



Container Deposit Study:

Phase II: A Beverage Container Deposit Return System for Washington - Qualitative Research and Recommendations



King County

Department of
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The Responsible Recycling Task Force

The Responsible Recycling Task Force (RRTF) was formed by King County's [Solid Waste Advisory Committee](#) (SWAC) and [Metropolitan Solid Waste Management Advisory Committee](#) (MSWMAC) in April of 2018 to respond to changes in international recycling markets and to develop a coordinated approach to improving recycling in the region. The task force consists of representatives from the King County Solid Waste Division, the City of Seattle, cities in King County, solid waste management companies, and other stakeholders. This report was prepared for the RRTF by the King County Solid Waste Division in collaboration with Seattle Public Utilities.

Contact and Information

For more information on the Responsible Recycling Task Force and the resulting recommendations, go to the [Responsible Recycling Task Force](#) website.

Authors

This report was authored by Eunomia Research & Consulting Inc., with support from Cascadia Consulting and C+C.

Disclaimer

Eunomia Research & Consulting has taken due care in the preparation of this report to ensure that all facts and analysis presented are as accurate as possible within the scope of the project. However no guarantee is provided in respect of the information presented, and Eunomia Research & Consulting is not responsible for decisions or actions taken on the basis of the content of this report.

Executive Summary

In 2018, King County formed the [Responsible Recycling Task Force](#), including members of King County, the City of Seattle, cities in King County, solid waste haulers, and stakeholders in order to develop a coordinated approach to recycling in the region.

The task force created a set of action items, which were developed by following the "responsible recycling framework."

Eunomia Research & Consulting (Eunomia), in collaboration with C+C and Cascadia Consulting Group, was tasked to contribute to Action 1E: *Develop a feasible model for a beverage deposit return system in Washington similar to the Oregon Beverage Recycling Cooperative model*. The study will be conducted in three phases, as follows:

1. Phase I: Inventory of Existing Deposit Return Systems (DRS)
2. Phase II: Qualitative Research and Recommendations
3. Phase III: Quantitative Assessment of Financial, Economic and Environmental Impacts

This report describes how a beverage container deposit system in Washington could work as a separate, stand-alone program (without an EPR system) as requested under Phase II.

Introduction

Interest in DRSs has renewed in recent years across the world. In 2010, 36 countries and states had DRSs in place affecting 279 million people. By 2019, the number of jurisdictions with DRS had increased to 58, affecting 612 million people.¹ This shift is primarily due to DRSs:

- Ability to reduce land and marine litter as the most effective mechanism for reducing beverage container litter, one of the most common items found during beach clean-ups.²
- Ability to achieve higher recycling rates for valuable materials such as PET bottles and aluminum cans than curbside recycling programs.
- Provision of high-quality secondary materials with lower contamination levels than curbside programs.³
- Operation via extended producer responsibility (EPR) principles to internalize the environmental and financial costs of end-of-life management of products and packaging to companies that make those products or use packaging.
- Capacity to better manage glass by reducing comingling with other recyclables;
- Production of quality post-consumer recycled feedstock to help brands meet recycled content goals.⁴
- Changing attitudes by industry groups as open to deposits, on the provision that unclaimed deposits are used to support the system.^{5 6}
- Greater engagement by consumers, the majority of whom are willing to pay more for recyclable products⁷ and are supportive of DRSs in states in which they are implemented.^{8 9}
- Desire for equitable access for residents, such as the 9% of Washingtonians who live in single-family homes and 15% of those who live in multifamily residences that do not have access to curbside recycling services.¹⁰

Today, despite a significant increase in the number of households with access to curbside services across the country, recycling rates for beverages containers remain lower in non-deposit states than in deposit

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states. In fact, 47% of all beverage containers recycled in the US are from the 10 deposit states, which cover just 28% of the population.¹¹ In Washington, only about 33% of polyethylene terephthalate (PET) bottles, the majority of which are beverage containers, are effectively collected and sent for reprocessing before being recycled into new materials. PET bottles represent 25% of all rigid plastic packaging waste generated in Washington. The rate for aluminum beverage cans is 44.5%.¹²

Study Approach and Parameters

The purpose of this study is to outline the design for a best-in-class deposit system in Washington considering how it could operate alongside the established curbside recycling program and the associated, existing collection and sorting infrastructure.

The broad goals of a best-in-class DRS are:

- To maximize redemption rates in order to prevent litter and maximize the quality and value of the recyclable material, necessary for a circular economy.
- Provide equitable access for all residents across the state to be able to redeem their containers at convenient redemption points.
- Supplement and enhance the recycling system without jeopardizing existing curbside services.
- Remain dynamic and relevant to the current environment, with a design that allows for necessary adjustments over time without requiring additional legislation.

The approach taken to define what a DRS could look like in Washington is as follows:

- Build from the best-in-class principles identified from a review of high performing DRS systems across the world, detailed in the Phase I report of this study.¹³
- Draw from conversations with operators and legislators of existing programs to understand the positives and negatives of their programs.
- Download the latest DRS thinking from Eunomia's internal experts on DRS in Europe and North America.
- Consider how the DRS could operate alongside the established curbside recycling program and the associated existing collection and sorting infrastructure.

A list of sources consulted is provided in the appendix. These recommendations represent the latest thinking on how DRS can work alongside established curbside services. The report sets out the key system design principles of a DRS system necessary to meet the goals set out, detailing why these are needed and providing recommendations on how these key elements should be covered in legislation. The recommendations are based on providing only what is necessary to be included in legislation to enable outcome-based targets to be met and ensure that there is the necessary oversight and governance to ensure transparency and mitigate fraud.

This report does not quantify the costs and benefits of a DRS to different stakeholders, as this detail will be presented in the Phase III report.

Proposed Deposit Return System Design

The key elements of a best-in-class DRS system for Washington are summarized below, along with whether each recommendation should be written into legislation or developed subsequently through operational decisions.

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Producer Responsibility and Obligated Parties

System Design Principles

- A producer-organized and funded DRS with individual producer responsibility.
- DRS operationally and financially managed through a single non-profit producer responsibility organization (PRO). Compliance with producer legislative requirements reported to regulatory body through non-profit PRO.
- Obligated parties to participate in the DRS include: government or government-appointed agency as program administrator; producers, manufacturers and importers to fund and organize the DRS; a producer responsibility organization (PRO) to manage and coordinate the collection and reprocessing of beverage containers under the DRS on behalf of producers; and retailers greater than or equal to 5,000ft² to act as redemption points.

Rationale

- Producer-managed DRS programs are generally more cost-effective than government-managed systems and ensure that the industry can address free riders. When programs are managed by producers against clear output-based requirements set in legislation, there is a financial incentive to comply at lowest cost and to address elements of the program that increase costs, such as fraud.
- Clear definitions of obligated parties and their required roles and responsibilities within the system are necessary for program success.
- Retailers must be included among obligated parties to form the basis of the redemption infrastructure, even as opt-out mechanisms are allowed. This will allow geographic coverage to be evaluated based on the market-driven locations of retailers that strive for convenient consumer access and coverage.

Legislative Recommendation

Legislation should clearly define the obligated parties under the program and their respective requirements, including:

- Government or government-appointed agency designated as program administrator, responsible for oversight.
- Producers, manufacturers, and importers designated as responsible parties for the DRS.
- Retailers greater than or equal to 5,000ft² should be obligated to redeem deposit containers, unless they request and are granted an exemption from the PRO by demonstrating that an alternate redemption location exists (e.g. a redemption center) that fulfills the geographic coverage requirements. The PRO has the ability to levy a fee on a retailer that is granted an exemption to support the funding of the alternative redemption location (i.e. to the redemption center) for covering their obligations. Retailers less than 5,000ft² may choose to opt-in.
- PRO formation and mechanisms through which producers, manufacturers and first importers shall work with the PRO and how the PRO will provide data to the government or government-appointed oversight agency.

The legislation should set a period by which the PRO shall be established. It is recommended that this be one year from when the legislation is enacted.

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Obligated Materials

System Design Principles

- All alcoholic and non-alcoholic beverages, defined as any liquid that is a ready-to-serve drink, regardless of packaging material.
- Beverage containers up to and including 3L in volume.

Rationale

- A broad scope maximizes the potential impact in terms of recycling rates and litter reduction, as in Alberta and British Columbia (BC).
- This approach is arguably the fairest for all beverage producers, as no beverage or company gains an advantage from being included in, or excluded from, the DRS.

Legislative Recommendation

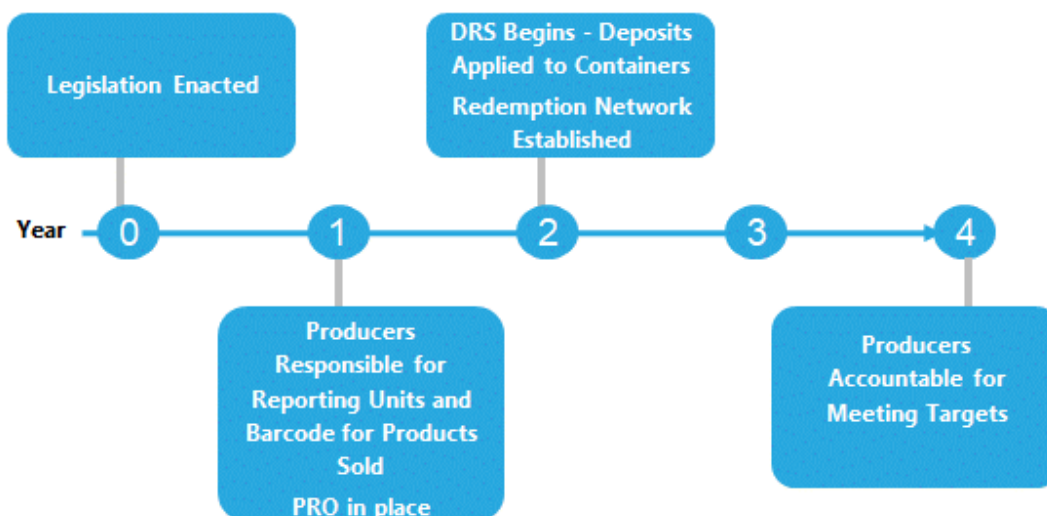
Legislation should mandate that all beverage types in containers of all materials be obligated under the DRS up to and including 3L in size, specifying that producers are required to register each product with the government agency and providing the products bar code such that it can be verified through the system when redeemed. The legislation should state that only beverages that have been registered with the government agency can be sold in the state.

Targets

System Design Principles

- 90% redemption rate performance target for beverage containers.
- 80% of the population should be within 5 miles of a redemption point, with at least one redemption point per every 5,000 residents.
- After the legislation is enacted, producers will be expected to report on units placed on the market after one year. The DRS should be functional within two years. Producers should be given a further three years to complete implementation of the system in order to meet the targets, as illustrated in Figure E 1.

Figure E 1: Recommended Timeline for DRS Implementation



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Rationale

- The recommended targets are based on those in Europe (redemption rate) and the top performing North American systems (BC and Maine). Requiring extensive geographic coverage of redemption points will secure producers' commitment to the highest achieving system possible for the lowest cost and ensure equal access for all residents.

Legislative Recommendation

Legislation should set the following performance and redemption point geographical coverage requirements:

- Performance Target: 90% redemption rate performance for beverage containers; and
- Geographical Access Target: 80% of the population should be within 5 miles of a redemption point, with at least one redemption point per every 5,000 residents

Legislation should include a timeline for meeting targets. We would recommend the following:

- One year after the legislation is enacted, producers shall report on units placed on the market by container size, material and product.
- Producers shall be individually legally required to demonstrate that the targets have been met within three years of the date the legislation is in effect.

