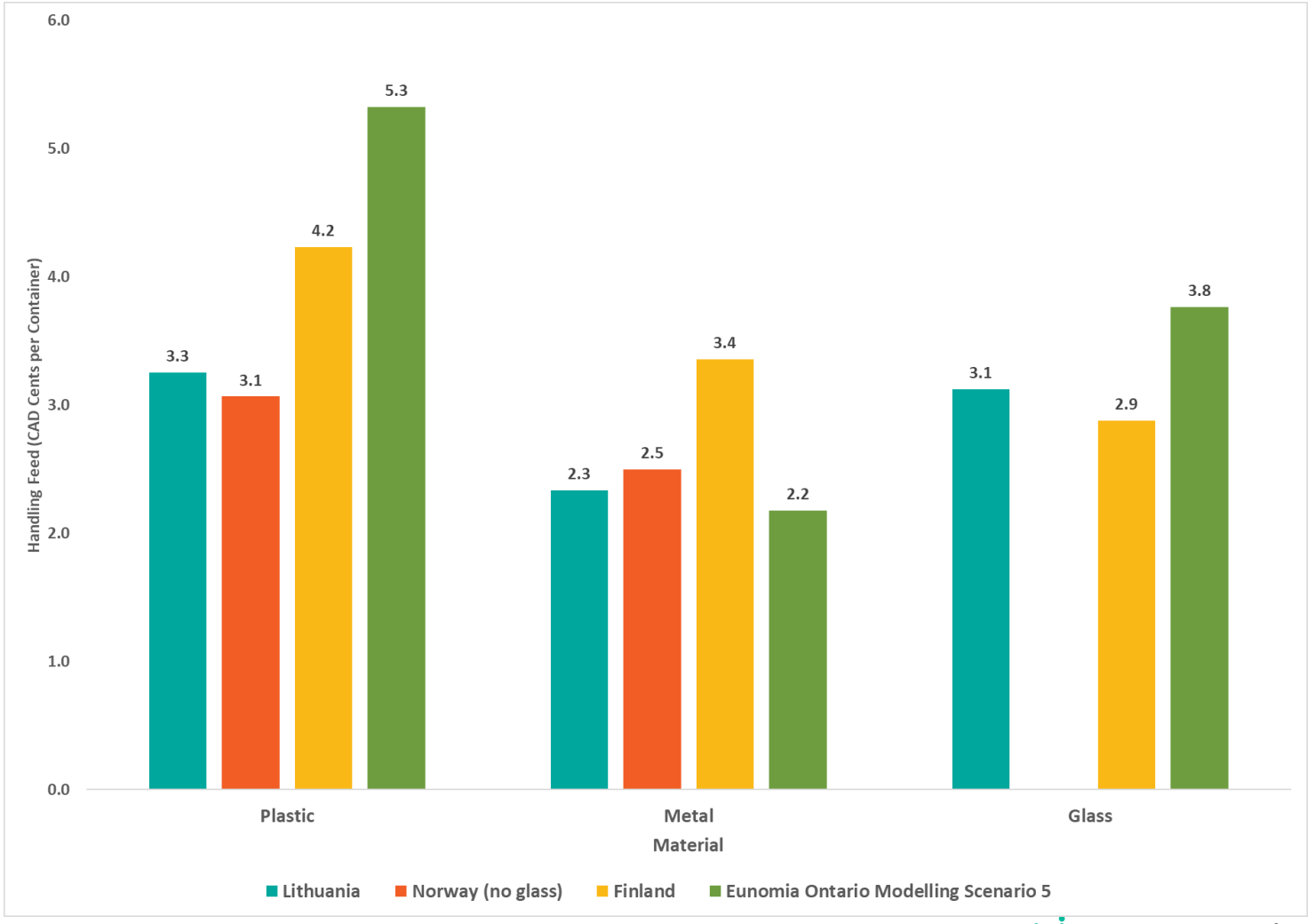


**Refer to the appendix from slide 57 for greater detail*

# Retail RVM Handling Fee Comparison

Retail RVM handling fees in this analysis include the container reception, storage, RVM costs and loading (onto collection vehicle) costs at a retailer.

Global systems that are in alignment with Scenario 5 include Lithuania, Norway, and Finland.
The graph illustrates a close correlation between the modeled handling fees, by material, and those observed in these systems. Plastic is higher as it does not compact as well as the other two materials.



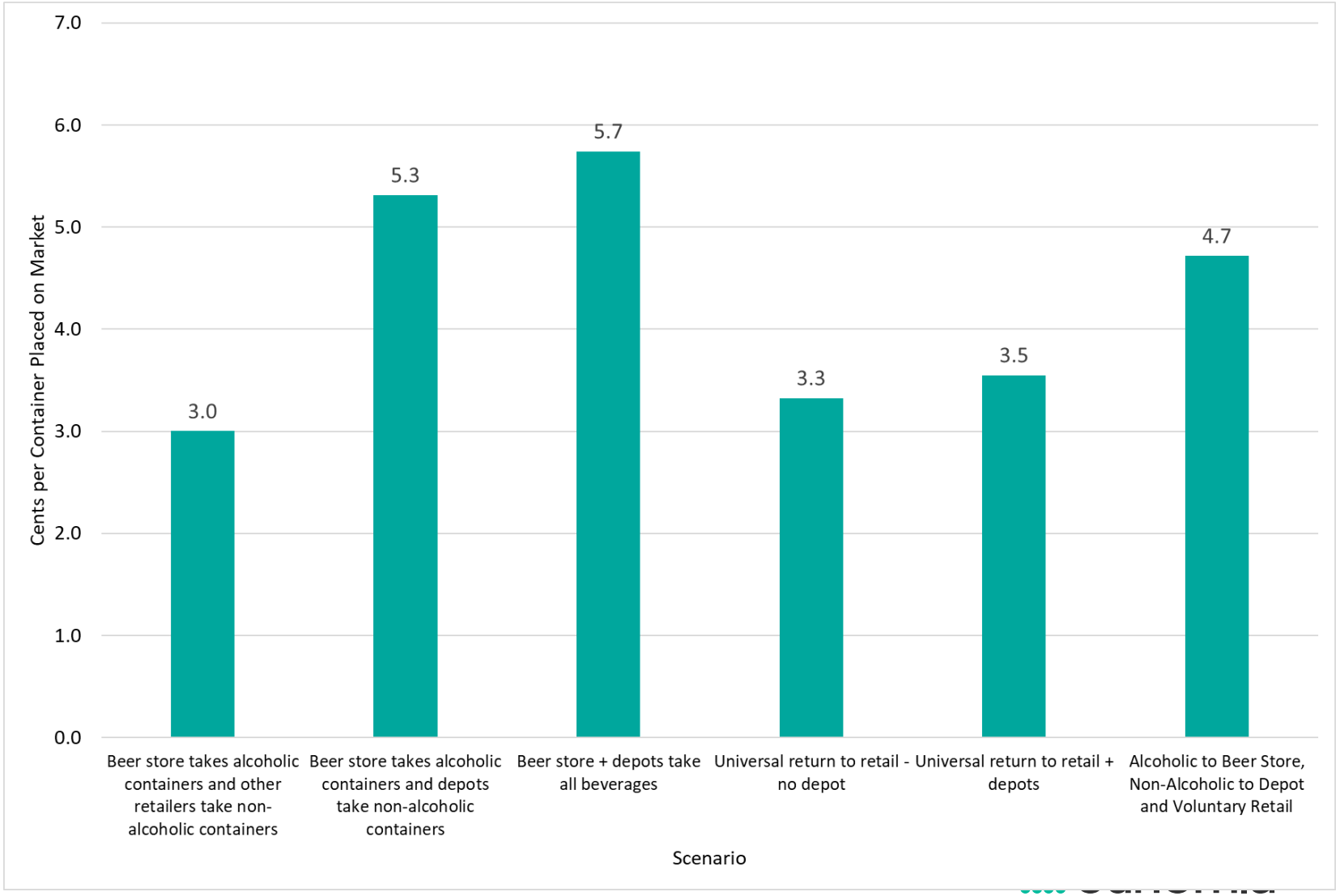



**Refer to the appendix from slide 57 for greater detail*

# Cost per Container Placed on Market

Sometimes referred to as a "container recycling fee", the net cost per container placed on market shows the cost which must be paid per container placed on the market to cover the operations of the deposit system.