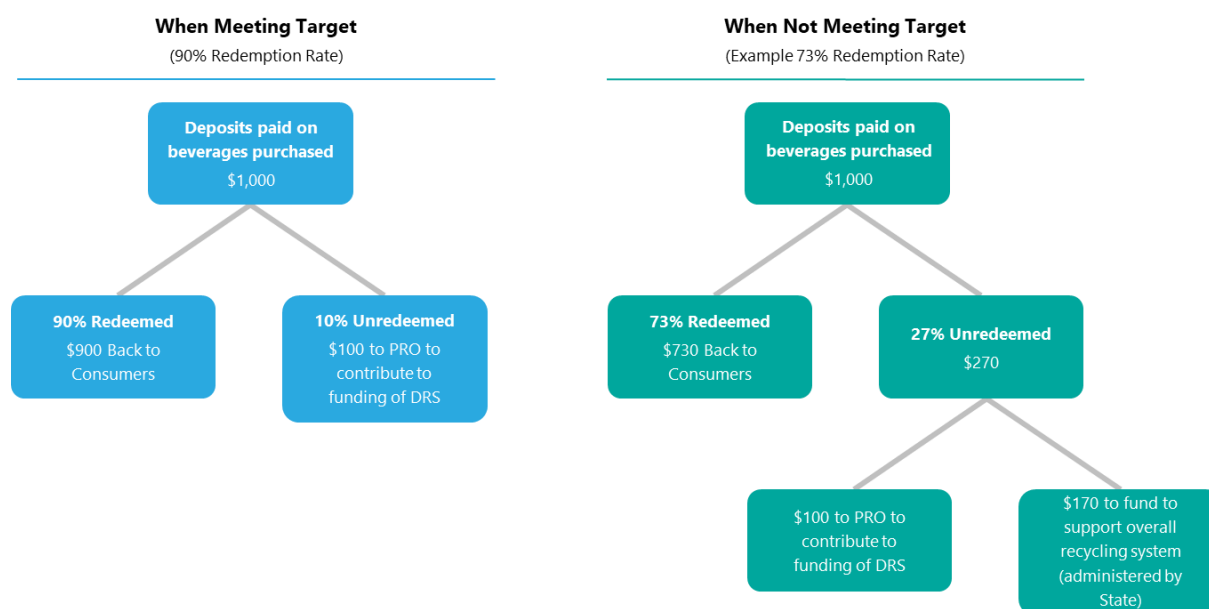
Deposit Rate, Structuring, Mechanism for Refund and Use of Unredeemed Deposits

System Design Principles

- \$0.10 deposit rate across all container sizes and beverage types.
- Transparent mechanism to adjust deposit rate.
- Ability of MRFs to redeem containers based on actual count and not weight or periodic audit-based assessments.
- Unredeemed deposits above 90% redemption target kept by PRO. Unredeemed deposits generated from a failure to meet the performance target are to be directed to a dedicated fund to support investment in improvements in curbside recycling infrastructure. This concept is illustrated through an example in Figure E 2. Although the target would not be required to be met until three years following the implementation of the deposit program, the distribution of unredeemed deposits should follow the breakdown outlined to provide early support for the curbside recycling system and allow investments to be made to facilitate the transition to an environment with both a DRS and curbside recycling operating alongside each other.

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Figure E 2: Distribution of Unredeemed Deposits When Target is Met and When Not Met



Rationale

- Consistent deposit rate to neighboring programs, including Oregon.
- \$0.10 deposit rate demonstrated to deliver close to 90% redemption rate, when coupled with geographic coverage requirements.
- Flat rate reduces confusion and simplifies accounting.
- Continuous improvement measures ensure relevance to market.
- Whole system supported through refund option for MRFs and disbursement of unredeemed deposits.

Legislative Recommendation

Every beverage container sold or offered for sale in the state less than or equal to a volume of 3L shall have a refund value of not less than \$0.10.

The legislation shall include an automatic increase in the deposit rate by increments of \$0.05 if:

- in each of the three previous calendar years, the number of beverage containers redeemed for the deposit value specified in this section was less than 90% of the total number of beverage containers that were sold in the state; and
- geographic coverage requirements are demonstrated to have been met in each of those years.

Producers shall be entitled to retain only the amount of unredeemed deposits associated with the achievement of the target. Any unredeemed deposits that are due to producers failing to meet the target shall be transferred from the PRO to the oversight agency, where a Bottle Bill Fund shall be established, separate and distinct from the State General Fund. This fund shall be used only to support investment in curbside recycling infrastructure.

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Redemption Infrastructure, Access, Location and Convenience

System Design Principles

- Mix of redemption options that focus on using technology to prevent fraud and increase convenience. Redemption options to include:
 - Reverse vending machines that use bar code technology to verify a unit and crush it to prevent it from being redeemed more than once.
 - Bag drops that allow consumers to redeem large volumes in a short period of time and for the deposit to be credited to a personal account.
 - Redemption centers for bulk redemption.
- The PRO to determine the number and distribution of each type of redemption option to meet the set geographical coverage requirements and to handle the volume of containers available to be redeemed.
- Requires retailer participation of stores with square footage >5,000ft². Retailers can apply to the PRO to opt-out if they can demonstrate that other redemption points allow geographics coverage requirements to be met.
- Operators of redemption points are paid through a handling fee for providing the redemption location.

Rationale

- A mix of redemption options allows for small and large volume redemption.
- Technology-focused approach reduces fraud and increases convenience.
- Retailer obligation allows for convenience for consumers while still providing options for retailers on how to fulfill obligation, as Oregon's program is structured.

Legislative Recommendation

Retailers greater than or equal to 5,000ft² should be obligated to redeem deposit containers, unless they request and are granted an exemption from the PRO by demonstrating that an alternate redemption location exists (e.g. a redemption center) that fulfills the geographic coverage requirements. The PRO has the ability to levy a fee on a retailer that is granted an exemption to support the funding of the alternative redemption location (i.e. to the redemption center) for covering their obligations. Retailers less than 5,000ft² may choose to opt-in.

The PRO is responsible for providing collection services and handling fees to all redemption points and for ensuring that redemption infrastructure meets geographic coverage target. Periodically, the PRO shall commission a study to assess the value of the handling fee that shall be paid, as described in "System Finances."

Fraud Mitigation

System Design Principle

- Audit, oversight and enforcement authority given to the government agency.
- To prevent free riders, the PRO should be allowed to set its own fees and regulate membership. This will establish a dedicated interest in addressing free riders, as the membership will not tolerate those that do not pay their fair share.

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- Use technological solutions, such as registered bar codes programed into reverse vending machines and bulk counting machines, to limit deposit return only for in scope beverages and also ensure that only in scope redeemed beverages are counted towards the redemption target.

Rationale

- Focus is on fraud prevention and intra-system management, as the PRO is best placed to self-police its membership and to tackle fraudulent redemption necessary to avoid undue costs.
- Technological solutions are the best way to manage redemption fraud, both across borders and through misreporting amounts redeemed, by providing automated verification of containers. Bar code verification will also identify new brands that may be selling their product but have not registered it with the government agency.
- Enforcement and penalties should be a last resort.

Legislative Recommendation

The legislation shall state that all units redeemed must be verified using an approved technology. The PRO shall make procedures prescribing the expected rules of compliance for its membership and enforce compliance as it sees fit. The PRO may put in place financial incentives to encourage producers to put in place fraud prevention solutions, notably state specific bar codes, as it sees fit. The PRO shall identify to the government agency those producers that are found not to have registered their product such that they are required to report on units sold and financially support the operation of the system.

The government agency shall have oversight authority over the PRO and may conduct audits and apply penalties as it sees fit.

Reporting

System Design Principles

- Reporting on extensive metrics required by:
 - o Producers to the PRO;
 - o The PRO to the State; and
 - o The State to the public.

Rationale

- Open and transparent reporting builds public trust in the system and invites scrutiny to ensure high performance.

Legislative Recommendation

Producers shall be required to report on the supply of their products to the market in Washington State to the PRO every year, if they have selected a PRO to report on their collection and management activities on their behalf to the State.

The PRO shall be required to report the following, at a minimum, to the government agency on:

- Number of units, by material type, size and beverage type placed on market in Washington State by each producer.
 - o Need to provide bar code provision for each product and evidence of labelling of deposit requirement on all beverage containers.

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- o Manufacturers shall register all new products with the State before product can be sold within Washington.
- Number of units collected, by each redemption location and by material type, size and beverage type and assessment of achievement or non-achievement of collection for recycling targets.
- Mechanisms put in place to prevent fraud as well as checks and measures and any enforcement activities.
- Details of geographical coverage and assessment of achievement or non-achievement of access/convenience targets.
- Location of redemption points and operating hours.
- Education programs provided to ensure consumers are aware of the program;
- The cost of managing the system and for funding the redemption; collection and processing infrastructure; the value of the unclaimed deposits and material revenue and the resulting producer fees.
- The producer fees, modulated such that fees reflect the cost of managing a specific beverage material in the system.

Government agency or appointed administrator shall be required to report publicly on:

- Audit and compliance activities.
- Brands and products registered and designated as obligated materials.
- Penalty measures and penalties issued.
- Cost of providing the oversight and governance role, including the cost of any systems necessary for producers to report compliance.

Collection and Reprocessing

System Design Principles

- PRO should be required to procure transport and processing services from third parties in line with Washington State procurement policies.¹⁴
- PRO should contract regional counting centers, facilities that verify redeemed deposit containers through technological sorting and counting for those collected through redemption options without automatic verification.

Rationale

- Contracted vendors can be chosen to best suit the needs of the differing redemption options.
- Counting centers established to verify containers, provide a role for MRFs and mitigate fraud through the use of technology, as in in Quebec, which requires technological solutions to provide for accurate counting to verify containers that are not redeemed through RVMs.

Legislative Recommendation

The PRO shall contract services for counting and verifying deposit containers through adequate technology in accordance with procurement policies established by the Washington State Office of Enterprise Services.

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System Finances

System Design Principles

- System funded by and produced through producer fees. Producer fees are set by the PRO and are based on system costs net of unredeemed deposits and revenue for example through the sale of material.
- Handling fees given to operators of redemption locations set using cost coverage model that is calculated periodically based on an independent review of costs.
- Material sales managed and retained by PRO.
- Unredeemed deposits used to finance system up to performance target.
- Excess funds from unredeemed deposits (if target unmet) go toward dedicated fund to support curbside recycling infrastructure.
- Producers fund oversight agency.

Rationale

- EPR based approach with service providers adequately paid for the role they provide in the functioning of the system.

Legislative Recommendation

The PRO shall report on producer fees on an annual basis.

An independent study shall be commission periodically to determine an appropriate handling fee for different redemption types based on costs incurred along with a return margin. Handling fees shall reflect the cost of provision plus take into consideration the wider system benefits associated with a specific redemption option. For example, retailers that chose to provide RVMs, which have a cost to install, should receive a higher handling fee because the RVM is also able to verify the deposit container, negating the need for further verification. A review period every three years will be used to update the handling fees for each redemption option. The government agency shall oversee this process to ensure that cost calculations are fair and unbiased.

The PRO shall retain control of recycled deposit material and any profits arising from the sale of such material.

Producers shall be entitled to retain only the amount of unredeemed deposits associated with the achievement of the target. Any unredeemed deposits that are due to producers failing to meet the target shall be transferred from the PRO to the oversight agency, where a Bottle Bill Fund is shall be established, separate and distinct from the State General Fund. This fund shall used only to support investment in curbside recycling infrastructure.

Producers shall cover the costs of the government agency required for administration and oversight to enable producers to meet their obligations set in the legislation.

Curbside Considerations and Impact Mitigation

The intersections and benefits that a best-in-class DRS creates with existing curbside recycling systems and providers include the following. The economic value of these measures will be assessed as part of the Phase III report of this study.

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- Provision of Services: MRF operators or haulers may be contracted to provide the following services to the PRO:
 - o Counting center operations, to count, sort and/or verify numbers of beverage containers that are collected through the redemption options without automatic verification.
 - o Collection services from redemption locations as well as independently from commercial premises.
 - o Redemption center operations.
 - o Bag drop location operations.
- Access to Deposits: MRFs may redeem DRS containers that go through their facilities and claim the deposit. Households that choose to place containers in their curbside bins have chosen not to claim back their deposit and as such the MRF operator can do so to help support the operation of its facility. Containers separated at MRFs are required to be verified through the counting centers before payment can be made to the MRF.
- Unredeemed deposits above 90% redemption target kept by PRO. Unredeemed deposits generated from a failure to meet the performance target are to be directed to a fund dedicated to support investment in improvements in curbside recycling infrastructure, allowing existing MRFs to better manage the evolving packaging stream and resulting in an even greater increase in the state's recycling rate.

Additional benefits to Washington's recycling system overall include:

- More options for residents to recycle, specifically in areas that have removed glass from curbside collections.
- Increase in total amount of material recycled because a large proportion of material collected will be pulled from the trash stream, which is currently being landfilled;
- Increased diversion of valuable materials from the landfill and elimination of costs associated with landfilling those materials.
- Greater incentive for commercial waste providers to work with their customers to separate deposit containers again increasing the commercial recycling rates;
- Increased output of high-quality recyclable commodities.
- Social and economic benefits associated with the establishment of a DRS including: the creation of jobs, gross value added to the economy and the equal opportunity available to all residents (whether urban or rural, in single-family or multifamily dwellings) to claim deposit refunds.
- Environmental benefits including: decreased land and marine litter, increased quality and quantity of material available for use as recycled content feedstock, creation of infrastructure that could support a refillable container program, and potential to decrease greenhouse gas emissions associated with production and disposal of beverage containers.

The phase III report will quantify the economic, environmental and social costs and benefits of a DRS in Washington to a range of stakeholders.

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Glossary of Key Terms

Aseptic Container – a tetrahedron-shaped plastic-coated paper carton, usually used to package liquids like milk and juice or processed food like vegetables and preserved fruits, often referred to by the brand name “Tetra Pak.”

Bag Drop – A redemption option for deposit return systems in which consumers drop-off filled bags of empty beverage containers to a designated location. Beverage containers are later verified and counted, and consumers are refunded their deposits through a digital account.