The chart shows the cost per container placed on market by scenario type. The results track closely with the cost per container redeemed, as the depot-based scenarios are 4.7-5.7 cents, while the retail scenarios range from 3.0-3.5 cents per container.



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# Appendix

5

# Detailed Scenario Results

# Total System Costs and Key System Statistics

| Scenario → | Beer store takes alcoholic containers and other retailers take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|
| Number of Retailers | 8,147 | 810 | 810 | 8,147 | 9,168 | 1,401 |
| Number of Counting, Verification, Baling – under hybrid scenarios can also accept returns | 27 | 136 | 117 | 27 | 38 | 107 |
| Number of Depots – Return Only | 0 | 349 | 301 | 0 | 16 | 274 |
| Containers Returned through Retail (in millions) | 4,390 | 1,510 | 3,150 | 5,460 | 4,950 | 1,850 |
| Containers Returned through Depot (in millions) | 960 | 4,410 | 3,150 | 1,200 | 1,770 | 4,080 |
| Recycling Rate | 71% | 78% | 83% | 88% | 89% | 78% |
| **Gross Cost ($M)** | **310** | **490** | **530** | **350** | **370** | **445** |
| Material Revenue ($M) | -80 | -90 | -95 | -100 | -100 | -90 |
| **Net Cost ($M)** | **230** | **400** | **440** | **250** | **270** | **360** |
| Net Cost per Redeemed Containers (cents) | 4.2 | 6.802 | 6.907 | 3.8 | 4.0 | 6.0 |
| Net Cost per POM Container (cents) | 3.0 | 5.3 | 5.7 | 3.3 | 3.5 | 4.7 |
| Unredeemed deposits ($M) | -220 | -160 | -120 | -85 | -80 | -160 |
| **Total Minus Unredeemed Deposits** | **10** | **240** | **320** | **165** | **190** | **200** |

**Material Revenues were estimated by taking an average by material over the last 5 years from Recycling Markets and CIF.*
*** Counting and Verification Only – for HoReCa containers*
*Note: values have been rounded*

# Scenario 1 - Beer Store take alcoholic and other retailers take non-alcoholic

## Total System Costs, in millions

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 130 | 20 | 0 | 2 |
| Transportation | 20 | 25 | 0 | 0 |
| Post-Collection Counting and Verification | 0 | 26 | 0 | 26 |
| Post-Collection Sorting | 27 | 10 | 0 | 8 |
| Admin | 5 | 2 | 0 | 2 |
| Material Revenue | -45 | -21 | 0 | -14 |
| **Total Net Cost** | **140** | **60** | **0** | **25** |
| Unredeemed Deposits | -140 | -40 | 0 | -40 |
| **Total Minus Unredeemed Deposits** | **0** | **20** | **0** | **-15** |

**In this scenario, bulk returns represent the costs for counting and verifying HoReCa and manually returned beverage containers. Containers themselves are not being returned to depot sites. For this table and the slides until the Model Assumptions section, the costs for the program are shown assuming unredeemed deposits are split evenly between the scenarios. This is for simplicity and may not in reality reflect how the unredeemed deposits will be distributed.*
*Note: values have been rounded*



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# Scenario 1 - Beer Store take alcoholic and other retailers take non-alcoholic

## Total System Costs, per redeemed container in cents

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 3.9 | 2.0 | 0.0 | 0.2 |
| Transportation | 0.6 | 2.7 | 0.0 | 0.0 |
| Post-Collection Counting and Verification | 0.0 | 2.7 | 0.0 | 2.7 |
| Post-Collection Sorting | 0.8 | 1.0 | 0.0 | 0.8 |
| Admin | 0.2 | 0.2 | 0.0 | 0.2 |
| Material Revenue | -1.3 | -2.2 | 0.0 | -1.5 |
| **Total Net Cost** | **4.1** | **6.5** | **0.0** | **2.4** |
| Unclaimed Deposits | -4.0 | -4.0 | 0.0 | -4.0 |
| **Total Minus Unclaimed Deposits** | **0.1** | **2.4** | **0.0** | **-1.6** |

**In this scenario, bulk returns represent the costs for counting and verifying HoReCa and manually returned beverage containers. Containers themselves are not being returned to depot sites.*