Circular Economy - an economy that aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system.¹⁵

Commercial Sector – Waste generators that include private commercial businesses, industrial operations, and institutions.

Counting Center – a facility in which redeemed deposit containers receive verification through technological sorting and counting.

Deposit – A sum of money required to be exchanged for a product in addition to the purchase price, in order to incentivize its return to the system.

Deposit Return System (DRS) – Also called container deposit systems or “bottle bill,” these programs place a refundable deposit on beverage containers which is returned to consumers when they redeem empty containers to a redemption location.

Distributor – refers to a person who engages in the sale of beverages in beverage containers to retailer in the state

Extended Producer Responsibility (EPR) – a mandatory type of product stewardship that includes, at a minimum, the requirement that the manufacturer's responsibility for its product extends to post-consumer management of that product and its packaging. There are two related features of EPR policy: (1) shifting financial and management responsibility, with government oversight, upstream to the manufacturer and away from the public sector; and (2) providing incentives to manufacturers to incorporate environmental considerations into the design of their products and packaging

Free riding – when one firm (or individual) benefits from the actions and efforts of another without paying or sharing the costs.

Handling Fee – a fee paid to parties providing redemption infrastructure calculated to cover the cost of receiving beverage containers from consumers and storing them prior to collection.

Material Recovery Facility (MRF) – Also sometimes called a recycling processor or sorting facility, an establishment primarily engaged in sorting fully or partially mixed recyclable materials into distinct categories and preparing them for shipment to recycling markets. There are also recovery facilities

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that focus on specific materials, such as plastic recovery facilities (PRF) or container recovery facilities (CRF).

Manufacturer – refers to a person who bottles, cans or otherwise places beverages in beverage containers for sale to distributors or retailers.

Polyethylene Terephthalate (PET) – a clear, strong, and lightweight plastic that is widely used for packaging foods and beverages, especially convenience-sized soft drinks, juices and

Producer – an organization or company that is a resident, and a brand owner, first importer, or franchisor that supplies designated packaging to consumers in a jurisdiction where producer responsibility obligations have been regulated.

Producer Responsibility Organization (PRO) – the entity (usually a non-profit organization) designated by a producer or producers to act on their behalf to administer an EPR or product stewardship program.

Redemption Center – a staffed or unstaffed facility in which residents drop off material for recycling; may be referred to by several other terms, including: depot, recycling center, eco-center, drop-off center.

Reprocessor – also called a reclaimer, these companies purchase post-consumer or post-industrial recycled commodities and process into resin feedstock to sell to manufacturers. For plastics reprocessors, end products include pellet, flake, and other resin products. Some vertically integrated reprocessors also have manufacturing operations and may use the recycled content feedstock that they reprocess in the production of their own products.

Residential sector – waste generators that include single-family and multifamily residences or households.

Retailer – also known as a dealer, refers to every person in the state who engages in the sale of beverages in beverage containers to a consumer.

Return-at-retail – a redemption option where deposit containers can be redeemed at a redemption point that is co-located with a retail establishment. Return-at-retail can take several forms, including bag drop locations, as described above, as well as kiosks incorporating RVMs that are located outside of the stores, usually in parking lots as a stand-alone redemption point.

Return-in-retail – refers to redemption when consumers present empty containers directly to a store associate who provides the deposit refund, or when RVMs are located within a retail establishment.

Reverse Vending Machine (RVM) – a machine through which beverage containers are redeemed, verified, and compacted, and deposits are automatically refunded. Used by consumers at redemption locations.

Introduction

Background

King County, the City of Seattle, cities in King County, solid waste haulers, and stakeholders have joined together in order to develop a coordinated approach to recycling in the region.

The Responsible Recycling Task Force (RRTF) created a set of action items, which were developed by following the "responsible recycling framework" that calls for recycling systems to:

- Focus on the quality vs. quantity of recyclables.
- Use consistent messaging across the region.
- Prioritize domestic reprocessing and markets.
- Consider the social and environmental effects of exporting recyclables.
- Create domestic demand for recyclables.
- Realize that responsible recycling is not free.
- Measure real recycling.

To address one of the resulting action items, Action Item 1A, King County contracted with C+C Consulting (C+C) to facilitate a study in 2019 that examined how various Extended Producer Responsibility (EPR) programs and policy elements could be applied to Washington state's current recycling infrastructure to achieve responsible recycling.

Following this work, Eunomia Research & Consulting (Eunomia), in collaboration with C+C and Cascadia Consulting Group, was tasked to work on Action Item 1E: *Develop a feasible model for a beverage deposit return system in Washington similar to the Oregon Beverage Recycling Cooperative model.*

A deposit return system (DRS) is a designated system that places a small monetary deposit on a product at the point, paid by the consumer at the time of purchase, which is refunded when the consumer redeems the product packaging to a designated redemption location for reuse and/or recycling.

The study will be conducted in three phases, as follows:

- Phase I: Inventory of Existing Deposit Return Systems (DRS).
- Phase II: Qualitative Research and Recommendations.
- Phase III: Quantitative Assessment of Financial, Economic and Environmental Impacts.

This report describes how a beverage container deposit system in Washington could work as a separate, stand-alone program (without an EPR system) as requested under Phase II.

Context

DRSs have a long history in North America, with the first US system enacted in Oregon in 1972. DRSs in America were, in a number of cases, the first recycling programs of any kind and established with the primary objective of reducing litter. This differs from the objectives of systems in Canada, for example, which were originally set up to facilitate the return of refillable glass beer bottles.

Today, despite a significant increase in the number of households with access to curbside services across the country, recycling rates for beverage containers remain lower in non-deposit states than in deposit states. In fact, 47% of all beverage containers recycled in the U.S. are from the 10 states with DRS laws, although those states cover just 28% of the population.¹⁶ In Washington, only about 33% of polyethylene terephthalate (PET) bottles, the majority of which are beverage containers, are effectively collected and sent for reprocessing and recycling into new materials. PET bottles represent 25% of all rigid plastic packaging waste generated in Washington.¹⁷ Washington is not alone in under-recovery of PET bottles. Nationally, the recycling rate for PET sits at just 28.9%.¹⁸

As curbside recycling proliferated over the past four decades, establishing new DRSs became less of a priority. However, in recent years, this view has shifted and DRSs are being supported for the following reasons:

- DRSs have been proven as the most effective mechanism for reducing litter from beverage containers. Marine litter has become a particular issue of interest, and primarily emanates from the land, so it can be prevented through mechanisms like DRS. Plastic beverage bottles were reported as the fifth most common item recovered from beach clean-ups in 2018.¹⁹ Washington's long coastline and network of islands also makes a strong case for a focus on marine pollution.
- DRSs deliver decreased contamination levels and lower yield loss rates across the recycling system when compared to curbside collection systems. PET reprocessors report yields from DRS bales at approximately 70-80% versus yields from single stream curbside recycling programs at only 45-55%,²⁰ indicating that DRSs produce a higher quality, more valuable secondary material output, which fills an important need for growing the circular economy.
- Following China's 2018 National Sword/Blue Sky Policy and the reduction in markets for recyclables, many international markets for recyclables were restricted. Additionally, in May 2019, 187 countries decided to significantly restrict international trade in plastic waste to address the improper disposal of plastic waste and reduce its leakage into the environment through the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Through this treaty, international shipments of plastic waste will be allowed only with the prior written consent of the importing country and any transit countries, effective January 1, 2021.²¹ To respond to these restrictions, investments in U.S. reprocessing plants has increased and some previously closed plants have reopened.²² Clean, well-sorted

recyclables – like those emanating from a DRS program – will more easily find a market and ensure that the efforts of residents of Washington to recycle are not wasted.

- A best-in-class DRS is operated under the principles of extended producer responsibility that seek to internalize the environmental and financial costs of end-of-life management of products and packaging to companies that make those products or use packaging.
- DRSs that include all beverage containers capture a large percentage of the glass in the recycling system, which, when comingled with other recyclable material in single stream curbside recycling systems, reduces the quality and value of that other material, specifically of the fiber stream, despite investment by glass recyclers, such as that by Strategic Materials.
- Many beverage brands have made global commitments to: recyclability, increased use of recycled content within their packaging, and/or to support and enhance recycling systems so as to increase the amount of quality material that can supply the circular economy. These goals are all reliant on more robust recycling collection systems, such as DRSs, to provide quality post-consumer recycled material approved by the Food and Drug Administration (FDA) for food contact packaging.²³ A recent report from the National Association for PET Container Resources (NAPCOR), the trade association for the PET packaging industry in North America, stated that there is not enough recycled PET supply or processing capacity in the U.S. to meet brand owners' stated commitments. The report states that current collection volumes could only support a ten percent recycled content commitment by consumer-packaged goods companies (CPGs).²⁴
- Changing attitudes towards deposit systems from producers and industry associations can be demonstrated by the American Beverage Association's recent public statement in which they said they would be open to deposits, on the provision that unclaimed deposits are used to support the system, rather than used by the state for other purposes.²⁵ More recently, the Can Manufacturers Institute and The Aluminum Association set out their views on what makes a strong deposit system.²⁶
- Greater engagement by consumers, more than half of whom would pay more for sustainable products designed to be reused or recycled.²⁷ Polls in states with bottle bills also regularly find that the majority of the public in favor of the program and favor expansion.^{28 29}
- Despite having one of the most robust curbside recycling systems in the country, 9% of Washingtonians who live in single-family homes and 15% of those who live in multifamily residences do not have access to curbside recycling service. Another 10% of single-family households as well as another 10% of multifamily households must voluntarily subscribe and pay for recycling service separately from garbage service, creating a potential disincentive for recycling participation among households in areas where subscriptions are optional.³⁰

The majority of the DRSs that currently operate in the U.S. have been operating for more than three decades. Due to overly prescriptive legislation that requires legislative approval to implement even small changes, which have been historically lobbied against by the beverage industry, these systems have been unable to adequately evolve over time and ensure they are following best-in-class principles. This has left the majority of the U.S. programs with middling redemption rates that do not perform to the potential of modernized, effective DRSs.

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In European jurisdictions, the recent increase in DRSs has been driven primarily to meet minimum recycled content legislation and a 90% collection for recycling target for beverage containers set through the Single Use Plastics Directive.³¹ In 2010, 36 countries and states had DRSs in place affecting 279 million people. By 2019, the number of jurisdictions with DRS had increased to 58, affecting 612 million people.³²

Though this report advises on a stand-alone DRS system, it should be noted that DRSs are compatible with EPR programs for a wider range of packaging and paper products. A DRS is a collection mechanism that is efficient at retrieving high levels of deposit materials put on the market, if the deposit is at a level sufficient to incentivize returns when paired with adequate geographic coverage to provide convenience for consumers. The draft report “Recommendations for Managing Plastic Packaging Waste in Washington,” published in August 14, 2020, recommends EPR for packaging as well as a complementary DRS for beverage containers.³³ The system conditions associated with the model EPR system are included in Appendix 1.0.

Study Approach and Parameters

This study considers the design for a best-in-class DRS in Washington and how it could operate alongside the established curbside recycling system and the associated, existing collection and sorting infrastructure. The Phase I report outlined the principles that are common to best-in-class systems across the globe and investigated the attributes of oft-cited systems in the U.S., Canada and Europe. Eunomia has synthesized this information alongside existing knowledge of how new DRSs are being designed around the world to operate alongside curbside recycling programs to inform the design of a DRS for Washington.

For Phase II, this report outlines how a DRS could work in Washington as a stand-alone program including specific design and policy elements that should be included in legislation, based on best practices around the world. Additionally, it describes how a DRS would work with the existing curbside recycling system, including potential synergies and uses of infrastructure as well as potential impacts.

The broad goals of a best-in-class DRS are:

- To maximize redemptions rates in order to prevent litter and maximize the quality and value of the recyclable material, necessary for a circular economy.
- Provide equitable access for all residents across the state to be able to redeem their containers at convenient redemption points.
- Supplement and enhance the recycling system without jeopardizing existing curbside services.
- Remain dynamic and relevant to the current environment, with a design that allows for necessary adjustments over time without requiring additional legislation.

In order to design and make recommendations on how a DRS for beverage containers could be implemented in Washington, the team has analyzed key factors from high performing, low cost systems from across the world, as summarized below.

Effectiveness

- *What does the legislation include?* The most effective legislation for establishing a DRS is often the simplest. This report recommends a DRS for Washington outlined in legislation that is less prescriptive than many DRSs in order to allow for flexibility and growth of the system. Legislation should set targets for redemption and standards for measurement, including methodology for calculating actual recycling.
- *How is the deposit value determined?* The deposit should be set to maximize redemption rates with the flexibility for it to be revised without additional legislation.
- *Who is able to participate?* There should be a focus on customer access, convenience and experience.
- *What does the deposit apply to?* There should be a broad scope of beverages and packaging materials included.