*Note: values have been rounded*



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# Scenario 2 - Beer Store take alcoholic and depot take non-alcoholic

**Total System Costs, in millions**

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 0 | 30 | 25 | 25 |
| Transportation | 0 | 50 | 2 | 10 |
| Post-Collection Counting and Verification | 0 | 78 | 22 | 185 |
| Post-Collection Sorting | 0 | 16 | 5 | 31 |
| Admin | 0 | 3 | 1 | 5 |
| Material Revenue | 0 | -34 | -8 | -46 |
| **Total Net Cost** | **0** | **140** | **50** | **210** |
| Unredeemed Deposits | 0 | -40 | -20 | -100 |
| **Total Minus Unredeemed Deposits** | **0** | **100** | **30** | **110** |

*Note: values have been rounded*



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# Scenario 2 - Beer Store take alcoholic and depot take non-alcoholic

**Total System Costs, per redeemed container in cents**

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 0.0 | 2.1 | 3.7 | 0.7 |
| Transportation | 0.0 | 3.3 | 0.3 | 0.3 |
| Post-Collection Counting and Verification | 0.0 | 5.2 | 3.3 | 4.9 |
| Post-Collection Sorting | 0.0 | 1.1 | 0.8 | 0.8 |
| Admin | 0.0 | 0.2 | 0.2 | 0.2 |
| Material Revenue | 0.0 | -2.3 | -1.1 | -1.2 |
| **Total Net Cost** | **0.0** | **9.5** | **7.2** | **5.6** |
| Unclaimed Deposits | -- | -2.7 | -2.7 | -2.7 |
| **Total Minus Unclaimed Deposits** | **--** | **6.8** | **4.5** | **2.9** |

*Note: values have been rounded*



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# Scenario 3 - Beer Store and depot take all beverage containers

**Total System Costs, in millions**

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 0 | 70 | 10 | 15 |
| Transportation | 0 | 85 | 1 | 5 |
| Post-Collection Counting and Verification | 0 | 141 | 11 | 113 |
| Post-Collection Sorting | 0 | 34 | 4 | 29 |
| Admin | 0 | 5 | 1 | 5 |
| Material Revenue | 0 | -47 | -6 | -41 |
| **Total Net Cost** | **0** | **290** | **20** | **120** |
| Unredeemed Deposits | 0 | -60 | -10 | -55 |
| **Total Minus Unredeemed Deposits** | **0** | **230** | **10** | **65** |

*Note: values have been rounded*



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# Scenario 3 - Beer Store and depot take all beverage containers

## Total System Costs, per redeemed container in cents

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 0.0 | 2.3 | 2.7 | 0.5 |
| Transportation | 0.0 | 2.7 | 0.2 | 0.2 |
| Post-Collection Counting and Verification | 0.0 | 4.5 | 2.8 | 4.1 |
| Post-Collection Sorting | 0.0 | 1.1 | 1.1 | 1.1 |
| Admin | 0.0 | 0.2 | 0.2 | 0.2 |
| Material Revenue | 0.0 | -1.5 | -1.5 | -1.5 |
| **Total Net Cost** | **0.0** | **9.2** | **5.4** | **4.5** |
| Unclaimed Deposits | -- | -1.9 | -1.9 | -1.9 |
| **Total Minus Unclaimed Deposits** | **--** | **7.3** | **3.5** | **2.6** |

*Note: values have been rounded*

# Scenario 4 – Universal return to retail, no depot

## Total System Costs, in millions

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 150 | 20 | 0 | 2 |
| Transportation | 30 | 25 | 0 | 0 |
| Post-Collection Counting and Verification | 0 | 26 | 0 | 31 |
| Post-Collection Sorting | 36 | 9 | 0 | 10 |
| Admin | 5 | 2 | 0 | 2 |
| Material Revenue | -65 | -17 | 0 | -18 |
| **Total Net Cost** | **160** | **65** | **0** | **25** |
| Unredeemed Deposits | -55 | -15 | 0 | -15 |
| **Total Minus Unredeemed Deposits** | **105** | **50** | **0** | **10** |

**In this scenario, bulk returns represent the costs for counting and verifying HoReCa and manually returned beverage containers. Containers themselves are not being returned to depot sites.*