Management, Oversight and Governance

- *Who oversees and manages the system?* Government should have a role in oversight, compliance and issuance of penalties, while operational management is run through a producer appointed non-profit organization.
- *How are results and metrics reported?* There should be an emphasis on transparency, including public reporting of costs and benefits, so that the system can be monitored and evaluated to ensure it is performing as intended.
- *How are container redemptions verified?* A technology-driven approach to container verification facilitates reporting and fraud mitigation.
- *What is the redemption infrastructure?* There should be a mix of options for redemption that includes a retailer obligation to ensure comprehensive coverage.

Financing

- *Who pays for the system?* It should follow Extended Producer Responsibility principles, with producers funding the system net of material revenue and unclaimed deposits.
- *How are contracts made?* There should be open and transparent procurement of all contractors employed by the system with fair, competitive pay for service providers.
- *Who retains unredeemed deposits?* Unredeemed deposits should support operation of the DRS up to the point at which the target is met, but if the system is underperforming, additional unredeemed deposits should support the state recycling system overall and not be retained by producers.

The recommendations in this report have been developed based on the evaluation of systems against these best-in-class principles as well as the latest thinking Eunomia has gathered from talking to providers of recycling services both DRS and curbside locally and in other jurisdiction and as such

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represent the latest thinking on how DRS can work alongside established curbside services. A list of sources consulted is provided in the appendix. The report sets out the key system design principles of a DRS system necessary to meet the goals set out above, detailing why these are needed and providing recommendations on how these key elements should be covered in legislation. The recommendations are based on providing only what is necessary to be included in legislation to enable output-based targets to be met and ensure that there is the necessary oversight and governance to ensure transparency and mitigate fraud. The report is structured as follows:

- The Proposed Deposit Return System Design section describes each element of a best-in-class DRS, details a recommended position for Washington, explains the rationale behind the recommendation and then comments on, if, and how the element should be referenced in legislation.
- The Curbside Considerations Impact Mitigation and Benefits section provides a description of the impacts of a DRS on the curbside recycling system, including possible costs and possible mitigations as well as benefits. Many of these impacts will be quantified in Phase III of this study.

Proposed Deposit Return System Design

In this section we set out the key elements of a best-in-class DRS system for Washington.

Producer Responsibility and Obligated Parties

A DRS requires that a number of parties work together to create a productive and efficient reverse supply chain to facilitate the collection and refunding of obligated materials. There are two primary ways for managing a legislated DRS.

1. Government-organized: A government-organized system is run by an agency of the state government that makes all rules and processes for management and operation.
2. Producer-organized: A producer-based model places the legal obligation on producers for delivery of the DRS to achieve specific outcome-based requirements.³⁴

For either system, DRS legislation should include a comprehensive account of the roles and responsibilities associated with the DRS and include all parties that will participate in the system.

System Design Principles

A producer-organized and funded DRS is recommended for Washington. This should include the provision of individual producer responsibility wherein individual producers are assigned the legal obligation to meet the legislated performance standards. Compliance with these obligations can be achieved through membership in a Producer Responsibility Organization (PRO). After the legislation is enacted, the DRS should be functional within two years. Producers should be given a further three years to complete the system in order to meet the geographical coverage and performance targets.

Roles of these parties in relation to a system under this provision should include the following:

Administrator - Government or Government-Appointed Agency

An existing or new government agency, or a non-profit agency appointed by and accountable to the State of Washington should handle oversight of the system. If an appointed agency is used, it could also oversee additional stewardship programs in the state and be more flexible in responding to changes in the system. Regardless of structure, this agency should have a role in oversight, compliance and issuance of penalties. An audit team may be established to verify compliance by the PRO and by independent redemption centers.

The costs to the agency for oversight and administration should be covered through producer fees, as they are responsible for the cost and management of the system, including system oversight.

Responsible Party – Producers, Manufacturers, Importers

Producers that put products on the market that are included in the obligated materials list are required to participate and contribute to the DRS system. Producers should be individually responsible for meeting targets with the ability to report through a producer responsibility organization (PRO), which will manage and administer the system.

Washington should establish a *de minimis* threshold for producers that exempts small and emerging producers from full participation. Incremental revenue thresholds should regulate participation. Small producers may still be required to join the PRO but may not be required to act as full paying members in order to protect small businesses from overly burdensome obligations that prevent business growth.

Importers or distributors that sell beverages that are not produced in Washington will be subject to the same requirements as producers in order to ensure full responsibility for all obligated materials that are put on the market in the state.

In B.C., the Recycling Regulation defines a producer of a beverage container as:

- “(a) a person who manufactures in British Columbia a beverage which is sold in a container;*
- (b) if paragraph (a) does not apply, a manufacturer’s agent who represents to the Liquor Distribution Branch a person who manufactures outside British Columbia a beverage which is sold in a container;*
- (c) if paragraphs (a) and (b) do not apply, a person who distributes in British Columbia a beverage, other than liquor, which is sold in a container;*
- (d) if paragraphs (a) to (c) do not apply, a person who imports into British Columbia, for sale in British Columbia, a beverage which is sold in a container.”*

Producer Responsibility Organization

Typically, a single non-profit PRO is established to manage and coordinate the collection and reprocessing of beverage containers under the DRS on behalf of producers. This could be the same PRO as that established under EPR for PPP collected under curbside and depot services or a separate PRO. The PRO handles the incoming revenue from sold material and unredeemed deposits, and outflow of payments to any appointed operators of the system.

The non-profit PRO is also responsible for compliance with targets established in the legislation and fraud prevention, via technological solutions to reduce fraud. The PRO determines the level of producer administration fee necessary to ensure cost coverage of the system and is responsible for collecting those from its members based on units placed on the market and for self-policing free riders. This may include fees that are modulated to reflect the container’s cost and value in the system, e.g. aluminum has a higher market value, so its relative cost in the system would be less than materials, such as cartons that are less recyclable and have a lower market value. The PRO also has the ability to set service standards for redemption centers, ensuring a consistent standard.

The non-profit PRO should be subject to extensive and transparent reporting requirements on an annual basis that detail performance, system finances, procurement processes and operational mechanisms.

Reporting requirements vary greatly across existing programs. For instance, there is no requirement in Maine for reporting on redemption rates. The resulting absence of data to assess the effectiveness of the program has long been a concern and was reported by a Study Commission in 2001.³⁵ On the contrary, Alberta’s PRO self-reports on a wide range of performance indicators and

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measures, making it one of the most transparent DRSs in the world. Extensive and transparent reporting requirements relate to several desired outcomes, including: environmental protection, fiscal stewardship, governance excellence, customer excellence and system efficiency and effectiveness.

Retailers

As the point of sale for beverage containers, retailers should be expected to participate in their collection. While there is opposition from some retailers, grocers are located in convenient locations and allow consumers to redeem at the same time as shopping. As such, inclusion of retailers in redemption infrastructure provides a higher level of access than a system that just relies on standalone redemption centers not linked to retailers.

Retailers greater than or equal to 5,000ft² should be required to act as redemption points, unless other redemption options are available in the vicinity and the PRO can certify that geographic coverage requirements are met. In this case, the retailer may choose to pay a fee, set by the PRO, to the alternate redemption point. These recommended obligations are discussed further in the Producer Responsibility and Obligated Parties section.

Rationale

Producer-managed programs are generally more cost effective compared to government-managed programs and ensure that the industry can address free riders in the system, as these parties push up cost for other producers. When programs are managed by producers against clear output-based requirements set in legislation, there is a financial incentive to comply at lowest cost and to address elements of the program that increase costs, such as fraud. Oregon is an example of a producer-managed program. Government-managed programs are slow to adapt to change and often laden with bureaucracy, as is seen in the programs organized by governments, like most of those in the U.S., described in the Phase I report.

Clear definitions of obligated parties and their required roles and responsibilities within the system are necessary for program success. Where elements of this are missing, the program will be less robust. For example, a lack of a clear definition of obligated materials may lead to loopholes and free riders that place beverages on the market but do not pay into the DRS.

A government or government-appointed agency that is independent of producers needs to be established to oversee the system and ensure that producers and/or the PRO adhere to legislative requirements.

Public reporting by a PRO on the performance and management of a DRS is essential for ensuring that the system is operating as expected and adhering to the intentions of the policy. The PRO is likely to procure part or all of the collection, counting, and sorting activities, therefore, reporting on procurement practices and on the performance of these contractors is also necessary.

Retailers must be included among obligated parties to form the basis of the redemption infrastructure, even as opt-out mechanisms are allowed. This will allow geographic coverage to be

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evaluated based on the market-driven locations of retailers that strive for convenient consumer access and coverage.

Legislative Recommendation

Legislation should clearly define the obligated parties under the program and their respective requirements, including:

- Government of government-appointed agency designated as program administrator, responsible for oversight.
- Producers, manufacturers and importers designated as responsible parties for the DRS.
- Retailers obligated to take back deposit containers, in line with the “Redemption Infrastructure, Access, Location and Convenience” system principles.
- PRO formation and mechanisms through which producers, manufacturers and first importers shall work with the PRO and how the PRO will provide data to the government or government-appointed oversight agency.

The legislation should set a period by which the PRO shall be established it is recommended that this be one year from the legislation being enacted.

Obligated Materials

The list of obligated materials defines which beverage containers should be included in scope of the DRS and have a deposit applied. This includes material type, beverage type and size.

System Design Principles

The DRS should include all alcoholic and non-alcoholic beverages, regardless of packaging material. This aligns with the policy in Alberta and to the changes being implemented in British Columbia.

“Beverage” should be defined in order to specify the materials to which the DRS applies, and ensure that all producers are obligated to participate so that redemption rates are maximized. The *Break Free from Plastic Pollution Act* bill defines “beverage” as “any drinkable liquid intended for human oral consumption” and lists applicable beverages, include “any other beverage determined to be appropriate by the Administrator.”³⁶ This approach keeps the policy flexible to allow for the addition of new beverages that may come on the market without requiring additional legislation.

Further, the bill defines “beverage container” as “a prepackaged beverage container— (i) made of any material, including glass, plastic, metal, and multimaterial; (ii) the volume of which is not more than 3 liters.”

Alberta takes a similar approach in its regulation and defines beverage as “any liquid that is a ready-to-serve drink and is not exempt from this Regulation.”³⁷

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Washington should follow a similar approach in its definition of obligated materials. This will include the beverage container types shown in Table 1.

Table 1: In Scope Beverages and Packaging Material

Drink Type	Material Type						
	Aluminum	PET	HDPE	Glass	Gable top	Aseptic	Pouches
Soft drinks including: Carbonated, sparkling, non-sparkling water and flavored drinks, teas, wellness and functional, energy, fruit and vegetable juices and drinks	Y	Y	Y	Y	Y	Y	Y
Milk and dairy	Y	Y	Y	Y	Y	Y	Y
Beer, hard cider, wine, spirits (liquor) and all other alcoholic beverages	Y	Y	Y	Y	Y	Y	Y

Rationale

A broad scope maximizes the potential impact in terms of recycling rates and litter reduction. This approach is arguably the fairest for all beverage producers, as no beverage or company gains an advantage from being included in, or excluded from, the DRS. It has the added benefit of simplicity for consumers, retailers and producers, and means consumers do not have to sort their beverage containers. This is in contrast to Oregon’s legislation, which does not apply to all beverages, and provides its applicability as pertaining to:

“Any individual, separate, sealed glass, metal or plastic bottle or can, except for a carton, foil pouch, drink box or metal container that requires a tool to be opened, that contains any one of the following beverages, intended for human consumption and in a quantity less than or equal to three liters:

- (a) Water or flavored water;*
- (b) Beer or another malt beverage;*
- (c) Mineral water, soda water or a similar carbonated soft drink;*
- (d) Kombucha; or*
- (e) Hard seltzer.”³⁸*

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Additionally, including all types of beverages will maximize the shift of glass from curbside to DRS and ensure all packaging types for beverages are treated equally and prevent material switches from one material in scope to one that is not, and ensure that all future beverage types and packaging types are automatically included in the system in order to ensure that there are no loopholes and to prevent a proliferation of free-riders that may choose to alter their packaging if there are exceptions.

Legislative Recommendation

Legislation should mandate that all beverage types in containers of all materials be obligated under the DRS up to 3L in size, specifying that producers are required to register each product with the government agency and providing the products bar code such that it can be verified through the system when redeemed. The legislation should state that only beverages that have been registered with the government agency can be sold in the state.

Targets

In a producer-responsibility DRS, performance targets are used to outline the parameters that producers must design the system to meet. Performance targets, including a redemption rate target and an access/convenience target, are described below.

Redemption Rate Targets and Phasing

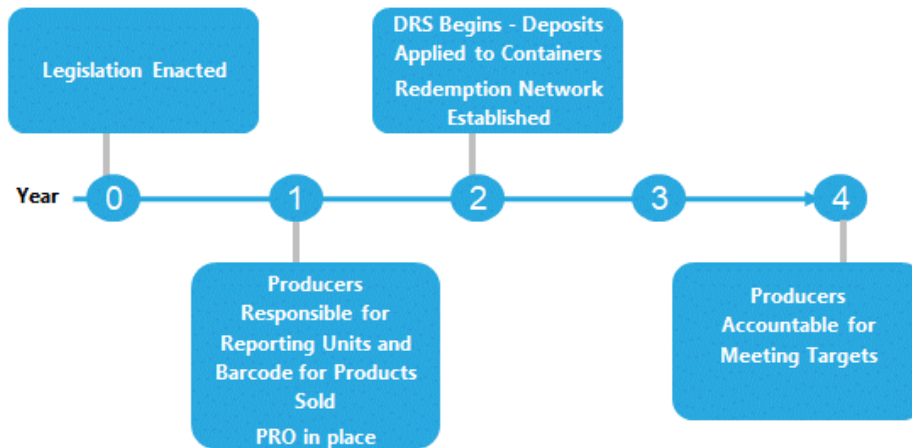
Performance targets related to the percentage of beverage containers redeemed, recovered, or recycled are the most common type of target associated with DRSs. Whether targets refer to redemption or recycling is essential to define.

System Design Principles

A 90% collection target for beverage containers should be written into the legislation with financial penalties on the PRO for non-achievement. This target should be related to “redemption” not to “recycling.” All of these terms should be defined. After the legislation is enacted, producers will be expected to report on units placed on the market after one year. The DRS should be functional within two years. Producers should be given a further three years to complete implementation of the system in order to meet the redemption target, as illustrated in Figure 1.

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Figure 1: Recommended Timeline for DRS Implementation

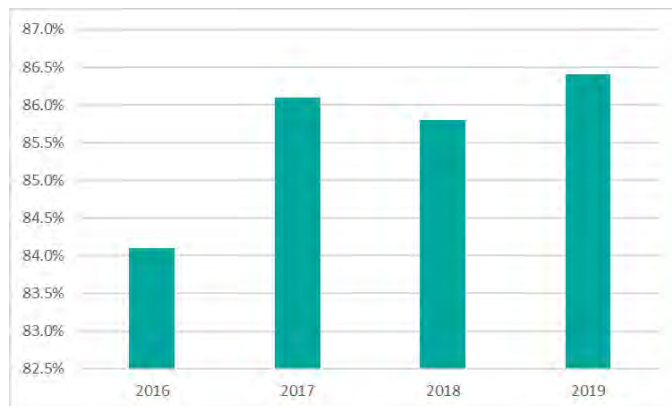


Rationale

When a DRS is organized by the private sector, cost efficiency is often the primary concern of the PRO. Therefore, it is essential that governments set strong performance standards that producers must meet to ensure that producers operate a system capable of achieving the highest outcomes possible for the lowest cost.

In Alberta, the government set an unofficial redemption rate target of 85% by the end of 2011. Although this rate is currently being achieved, it is not mandatory and is not material-specific. The PRO operators of the DRS in Alberta set their own target redemption rates, by material every year based on the performance of the previous year. However, these targets are also not binding and there are no repercussions if not met. Overall redemption rate targets for the past four years are shown in Figure 2.³⁹

Figure 2: Alberta PRO Redemption Rate Targets



Source: BCMB Annual Report 2018.

https://www.bcmb.ab.ca/uploads/source/Annual_Reports/2019.06.05.BCMB.2018.Annual.Report.Web.Version.pdf

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The two PROs in B.C. both set their own targets for recovery and consumer access, as follows:

- Encorp (the PRO for non-alcoholic beverages) set its recovery target of 82% in 2018.⁴⁰
- The Brewers Recycled Container Collection Council (BRCCC), which manages alcoholic beverages, has set a recovery target of 87.5% for the years 2015-2019.⁴¹

Ontario is proposing a 75% diversion target for all beverage containers (i.e. PET bottles, glass, aluminum cans, cartons) supplied into the province applicable to both the residential and commercial sectors via its transition to a full packaging EPR program.⁴²

When a DRS is structured with the correct incentives and geographic coverage, a 90% collection target is achievable, as demonstrated in many programs across Europe, including in Germany and Norway, with recovery rates of approximately 97% and over 95%, respectively, discussed in further detail in the Phase I report.⁴³ The European Union has set a 90% separate collection for recycling target for plastic bottles by 2029 without a mandatory DRS, but many member states are implementing DRSs in order to meet this target.⁴⁴ A 90% collection target for a DRS is a best-in-class recommendation that will enable the DRS to operate as efficiently as possible and lead to the highest recycling rates. However, it should be expected that loss rates will occur during processing and this is not equivalent to the amount of material that will be recycled, which should be defined as only that material that is used as an input in the creation of new products or materials.

Requiring reporting on units placed on the market by producers after the first year will allow a database to be built against which to measure progress and compliance as well as to gather data for EPR programs. A packaging EPR program will likely apply to only residential packaging. Requiring reporting from both the residential and commercial sectors will allow for DRS effectiveness to be measured and allow a future EPR program to be expanded to all sectors.

Legislative Recommendation

A performance target of 90% redemption should be written into the legislation to take effect within three years after the DRS system is implemented.

Consideration will be needed as to when these targets are met after the legislation is enacted. We would recommend the following:

- One year after the legislation is enacted, producers shall report on units placed on the market by container size, material and product.

Producers shall be individually legally required to demonstrate that the targets have been met within three years of the date the legislation is in effect.

Access/Convenience Target and Phasing

In addition to the redemption target, as stated above, there should also be a requirement to guarantee a minimum level of convenience for all users through minimum geographic coverage of redemption points.

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System Design Principles

To ensure equal access for all residents, a geographic access target should be included in the legislation that specifies that 80% of the population should be within 5 miles of a redemption point, with at least one redemption point per every 5,000 residents. After the legislation is enacted, the DRS should be expected to be operational within two years. From this point, producers should be accountable to meeting the target for geographic coverage and access target within an additional three years.

Rationale

The system elements that most impact the redemption rate of DRSs are: the level of incentive and, access to redemption points. Though a purely return-in-retail model would automatically provide geographic coverage and a high level of consumer access for the DRS, it is acknowledged that this might not be politically or logistically feasible for Washington. Therefore, geographic coverage targets are essential for Washington's DRS to be successful. However, if the redemption target is set sufficiently high (i.e. at least 90%), then sufficient coverage will be needed to meet the performance so as to ensure that the access target is met.

PROs in British Columbia emphasize convenience in their Stewardship Plans. Encorp not only includes a 97% consumer access goal, based on drive times (30 minutes for urban areas and 45 minutes for rural areas) set out in the Stewardship Agencies of British Columbia (SABC) accessibility standard,^{45 46} but also a 90% awareness goal of locations to which containers can be redeemed.⁴⁷ BRCCC also includes an accessibility target of 385 redemption locations by 2019 (or 80% of the population living within a 10-minute drive of a redemption location).⁴⁸ These targets have been used as the basis of the recommendation of targets for Washington.

Legislative Recommendation

A target related to access that specifies that 80% of the population should be within 5 miles of a redemption point, with at least one redemption point per every 5,000 residents should be set in legislation and should come into effect three after the implementation of the DRS.

Consideration will be needed as to when these targets are met after the legislation is enacted. We would recommend the following:

- Within one year after the legislation is enacted, producers shall report on units placed on the market by container size, material and product.

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Producers shall be individually legally required to demonstrate that the targets have been met within three years of the date the legislation is in effect.

As Washington is seeking higher recycling rates for beverage containers through a DRS, what is meant by “recycled” must be clearly defined.

Many jurisdictions report on material collected for recycling as recycled. Washington State defines “Recycling” as:

“transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill disposal or incineration. Recycling does not include collection, compacting, repackaging, and sorting for the purpose of transport.”

There are significant loss rates for each material that occur between collection and reprocessing. This loss needs to be accounted for in the definition of recycling in order to fully reflect the material that is able to be used in new products and that contributes to a circular economy. Recycled should be defined as material that is sent to a reprocessor, post-collection and sorting, to be used in the production of new products.

In 2019, the European Union (EU) added a standard definition of “recycling,” to be used across the its waste and recycling policies. This new definition, which include only that material that is used as an input in the creation of new products or materials, is more stringent than that which was used in most EU member states and includes specific calculation methodology for each material. These are detailed in Appendix A.3.0.

Deposit Rate, Structuring, Mechanism for Refund and Use of Unredeemed Deposits

The deposit rate is the amount of money paid as a deposit on a beverage container in a DRS. Deposits are generally initiated by the producer, distributor, or first importer of a beverage container at the time that it is sold to the retailer. This deposit is then paid to the retailer by the consumer and refunded to whoever redeems the container through the DRS. As in all DRSs, a percentage of beverage containers will not be redeemed for a refund of the deposit. Some will be disposed of in the trash or discarded as litter, leaving those deposits unredeemed. This pool of money can be substantial and is used in a variety of ways across programs and retained by various parties.

System Design Principles

It is recommended that:

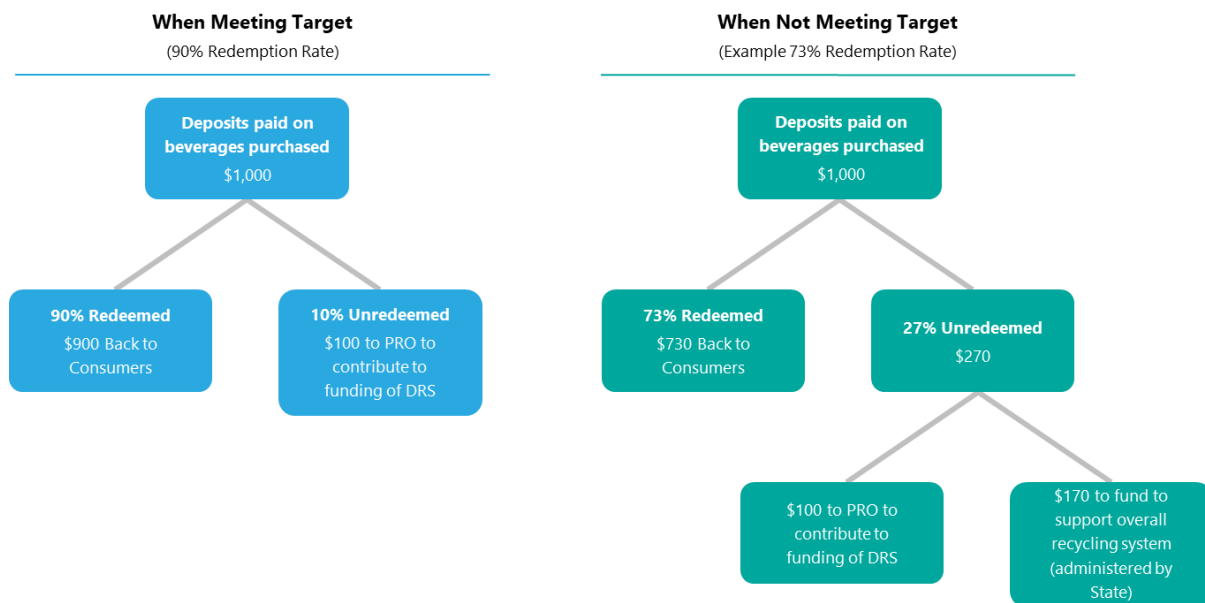
- The deposit rate be set at \$0.10 across all container sizes and beverage types;
- The \$0.10 deposit rate structure is flat across all container types and sizes.
- There is a mechanism to adjust the deposit rate without the need for a legislative change. Legislative mechanisms for increasing the deposit should be triggered when the redemption

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targets have not been met for three consecutive years despite the geographic coverage target being met.

- There is the ability of operators of MRFs to recover the deposit for containers that are processed through their facilities based on the verification of each unit and not on a weight-based conversion factor or periodic audit-based assessments.
- Unredeemed deposits are kept by the PRO to offset the cost of providing the system, but only the proportion associated with the achievement of the target. If the target is not met, additional revenue should go to a fund to support the state recycling system overall. This concept is illustrated in Figure 3. Although the target would not be required to be met until three years following the implementation of the deposit program, the distribution of unredeemed deposits should follow breakdown outlined to provide early support for the curbside recycling system and allow investments to be made to facilitate the transition to an environment with both a DRS and curbside recycling operating alongside each other.

Figure 3: Distribution of Unredeemed Deposits When Target is Met and When Not Met



Rationale

Deposit Rate

The deposit rate is the mechanism for incentivizing returns and needs to be set at a level sufficient to ensure consumers feel it is worth redeeming their containers.

The rate of the deposit and convenient access to a redemption location are the two primary factors that lead a high redemption rate. Table 2 shows the deposit value and number of redemption points under different programs and the corresponding redemption rate. Those with a higher deposit have a higher redemption rate.