*Note: values have been rounded*

# Scenario 4 - Universal return to retail, no depot

## Total System Costs, per redeemed container in cents

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 3.4 | 2.0 | 0.0 | 0.1 |
| Transportation | 0.7 | 2.5 | 0.0 | 0.0 |
| Post-Collection Counting and Verification | 0.0 | 2.6 | 0.0 | 2.6 |
| Post-Collection Sorting | 0.8 | 0.9 | 0.0 | 0.8 |
| Admin | 0.2 | 0.2 | 0.0 | 0.2 |
| Material Revenue | -1.4 | -1.7 | 0.0 | -1.5 |
| **Total Net Cost** | **3.6** | **6.5** | **0.0** | **2.2** |
| Unclaimed Deposits | -1.3 | -1.3 | 0.0 | -1.3 |
| **Total Minus Unclaimed Deposits** | **2.3** | **5.2** | **0.0** | **0.9** |

**In this scenario, bulk returns represent the costs for counting and verifying HoReCa and manually returned beverage containers. Containers themselves are not being returned to depot sites.*



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# Scenario 5 – Universal return to retail and depot

## Total System Costs, in millions

| Concept | Retailer (RVM) | Retailer (Manual) | Redemption Center (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 150 | 20 | 1 | 3 |
| Transportation | 30 | 25 | 0 | 4 |
| Post-Collection Counting and Verification | 0 | 26 | 2 | 47 |
| Post-Collection Sorting | 32 | 8 | 1 | 13 |
| Admin | 5 | 1 | 0 | 3 |
| Material Revenue | -58 | -16 | -2 | -25 |
| **Total Net Cost** | **160** | **60** | **3** | **45** |
| Unredeemed Deposits | -45 | -10 | -1 | -20 |
| **Total Minus Unredeemed Deposits** | **115** | **50** | **1** | **25** |

*Note: values have been rounded*



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# Scenario 5 - Universal return to retail and depot

## Total System Costs, per redeemed container in cents

| Concept | Retailer (RVM) | Retailer (Manual) | Depot (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 3.7 | 2.1 | 1.2 | 0.2 |
| Transportation | 0.7 | 2.6 | 0.2 | 0.2 |
| Post-Collection Counting and Verification | 0.0 | 2.9 | 1.3 | 2.9 |
| Post-Collection Sorting | 0.8 | 0.9 | 0.8 | 0.8 |
| Admin | 0.2 | 0.2 | 0.2 | 0.2 |
| Material Revenue | -1.4 | -1.7 | -1.5 | -1.5 |
| **Total Net Cost** | **3.9** | **6.9** | **2.3** | **2.7** |
| Unclaimed Deposits | -1.2 | -1.2 | -1.2 | -1.2 |
| **Total Minus Unclaimed Deposits** | **2.8** | **5.7** | **1.1** | **1.6** |

*Note: values have been rounded*



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# Scenario 6 – Beer Store for Alcoholic and Depot & Voluntary Retail for Non-Alcoholic

## Total System Costs, in millions

| Concept | Retailer (RVM) | Retailer (Manual) | Depot (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 15 | 30 | 15 | 20 |
| Transportation | 4 | 50 | 2 | 15 |
| Post-Collection Counting and Verification | 0 | 68 | 17 | 149 |
| Post-Collection Sorting | 3 | 16 | 5 | 28 |
| Admin | 1 | 3 | 1 | 5 |
| Material Revenue | -4 | -34 | -7 | -43 |
| **Total Net Cost** | **20** | **130** | **30** | **170** |
| Unredeemed Deposits | -10 | -40 | -15 | -95 |
| **Total Minus Unredeemed Deposits** | **10** | **90** | **15** | **75** |

*Note: values have been rounded*



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# Scenario 6 – Beer Store for Alcoholic and Depot & Voluntary Retail for Non-Alcoholic