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Table 2: Recommendation for Access and Redemption Rate

System	Deposit	Geographical Coverage/ Redemption criteria	Overarching Redemption Rate
Alberta	CAD 10c (USD 7.47c) up to 1L then CAD 25c over 1L.	10mins drive time for 50% of population (focus on urban areas) (227 redemption depots = 1 redemption depot per 19,255 people)	85.3% (2019)
British Columbia	10c and 20c (under 1L and over 1L, respectively), considering move to 10c flat rate	80% or population living within 10min (385 redemption locations = approx. 1 location per 13,171 people)	77.4% (2019 with 5c deposit for <1l))
Germany	25euro cent (USD28c)	Extensive return-in-retail network (over 100,000 = 1 redemption point for every 820 people)	~97%
Norway	25c <0.5l and 38c >	Extensive return-in-retail network, 15,000 redemption points (1 redemption point for every 352 people)	87.3% cans and 88.6% PET (2019)
Oregon	10c	55 redemption centers/bottle drop plus ~330 retailers (1 return point per 10,955 people)	90.8% (2019)
Maine	5c plus 15c for wine and liquor	Currently 499 redemption centers (1 per 2,900, aiming to reduce to 1 per 5,000 people)	74.7% (2016)

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A \$0.10 for Washington is recommended in order to provide consistency with its neighbors – Oregon and British Columbia (noting that the British Columbia value is CAD\$0.10, currently equivalent to approximately USD\$0.075). A consistent regional deposit value will reduce confusion, increasing the effectiveness of educational efforts, as well as reduce the incidence of cross-border fraud. A flat rate deposit, rather than one that varies by size, material or beverage type, provides equal incentive to redeem all containers, ensures that the system is fair to all producers, and is simpler to administer. Further support for this strategy is provided by Alberta, which has a higher deposit rate for containers >1L, yet has no notable differences in the redemption rate for >1L plastic bottles to <1L plastics bottles.

However, though \$0.10 is greater than the deposit value of most systems in the US, it is still relatively low compared to systems in Europe that achieve the highest redemption rates. At €0.25 (\$0.28), the German deposit is higher than most, which is linked to an impressive reported redemption rate of approximately 97%.⁴⁹ Many DRSs in the U.S. were instituted in the 1970s and 1980s and have had few updates since. A \$0.05 deposit on a container in 1982 is equivalent to only \$0.02 in 2020 due to inflation, yet the deposit rate has not increased in many instances, decreasing the value of the deposit and the incentive to redeem containers.

Therefore, continuous improvement measures that automatically increase the deposit if redemption targets are not achieved despite geographic coverage targets being met are also recommended. This scenario would suggest that it is the incentive of the deposit value, not access, that is limiting returns and redemption rate. In the 2011 update to its deposit legislation, Oregon included the provision that:

“every beverage container sold or offered for sale in this state shall have a refund value of not less than five cents.

(2)(a) Every beverage container sold or offered for sale in this state shall have a refund value of not less than 10 cents, beginning on the later of:

(A) Eight months after the Oregon Liquor Control Commission determines that, in each of the two previous calendar years, the number of beverage containers returned for the refund value specified in this section was less than 80 percent of the total number of beverage containers that were sold in this state

(B) January 1 of the calendar year following the determination by the commission described in subparagraph (A) of this paragraph.”⁵⁰

Oregon increased its deposit from \$0.05 to \$0.10 in April 2017 through the triggering of this provision. This flexible approach recognizes the link between the deposit and redemption rates, and the need to keep the deposit value under review. The redemption rate during January – March 2017 was 59%.⁵¹ Following the increase, Oregon hit 90% redemption in 2018.⁵²

Yet, Oregon also implemented a number of other changes, including increasing the scope and investing in 45 bottle drops (as of 2018), over a short time period. These additional changes make the specific impact of the increased deposit amount on redemption rates less clear.⁵³

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An example of what an increase in a deposit can do without changing other elements of the program is found in Alberta, which in 2008 raised the deposits on all beverage containers from CAD\$0.05 (USD \$0.04) to CAD\$0.10 (USD\$0.08) for containers 1L and under and from CAD\$0.20 (USD \$0.15) to CAD\$0.25 (USD\$0.19) for containers greater than 1L. The collection rate increased by approximately 13% from less than 75% before the change to above the 85% target just three years after implementation.^{54 55}

Therefore, Washington needs a mechanism to increase the deposit if access targets are being met but performance falls short of targets. This flexible approach recognizes the link between the deposit and redemption rates, and the need to keep the deposit value under review. Oregon's provision for increasing the deposit was a one-time occurrence, whereas retaining the ability to review and increase the deposit after three years of non-achievement of the redemption target will allow Washington to retain a system that is responsive to the market and effective into the future.

Deposit Structuring

Deposits can vary according to the size or type of beverage. This is true in Alberta and British Columbia, where larger containers have greater deposits in both provinces. However, varying deposit rates may also lead to consumer confusion and more complicated accounting. In fact, after recently increasing the deposit for their smaller containers, the PRO in British Columbia is considering moving to a flat rate for all containers.⁵⁶ The obligation to charge a higher deposit on larger containers was removed from the provincial regulation in 2020, supporting this potential change.⁵⁷

Mechanism for Refund

In most cases, the consumer will return their containers through a redemption point that allows them to reclaim the deposit value. However, under any deposit system there will always be a percentage of containers that will flow through the curbside services and under these circumstances the consumer has made the decision not to collect the deposit. On this basis, there is an argument that MRFs should have the option to retrieve beverage containers and return them to the DRS, so that they can be accurately verified. If MRFs choose to participate in the system in this way, they should be entitled to the value of the deposit for the containers that they redeem.

Unredeemed Deposits

In Alberta, Oregon, British Columbia and Norway, all of which operate under a PRO, unredeemed deposits are retained by the PROs to cover program costs. In Germany, where the system is decentralized, unredeemed deposits are retained by individual producers.

In the U.S., some states retain the unredeemed deposits. In Maine, the State retains unredeemed deposits in its General Fund, unless the associated producer is part of a commingling group. If they participate in a commingling group, the producer is able to retain the unredeemed deposits on their containers.⁵⁸

Unredeemed deposits are a valuable source of income and should be used to support the recycling system as a whole. The PRO should use the portion of unredeemed deposits associated with

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achieving the target (i.e. 10% of deposits paid will be unredeemed if the redemption target of 90% is met) and use these funds to support the system that it administers. If the performance target is not met, the additional funds (the amount exceeding 10%) should be used to allocated to a fund to support the state's recycling system. The fund would be administered by the State to be disbursed to MRFs and reprocessors to support the recycling of other packaging materials, therefore, building a stronger recycling system overall. This approach to the distribution of funds was developed by the project team to eliminate the potential incentive for producers to not meet the performance target. Such an incentive is created if producers are granted the total of all unredeemed deposits when the target is unmet, if the sum of these unredeemed deposits is likely to be greater than the penalty for not meeting the target. The risk of penalty, combined with the lack of reward of additional revenue from unredeemed deposits will create a greater incentive for producers to create an effective system that achieves the performance target. If the producers miss this target, the excess funds from unredeemed deposits will be earmarked to help support the overall recycling system in the state.

Legislative Recommendation

Deposit rate and structuring: Every beverage container sold or offered for sale in the state less than or equal to a volume of 3L shall have a refund value of not less than \$0.10.

The legislation shall allow an automatic increase in the deposit rate by increments of \$0.05 if:

- in each of the three previous calendar years, the number of beverage containers redeemed for the deposit value specified in this section was less than 90% of the total number of beverage containers that were sold in the state; *and*
- geographic coverage requirements are demonstrated to have been met in each of those years.

Destinations of unredeemed deposits: Producers shall be entitled to retain only the amount of unredeemed deposits associated with the achievement of the target. Any unredeemed deposits that are due to producers failing to meet the target shall be transferred from the PRO to the oversight agency, where a Bottle Bill Fund is shall be established, separate and distinct from the State General Fund. This fund shall be used only to support investment in curbside recycling infrastructure.

Redemption Infrastructure, Access, Location and Convenience

Convenience is provided through local, quick access to clean, easy-to-use redemption points. The consumer experience is an important factor in redemption rates and consumers are looking for convenience and speed. Redemption points are interface between consumers and the DRS, so the redemption infrastructure is a key system element that leads to a high redemption rate. The types of redemption infrastructure and geographical coverage vary across systems and jurisdictions, as shown in Table 2, above. The different redemption options are described below.

Bag Drops

The bag drop redemption option is based on the Bottle Drop Express program in Oregon (as seen in Figure 4), run by Oregon Beverage Recycling Cooperative (OBRC, an industry-appointed non-profit)

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or British Columbia's Return-It™ EXPRESS 'drop-and-go' service. Bag drops are stand-alone structures (typically repurposed shipping containers) that are located in the parking lots of large retailers or in municipal depot drop-off facilities. Consumers purchase bags in which they place their empty containers.⁵⁹ In Oregon, it is assumed that each bag can hold approximately 100 glass bottles, 150 PET bottles or 250 cans.⁶⁰ Full bags are deposited at bag drop structures through a service hatch. Each consumer has an online account and when dropped-off bags are verified through the counting center, the deposit refund is credited to the consumer's account. The consumer can then use the deposit credit to purchase goods at retailers or have the option to donate the money to a charity/school/etc.

OBRC's model is similar to that operated by a private company, CLYNK, that partners with supermarkets in Maine and New York and places an unmanned box in the parking lot that customers can unlock with a membership card. This fills a niche in the market and allows for increased speed and convenience of redemption, enabling customers to drop off up to a month's worth of containers at once. CLYNK provides all collections and optimizes their collection routes and redemption points based on 20-minute drive time distributions.⁶¹ CLYNK receives revenue from bag purchases and convenience fees, and also receives matching funds from retailers for the benefit of CLYNK users being encouraged—through promotions and advertisements—to use their deposit refunds in the stores at which the bag drop facilities are located.

Bag drop facilities are not continuously staffed, but are monitored periodically by mobile teams and include cameras and sensors to alert the collection agents to when collections are needed. This model makes them especially cost-effective.

Figure 4: Oregon Bottle Drop Express Outlet



Source: OBRC, <https://www.bottledropcenters.com/Express>

RVMs

Reverse vending machines (RVMs) are machines that facilitate beverage container redemption. Consumers insert containers into RVMs, which may be located in a store atrium, entryway or in a kiosk in a parking lot, and which automatically verify and count containers and provide the deposit back to consumers. These machines facilitate the DRS and allow retailers to streamline the takeback

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of empty containers. RVMs require square footage and periodic emptying by the store or servicing by the PRO or a contractor.

Redemption Centers

Redemption centers are generally assumed to be privately-owned and operated businesses that exist to collect deposit containers and are compensated through handling fees. Some redemption centers are also run by the PRO directly.

In British Columbia, redemption centers often serve multiple purposes, with those that redeem beverage containers also acting as redemption points for other products covered under stewardship programs (e.g. electronics, textiles, light bulbs). This method allows consumers to recycle multiple products or materials as part of their redemption trips.⁶²

Return-in-Retail

Return-in-retail is arguably the most convenient option for redemption, as consumers can return their containers at the same time that they purchase new ones and other goods. Return-in-retail refers to redemption when consumers present empty containers directly to a store associate who provides the deposit refund, or when RVMs are located within a retail establishment.

Though this redemption is convenient, it is often viewed unfavorably by retailers who do not want used, potentially dirty, material inside their stores or for their employees to be required to participate in the operations of the DRS.

Return-at-Retail

Though return-in-retail may be unfavorable, there is still value in co-locating redemption points with retail establishments. OBRC reports that most consumers combine redemption with a trip to a grocery store. This is especially true for redemption locations sited at retail establishments.⁶³ Return-at-retail can take several forms, including bag drop locations, as described above, as well as kiosks incorporating RVMs that are located outside of the stores, usually in parking lots as a stand-alone redemption point. These are common in Lithuania and New South Wales, Australia. These redemption points provide the convenience of co-locating retailers and redemption points so shoppers can redeem their containers on one trip but allow retailers to forgo the obligations of redemption operations.

Technology

Technology can be utilized at or in combination with any of the redemption options to create a more accurate and efficient system. The types of technology include:

- Reverse vending machines (RVMs, described below);
- Bar code verification (described in Fraud Mitigation section); and
- Counting centers (described in Collection and Reprocessing section).

Curbside Recycling

Curbside recycling of containers can also be included as part of a DRS, with the deposit unredeemed by the consumer, which could be claimed by the MRF operator or potentially the municipality, with deposits paid to those claimants based on the actual number of units recovered from the MRF, rather than a weight-based conversion factor, as used in some jurisdictions, which is not accurate.

System Design Principles

We recommend that Washington:

- Sets a specific geographic coverage target and allows the PRO to put in place the types of redemption infrastructure that caters for low and high-volume redemption, and demonstrates as far as possible the “common stop” principle whereby redemption is as close as possible to the point of purchase so as to reduce any potential impact from additional vehicle trips.
- Mix of redemption options that focus on using technology to prevent fraud and increase convenience. Redemption options to include:
 - o including RVMs that use bar code technology to verify a unit and are able to crush units to prevent a unit being redeemed more than once
 - o bag drop that allow consumers to redeem large volumes in a short period of time and for the deposit to be credited to a personal account
 - o redemption centers for bulk redemption
- Redemption centers operated by independent owners should be registered and permitted through the PRO and
 - o Manage opt-out policies for retailers.
- Utilizes a technology-based approach to allow for improved consumer experience and fraud mitigation.
- Requires that parties providing redemption infrastructure comply with a set of standard operating requirements and are fairly paid for providing redemption points with those choosing RVMs (which reduce downstream costs) compensated proportionally through handling fees.
- Redemption centers can be opened by private entrepreneurs, they must register with the PRO and detail on their application:
 - o The location of the proposed redemption center; and
 - o the retailers within a five-mile radius that might be able to opt-out of their obligations once the redemption center opens, if the PRO certifies that geographic coverage requirements are still met
- The PRO may also choose to open redemption centers if adequate geographical coverage is needed or if the PRO decides to consolidate redemption points.

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- Retailers with stores equal to or greater than 5,000ft² should be obligated to take back deposit containers. However, they may meet this obligation in several ways:
 - o Take back containers via return-in-retail, either through manual take back or RVMs;
 - o Allow their stores to serve as a return-at-retail location, co-locating a bag drop or other redemption option on the grounds of the retailer;
 - o Retailers may request an exemption from redeeming deposit containers by completing an exemption request form and demonstrating that an alternate redemption location exists (e.g. a redemption center) that meets the geographic coverage requirements. Sufficient coverage shall be based to the greatest extent practicable upon the application for approval of the redemption center. If the request is granted by the PRO, be served by and be charged the cost of participation, set by the PRO, to the other redemption location (i.e. to the redemption center) for covering their obligations.

Retailers with stores smaller than 5000ft² should be exempt from the obligation, but may choose to opt-in to the system and act as a redemption point in order to participate in the system and be compensated through the handling fee. The PRO is responsible for collecting containers from all obligated retailers and from those that choose to opt-in to the DRS.

Rationale

The proposed infrastructure mix accommodates both large and small volume redeemers, as well as rural and urban communities. A suburban town in the Seattle metropolitan area will not need the same redemption infrastructure as a rural community in the eastern region of the state. Equally, retailers do not have the space to accommodate large volume redeemers. Demographics and existing infrastructure have been used to model a system that allows all consumers to have a simple, convenient system for redemption, this will be detailed in the Phase III report.

The number and distribution of each type of redemption point will be constructed to meet the geographical coverage requirements and to handle volume. A mix of redemption options allows for small and large volume redemption, which is necessary for situations such as handling high volume for operators collecting from restaurants or boy scout groups raising money. Redemption infrastructure should, as much as possible, be technology-based to improve customer experience and to help reduce total system costs and fraud.

In Europe, *return-in-retail* is the most popular redemption option as it ensures that consumers are able to return containers just as easily as they are able to purchase them and that there is a single location for both purchasing and redeeming containers, reducing the potential need for additional trips. In Canada, redemption is predominately through redemption centers, although in B.C. there is a requirement for retailer participation.

U.S. systems use a mix of redemption options; however, traditionally the enforcement of return-in-retail has been poor, resulting in reliance on an inadequate network of redemption centers. This is apparent in California, where a decline in redemption locations has resulted in less than half off

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Californian consumers receiving a refund of the deposit that they pay.⁶⁴ Redemption via return-in-retail, which is mandated within the legislation has not been enforced in California and the network of redemption centers in convenience zones, aimed at providing a geographic coverage of redemption points, has failed, in part due to municipal zoning, preventing waste and recycling type activities. The retailer obligation is needed to ensure that geographic coverage is able to be met if hurdles to establishing other redemption points, such as zoning restrictions, are faced.

Oregon requires retailers to participate or to pay a membership fee to OBRC for discharging their obligations to take back containers (more detail is provided in Appendix A.2.3). This structure was used as the basis for the recommendation that the larger retailers be required to participate or pay toward the redemption point that allows the geographic coverage target to be met and for the retailer to opt-out. Approximately 80% of Washington retailers are less than 5,000ft², so could choose whether to opt-in to the program.⁶⁵

Redemption centers thrive when volume is high, and it is assumed that the redemption centers in Washington will be used primarily by high volume redeemers such as independent businesses redeeming containers from the hospitality sector and those collecting containers for charity drives, such as scout groups.

Regardless of redemption type, the main consideration is to minimize consumer travel distances and to ensure that, as far as possible, redemption points are accessible regardless of mode of transport. As such, geographic coverage requirements that also consider access from public transportation are likely to provide the most convenient network.

In addition to convenience, consumer experience and the speed by which consumers can redeem is also a factor. Bag drops allow people to drop off large volumes and then have money credited to online accounts a number of days after the containers have been deposited. Reverse vending machines (RVMs), on the other hand, allow for consumers to access the value of the deposit instantly and also provide a wider system benefit by verifying the container and crushing it, preventing it from being redeemed a second time.

Legislative Recommendation

Targets related to access and convenience and the responsibility of the PRO to meet them should be included in the legislation.

Any person may establish a redemption center, subject to the approval of the PRO. Application for approval must include:

- the name and address of the person responsible for the establishment and operation of the redemption center
- the kind of beverage containers that will be accepted at the redemption center
- the names and addresses of the retailers to be served by the redemption center.

Retailers greater than or equal to 5,000ft² should be obligated to redeem deposit containers, unless they request and are granted an exemption from the PRO by demonstrating that an alternate redemption location exists (e.g. a redemption center) that fulfills the geographic coverage

requirements. If the request is granted by the PRO, for the retailer to be served by and be charged the cost of participation, set by the PRO, to the other redemption location (i.e. to the redemption center) for covering their obligations, the retailer may refuse to redeem deposit containers and post on a clearly visible and legible sign information on where consumers can redeem deposit containers.

Retailers less than 5,000ft² may choose to opt-in to redeem containers and will be provided services by the PRO.

PRO is responsible for providing collection services and handling fees to all redemption points and for ensuring that redemption infrastructure meets geographic coverage target.

Fraud Mitigation

Fraud can occur in a DRS through multiple channels. This can increase the cost for other stakeholders, reduce the effectiveness of the DRS and create cost and compliance issues. Fraud in a DRS may come from multiple forms, including:

- Free riding: when one firm (or individual) benefits from the actions and efforts of another without paying or sharing the costs.
- Cross-border fraud: Individuals or organizations that purchase containers in a state without a DRS (e.g. Idaho) and therefore did not pay a deposit on the containers but try to redeem the container for the deposit refund.
- Redemption fraud:
 - o By a consumer: when consumers redeeming containers try to claim a greater number of deposit refunds than containers they are redeeming from redemption point operators; and
 - o By redemption point operators: when redemption point operators try to claim a greater number of deposit refunds and/or handling fees than containers they are redeeming from producers. This occurs more frequently when using weight or bag-based measurements for determining the amount of deposits and/or handling fees that are due, but can also occur on the front-end of the process due to the under-reporting of deposit containers placed on the market.

System Design Principles

Any deposit system is susceptible to fraud. Deposit fraud can occur anywhere along the system and must be addressed. However, as much as possible, fraud should be addressed internally, without the need for legislative enforcement.

Enforcement against fraudulent activities should occur throughout the system. Currently, in Washington, there is no centralized enforcement around recycling contamination, illegal dumping or recyclables handling. Any oversight is done at a local level. MRFs are subject to state regulation as handlers of solid waste and have to be permitted or exempted and demonstrate that they are

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handling recyclables appropriately, but there is no dedicated auditing team responsible for ensuring that this is true. Yet, this small amount of regulation is more than in many other states.

However, the financial exchanges in a DRS require a greater level of oversight, but, enforcement and penalties should be a last resort. Instead, in order to create the most robust anti-fraud system possible, the system should be established in a way to focus on prevention, to avoid the cost and strain on the system of identifying and penalizing fraudulent activity.

To prevent free riders, the PRO should be allowed to set its own fees and regulate membership. This will establish a dedicated interest in addressing free riders, as the membership will not tolerate those that do not pay their fair share. A system managed by and paid for by industry reduces the likelihood of free riders, as producers are better able to self-police than by involving the State. There will also be greater focus on mechanisms to reduce fraud and ensure accurate accounting. However, the PRO should be required to report those they identify as not complying with the legislation to the government regulatory agency.

Cross-border fraud from Idaho will be likely to be a risk in certain border areas, such as Spokane and Pullman, and redemption fraud is always a risk, especially with private operators of redemption centers. The latest information technology is deployed to ensure the accurate capture of redemption rates, to allow correct payments and to mitigate fraud. This must include bar code verification, which is the most accurate method of counting and verifying every unit redeemed – state-specific or regional bar codes would prevent cross-border fraud from non-deposit states. RVMs and counting centers use bar codes to verify container returns and prevent redemption fraud.

Technological solutions are the best way to manage redemption fraud by providing automated verification of containers. This may include a deposit label that allows the system to detect and prevent fraud, if the bar code is registered with the PRO and scanned by the RVM or at the counting center. This is used in Ontario and allows Ontario to safeguard its program from fraudulent redemption from containers sold in Quebec, for example, where the deposit is lower. Though this verification process is expensive, it may be worthwhile to investigate as an option that could be deployed regionally, as the three West Coast states will all have DRS programs with the establishment of Washington's. Such a solution would require further investigation.

Audit, oversight and enforcement authority for the state government's designated regulatory agency should be legislated to ensure that the program runs smoothly and that all provisions are being met.

Rationale

The PRO is best placed to self-police and address free riders, as its membership will have a financial interest in ensuring that no other producers do not pay their fair share of the system costs. Reporting requirements between the producers and the PRO should allow the PRO to identify those members that may be free riding. A *de minimis* threshold for producers that exempts small and emerging producers from full participation, but still requires. Incremental revenue thresholds should regulate participation. Small producers may still be required to join the PRO but may not be required to act as full paying members

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Germany's long land borders with countries that do not have a DRS and freedom of movement within the EU means there is high risk of fraud. Therefore, the German system relies on more expensive fraud prevention measures than other systems, with an associated cost for beverage producers. In addition to a unique bar code, container labels must include a marking that uses special security ink that is read by the RVM's infrared scanning technology. This level of fraud mitigation is not recommended for Washington, as it is costly and any incidence of cross-border fraud in Washington is likely to be limited to the Idaho border, which may not be worth such stringent measures.

Norway has developed a sensible compromise that not only balances the costs to producers against the costs of fraud but also recognizes producers' capabilities will vary. Producers can choose whether to use a universal bar code (which allows the beverage to be sold in any country), or a bar code unique to Norway. These are registered with the system and recognized by RVMs, which can then approve a refund or reject the container.

Unique bar codes are more expensive for producers, as they require separate stock keeping units for each state or region. Conversely, they reduce the costs of fraud for the DRS, as they prevent containers purchased out of state from being redeemed for a refund that was not paid in the first place. As a result, in Norway, the producer fees are lower for containers that use a unique bar code. All bar codes are registered with Infinitum and are scanned by the RVMs, which can reject containers that are not registered. Additionally, data from the RVMs enable Infinitum to monitor remotely return volumes and detect any unusual patterns that would indicate fraud.

Norway's approach is practical, but also indicates that cross-border fraud prevention mechanisms should not be set in legislation, but producers may choose to use to reduce operating costs.

To tackle redemption fraud in Alberta, the PRO conducts audits on compliance on a variety of measures outlined and regulated through its internal bylaws. Non-compliance results in fines and additional corrective action, such as:

- If a redemption center provides a refund to an auditor that is greater than +/- \$0.50 of the actual total refund value, a CAD\$200 (USD\$150) fine is imposed and further targeted audits are undertaken;⁶⁶
- Manufacturers, retailers, redemption point operators or individuals that do not comply with requirements of the *Beverage Container Recycling Regulation* are subject to a fine of not more than CAD\$50,000 (USD\$37,378) for individuals and CAD\$500,000 (USD\$373,775) for corporations;⁶⁷ and
- A compliance fee of CAD\$400 (USD\$299) can be applied for each event of non-compliance through a PRO bylaw to any person participating in the container deposit program for infractions out of accordance with bylaws.⁶⁸

Alberta's approach indicates the PRO can design fraud prevention mechanisms that service the efficiency of the system and balance cost considerations for mitigation measures against small incidences of fraud. However, the Province may still issue penalties for broad offences that it finds out of compliance with the regulation. This flexible approach places most of the responsibility for

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enforcement with the PRO, but allows the government to conduct audit and oversight and issue penalties of an amount that it deems appropriate up to the designated limit, if an offence is found.

Legislative Recommendation

The legislation shall state that all units redeemed must be verified using an approved technology. The PRO shall make procedures prescribing the expected rules of compliance for its membership and enforce compliance as it sees fit. The PRO may put in place financial incentives to encourage producers to put in place fraud prevention solutions notably state specific bar codes as it sees fit, PRO shall identify to the government agency those producers that are found not to have registered their product such that they are required to report on units sold and financially support the operation of the system.

The government agency shall have oversight authority over the PRO and may conduct audits and apply penalties as it sees fit.