**Total System Costs, per redeemed container in cents**

| Concept | Retailer (RVM) | Retailer (Manual) | Depot (RVM) | Depot Bulk Return |
|---|---|---|---|---|
| Reception Costs | 4.3 | 2.1 | 2.2 | 0.6 |
| Transportation | 1.2 | 3.3 | 0.4 | 0.4 |
| Post-Collection Counting and Verification | 0.0 | 4.5 | 2.7 | 4.3 |
| Post-Collection Sorting | 0.8 | 1.1 | 0.8 | 0.8 |
| Admin | 0.2 | 0.2 | 0.2 | 0.2 |
| Material Revenue | -1.1 | -2.3 | -1.1 | -1.2 |
| **Total Net Cost** | **5.3** | **8.9** | **5.2** | **5.0** |
| Unclaimed Deposits | -2.7 | -2.7 | -2.7 | -2.7 |
| **Total Minus Unclaimed Deposits** | **2.7** | **6.2** | **2.5** | **2.3** |

*Note: values have been rounded*



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# Model Assumptions

# Returns by Scenario

| | | Beer store takes alcoholic containers and other retail take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|---|
| **Number of Containers returned Annually, in millions** | Large Retailers | 1,740 | 0 | 0 | 2,260 | 2,050 | 340 |
| | Medium Retailers | 1,700 | 0 | 0 | 2,210 | 2,000 | 0 |
| | Small Retailers | 25 | 0 | 0 | 40 | 35 | 0 |
| | Beer Store & LCBO Stores | 930 | 1,510 | 3,150 | 960 | 870 | 1,510 |
| | Depots (Manual) | 0 | 2,680 | 1,610 | 0 | 450 | 2,450 |
| | Depots (RVMs) | 0 | 670 | 400 | 0 | 110 | 610 |



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# Annual Returns by Scenario

| | | Beer store takes alcoholic containers and other retail take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|---|
| **Number of Uncompacted Depot Returns Annually (excluding HORECA), in millions** | Large Urban | 0 | 880 | 546 | 0 | 406 | 804 |
| | Small Urban | 0 | 586 | 363 | 0 | 32 | 535 |
| | Large Rural | 0 | 828 | 514 | 0 | 115 | 756 |
| | Small Rural | 0 | 286 | 177 | 0 | 9 | 261 |



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# Containers Counted and Collected per Depot per Month

| | | Beer store takes alcoholic containers and other retail take non-alcoholic containers* | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot* | Universal return to retail + depots | Alcoholic to Beer Store, Non-Alcoholic to Depot and Voluntary Retail |
|---|---|---|---|---|---|---|---|
| **Number of Uncompacted Depot Returns Monthly (including HORECA)** | Large Urban | 6,558,500 | 2,928,500 | 4,147,700 | 7,355,300 | 5,366,500 | 3,576,800 |
| | Small Urban | 0 | 208,300 | 150,200 | 0 | 192,900 | 242,600 |
| | Large Rural | 3,699,700 | 1,652,000 | 2,339,700 | 4,149,100 | 3,027,300 | 2,017,700 |
| | Small Rural | 0 | 117,700 | 84,900 | 0 | 109,000 | 137,100 |

**In retail only scenarios, depots act as counting and verification centers only for containers*



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# Retailers by NAICS code

| NAICS Code | Category name | Rationale | Stores in Dataset | Estimated # of Stores > 4000 square feet |
|---|---|---|---|---|
| 445 | Food and Beverage Stores | Food and Beverage stores include grocery stores as well as some specialty markets. The large-scale specialty markets will sell packaged beverage containers. | 5,941 | 3,600 |
| 4453 (included in above) | Beer, wine and liquor stores | Inclusive of beer store and ODRP locations | 1,146 | (included above) |
| 446110 | Pharmacies and drug stores | As the threshold for most of the stores to be in scope above 4000 square feet, large pharmacies (e.g., Shoppers Drug Mart – 678 locations in Ontario) sell beverage containers. | 2,771 | 1,600 |
| 446191 | Food (health) supplement stores | See Pharmacies and Drug Stores above | 257 | 85 |
| 447110 | Gasoline stations with convenience stores | Convenience stores will sell sealed beverage containers | 1,325 | 460 |
| 4521 | Department stores | Large department stores generally include stores which sell groceries in addition to other goods | 186 | 186 |
| 452999 | All Other general merchandise stores | NAICS definitions Include agricultural cooperative stores, general stores, variety and dollar stores. | 1,625 | 1000 |

# RVM Assumptions

| | $ CAD |
|---|---|
| Purchase Costs | 41,040 |
| Installation Fee | 855 |
| Annual Operative/Maintenance Costs per RVM | 3,078 |
| Cost of Replacement | 1,460 |
| Renovation cost every 4-5 years | 6,205 |
| RVM Bin Purchase Cost | 71 |
| RVM Bin Washing Cost per Bin per Year | 1 |

| | |
|---|---|
| Loan Repayment Period (years) | 7 |
| Lifetime of Compactor (containers) | 1,300,000 |
| Number of Bins Needed per RVM (e.g., spares, replacements) | 3 |
| Number of Years before Replacement | 3 |

*Source: TOMRA T70 Dual and Eunomia*



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# RVM and Retail Space Assumptions

| | Square Footage (ft2) |
|---|---|
| RVM Footprint | 14 |
| Additional space for queuing | 22 |
| Backroom storage space – Retail with RVM | 32 per RVM |
| Backroom storage space – Small Retail with Manual Collection | 22 |
| Backroom storage space – Beer Store/LCBO manual return | 52 |
| Space required per unit volume storage (m3) | 11 |

*Source: Eunomia*

# Salary Assumptions

| | Average Annual Salary ($CAD) including 30% for benefits |
|---|---|
| Retail Staff | 49,000 |
| Manual Operator – Counting Centre | 52,000 |
| IT/Database Staff – Central Admin | 125,000 |
| Customer Services Staff – Central Admin & Collections | 50,000 |
| Collections Driver (short round) | 65,000 |
| Collections Driver (long haul) | 73,000 |
| Collections Supervisor | 81,000 |
| Collections Manager | 101,600 |

*Source: Canadian Averages from Indeed, Statcan data*



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# Local Depot Assumptions

| | |
|---|---|
| **Supervision/Loading Staff FTE per Depot** | 3 |
| **Management Staff per Depot** | 1 |
| **Business Overheads %** | 15% |
| **Profit** | 10% |

*Source: Industry*

# Retailer Time Assumptions

| RVM | Time (mins) |
|---|---|
| Emptying bins, time per empty | 5 |
| Cleaning RVMs, time per machine | 12 |
| Processing Receipts, time per receipt processed | 0 |
| RVM Beverage Containers Returned per Customer (# of containers) | 40 |
| Time needed per pickup | 30 |
| **Manual** | **Time (mins)** |
| Time to take back containers | 1 |
| Pickup Time | 5 |

*Source: Eunomia*



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# Retailer Collection Assumptions

| Collections from Retailer | Average |
|---|---|
| Storage Volume per Store (m3) | 4.8 |
| Beer Store Locations with Compaction | 0% |

*Source: Eunomia*

| | Beer store takes alcoholic containers and other retailers take non-alcoholic containers | Beer store takes alcoholic containers and depots take non-alcoholic containers | Beer store + depots take all beverages | Universal return to retail - no depot | Universal return to retail + depots |
|---|---|---|---|---|---|
| Average Pickups per store per week | 2 | 12 | 25 | 2 | 2 |
| Average Volume per pickup (m3) | 3 | 4 | 4 | 4 | 4 |

*Source: Eunomia*



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# Depot Assumptions

| Time Assumptions | Mins |
|---|---|
| Time to takeback containers for depot manual return | 4 |
| Time to unload HORECA/Manual Retail/Bag Drop containers into Counting Machines | 3 |
| **Space Assumptions** | **Square footage** |
| Floorspace per Large Depot (depots with counting, verification) | 18,000 |
| Floorspace per Small Depot (depots without counting, verification) | 7,000 |
| **Space Assumptions** | **% of Depot Space** |
| Storage | 41% |
| Office | 6% |
| Customer Interface | 15% |
| Loading | 11% |
| Sorting | 26% |

*Source: BCMB*



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# Space Costs

| Space Type | Lease cost per square meter per month |
|---|---|
| Office Space | $24.70 |
| Retail Space | $17.94 |
| Industrial Space | $15.94 |

*Source: CBRE Market Reports:*

1) GTA-Industrial-Market-Report-Q2-2023.pdf (cbre.com)
2) 26058ea9-7f90-4d65-b43c-1e87f55e430b-664791008.pdf (cbre.com)



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