Reporting

Open and transparent reporting on the operations and performance of the DRS allows for both State and public oversight of the system. The system should be designed to be as transparent as possible while protecting commercially-sensitive data, such as individual producer sales data.

System Design Principles

There needs to be reporting between:

- Producers and PRO;
- The State and PRO; and
- The State and the public.

Producer reporting to the PRO should be outlined by the PRO to allow the PRO to report on their behalf to the State and for the State to maintain oversight and provide transparency to the public.

Reporting between the State and the PRO and the State and the public should be outlined in the legislation and completed on an annual basis.

Rationale

Reporting publicly and extensively ensures that the program is transparent. Transparency builds trust in the public and enables appropriate levels of scrutiny.

The Alberta PRO self-reports on a wide range of performance indicators and measures, making it one of the most transparent systems. Producers must report to the PRO annually on the products that they put on the market. These relate to several desired outcomes, including: environmental protection, fiscal stewardship, governance excellence, customer excellence and system efficiency

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and effectiveness. The Phase I report provides more extensive detail on performance indicators included. The PRO also provides a full set of financial statements in its annual report. Additionally, there is reporting on:

- A redemption summary by material.
- Percent of materials recycled (as reported by end processor).
- End markets of materials.
- Social and community programs.⁶⁹

Legislative Recommendation

The reporting requirements of each of the obligated parties should be set in legislation and reflect the following.

Producers shall be required to report on the supply of their products to the market in Washington State to the PRO every year, if they have selected a PRO to report on their collection and management activities on their behalf to the State.

The PRO shall be required to report the following, at a minimum, to the government agency on:

- Number of units, by material type, size and beverage type placed on market in Washington State by each producer.
 - o Need to provide bar code provision for each product and evidence of labelling of deposit requirement on all beverage containers.
 - o Manufacturers shall register all new products with the State before product can be sold within Washington.
- Number of units collected, by each redemption location and by material type, size and beverage type and assessment of achievement or non-achievement of redemption targets.
- Mechanisms put in place to prevent fraud as well as checks and measures and any enforcement activities.
- Details of geographical coverage and assessment of achievement or non-achievement of access/convenience targets.
- Location of redemption points and operating hours.
- Education programs provided to ensure consumers are aware of the program;
- The cost of managing the system and for funding the redemption; collection and processing infrastructure; the value of the unclaimed deposits and material revenue and the resulting producer fees.

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- The producer fees, modulated such that fees reflect the cost of managing a specific beverage material in the system.

Government agency or appointed administrator shall be required to report publicly on:

- Audit and compliance activities conducted by government agencies or via third-party auditors to verify financial statements.
- Brands and products registered and designated as obligated materials;
- Penalty measures and penalties issued.
- Cost of providing the oversight and governance role, including the cost of any systems necessary for producers to report compliance.

Collection and Reprocessing

Transport and Transfer

Containers must be transported from redemption locations to reprocessors. In a DRS, this function is often served both by contracting to third-party operators and through reverse logistics, where empty containers are collected by delivery people from retail locations when they deliver new products. The requirements for transport and transfer vary depending on the redemption option.

System Design Principles

PRO should procure transport and transfer services from third party contractors.

Rationale

The PRO can contract third-party vendors to best suit the needs of the differing redemption options. In accordance with procurement guidelines, this contracting should be open and transparent, yet market driven to support small and medium businesses, increasing the opportunities for involvement in the DRS and the creation of associated jobs.

Legislative Recommendation

The PRO should be responsible for contracting but legislation should stipulate that it must adhere to guidelines for competitive procurement as outlined by the Washington State Department of Enterprise Services, including encouraging specific procurement policies such as the participation by Minority and Women Owned Businesses certified by the Office of Minority and Women's Business Enterprises (OMWBE) and Veteran-Owned Businesses, as described in RCW [2010 c 5 § 6](#); 1983 c 120 § 13:

“The legislature finds that minority and women-owned businesses are significantly under-represented and have been denied equitable competitive opportunities in contracting. It is the intent of this chapter to mitigate societal discrimination and other factors in participating in public works and in providing goods and services and to delineate a policy that an increased level of participation by minority and women-owned businesses is desirable at all

levels of state government. The purpose and intent of this chapter are to provide the maximum practicable opportunity for increased participation by minority and women-owned businesses in participating in public works and the process by which goods and services are procured by state agencies and educational institutions from the private sector.”⁷⁰ ⁷¹

Counting Centers

Counting centers function in a DRS to verify the number of containers that are redeemed through bag drops, non-RVM return-in-retail, and via curbside recycling programs. Containers from RVMs do not require counting at a center since they verify containers at the point of redemption and provide accurate accounting for container returns and refunds issued. In addition to providing counts of redeemed verified containers, counting centers may also carry out some additional processing of material, such as baling.

System Design Principles

The design recommends the establishment of regional counting centers across the state to count and verify all containers that are not redeemed through RVMs. Counting centers should be contracted through the PRO, with periodic audits by the government agency to ensure that counts of containers are accurate.

Material recovery facilities (MRFs) or transfer stations may serve as possible locations for counting centers with the addition of appropriate sorting and counting technology. If MRFs serve as counting center, contracts must be in place to ensure the integrity of the DRS such that fraud cannot occur.

Rationale

Counting and verifying all containers helps identify fraudulent activity and ensures payment is only made on eligible containers, reducing overall system cost. “Conditioners” in Quebec are certified by the PRO and provide services that may include: counting, weighing, measuring, controlling, surveying and verifications according to the established guidelines.⁷² Quebec also requires the use of technological solutions to provide for accurate counting, stating that centers applying to the PRO for accreditation must “possess adequate technology and a process that will allow satisfactory sampling and reliable counting of containers in accordance with [PRO] criteria of accuracy.”⁷³ This allows the industry to ensure that all deposit reimbursements are accurate according to their certified partners. An explanation of the function of counting centers and their success in the Lithuanian DRS [can be found here](#).

Legislative Recommendation

The PRO shall contract services for counting and verifying deposit containers through adequate technology in accordance with procurement policies established by the Washington State Office of Enterprise Services to ensure transparency and fairness.

System Finances

PRO Administrative Fees

PRO administrative fees are those that producers must pay to the PRO to cover the cost of the management of the PRO and administration of the program.

System Design Principles

Based on EPR principles, the producers should be responsible for the full cost of the DRS. The PRO should modulate fees to its members based on the costs and/or revenues associated with different materials reflecting the recyclability of different packaging types. However, fees by material and container type should be transparent and reported on an annual basis to provide transparency.

Rationale

As the PRO is responsible for the financial management of the system, it is responsible for determining proper funding from its members. It determines the level of producer administration fee necessary to ensure cost coverage. While some system finances may be covered via system revenues, producers will be responsible for funding any net costs.

These costs should all be transparent and reported on an annual basis, so that the government and the public can be assured that the system is being run efficiently.

Legislative Recommendation

The PRO shall report publicly in its annual report on fees charged to its members.

Handling Fees

Handling fees are fees paid by producers to the operators of redemption points, whether redemption center operators, retailers or others. Handling fees vary by system. In Maine, for example, retailers receive a flat \$0.045 per unit handling fee,⁷⁴ whereas in Alberta, handling fees differ according to material stream from CAD\$0.0317 (USD\$0.023) to CAD\$0.2279 (USD\$0.17), calculated via a formal process that aims to cover the actual cost of handling the containers plus a small return margin.⁷⁵

System Design Principles

The proposed approach for Washington is to calculate varying handling fees for the differing redemption options using a 'bottom-up' approach based on considerations of the actual costs incurred. The handling fees should be reviewed every 2-3 years and adjustments, based on the cost model, allowed without new legislation required.

Rationale

A bottom-up approach enables an estimate of the 'correct' handling fee for each redemption option. This allows all those involved in running the redemption infrastructure to be fully reimbursed for their costs.

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In Alberta, every three years, the PRO's Board of Directors commences a Handling Commission Review to determine and set handling commissions for the following three-year period.⁷⁶ Alberta law requires that handling commissions paid to redemption centers cover all costs of the redemption center system plus a fair return as proxy for profit. The PRO also maintains a redemption center viability policy that states that, "Handling Commissions must provide an opportunity, on a network wide basis, and not on an individual bottle redemption center basis, to earn a fair return."⁷⁷

The Alberta methodology is designed to calculate a return margin for producers and retailers that are obligated under the regulation that lack a sizeable asset or rate base as well as for those operating redemption points. Therefore, the calculation bases the return margin on the cost of goods sold. The PRO determines that redemption centers require working capital requirements and requires a margin on top of cost coverage. The PRO, therefore, implements a return margin methodology based on the average return margin for retail and wholesale companies with high turnover ratios. A similar structure should be applied in Washington. For example, retailers that chose to provide RVMs, which have a cost to install, should receive a higher handling fee because the RVM is also able to verify the deposit container, negating the need for further verification.

Legislative Recommendation

An independent study shall be commissioned periodically to determine an appropriate handling fee for different redemption types based on costs incurred along with a return margin. Handling fees shall reflect the cost of provision plus take into consideration the wider system benefits associated with a specific redemption option. A review period every three years shall be used to update the handling fees for each redemption option. The government agency shall oversee this process to ensure that cost calculations are fair and unbiased.

Material Value

After customers redeem their deposits, the collected containers are sorted and sold via commodities markets. This can be a significant source of income but can also fluctuate significantly due to changing market conditions.

It should be noted that material collected through a deposit return system typically attracts a higher value than the same material resulting from a single stream system due to the material being cleaner and better sorted.

System Design Principles

Material value should go to the producers/PRO to help offset the cost of operating the DRS. Operators of redemption points should be compensated through per container handling fees that cover the cost of the program.

Rationale

Allowing the producers/PRO to retain the value of the collected material provides an incentive to facilitate an efficient system that yields the highest redemption rates for the lowest cost. Producers

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will also have greater market power due to the volume of material that they are selling, allowing them to choose markets and buyers that will pay the best price.

In California, where redemption centers are dependent on selling material to cover their costs, commodity revenues can make up an estimated 80% of revenue in some redemption centers.⁷⁸ This is a great risk to the operators who are often small business owners and do not have the capital to withstand market fluctuations. Any change in the material markets, therefore, has a significant impact on the financial viability of a redemption center. Additionally, these individual businesses may struggle to find buyers for material at such small volumes or may have to pay for storage of material until they have stockpiled a sufficient volume for sale. High start-up costs and uncertain payment terms may prevent new redemption centers from opening, leaving gaps in geographical coverage. This has been the case in California over the past few years. Californians lost 957 redemption centers between 2013 and 2017,⁷⁹ corresponding with the downward trend in the redemption rate. Of existing centers, 17% closed in 2016 alone. In Marin County, just 2 redemption centers serve 263,604 people, an area of 828 mi².⁸⁰

Legislative Recommendation

The PRO shall retain control of recycled deposit material and any profits arising from the sale of such material.

Unredeemed Deposits

As described above, a percentage of beverage containers will not be redeemed by consumers for their deposits. This money can be used to finance various programs, including the administration of the DRS itself.

System Design Principles

As described in the Deposit Rate, Structuring, Mechanism for Return and Use of Unredeemed Deposits section, it is recommended that unclaimed deposits are retained by the PRO and used towards the costs of the program, but only the proportion associated with the achievement of the target. Any additional sums should be set aside for use in a fund to support the state's recycling system overall.

Rationale

A portion of unredeemed deposits are an essential source of income that should be retained by the PRO and used to cover program costs and maintain a well-functioning system that is generally self-funding. To ensure that there is no incentive for producers to underachieve the performance target in order to retain a larger portion of unredeemed deposits, the unredeemed deposits above the 10% rate of non-recovery (i.e. those associated with under-achievement of the performance target) should be put into a fund to support the recycling system as a whole, such as the curbside recycling system or investments in processing facilities, managed by the government or its appointed administrator.

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Unredeemed containers, even when the redemption rate is high, can add up to a substantial sum. This pool of money is attractive to governments and can be used as a justification for implementing a deposit program, in order to allocate money towards the recycling system or other state priorities. In 2019, Vermont amended their DRS legislation to allocate all unredeemed deposits as the property of the State of Vermont, to be used for clean water programs.⁸¹ This reversed a previous position where producers and distributors retained the unredeemed funds. Assigning a designated portion of the unredeemed deposits to specific programs helps to alleviate these issues while maintaining the PRO's incentive to meet the performance target.

Legislative Recommendation

The legislation should describe the distribution of unredeemed deposits, as described.

Government Agency

There will be a cost for the government agency to administer the system and provide oversight, compliance, auditing and enforcement and for operating a public digital registry to receive and share data. Examples of government-appointed agencies to provide oversight and compliance are Ontario's Resource Productivity & Recovery Authority and Alberta's Beverage Container Management Board.

System Design Principles

The government agency costs for oversight, maintenance of a public digital registry for producers and any other resources needed to comply with the standards set under the legislation should be transparent and reported on annually to the public. These costs will be passed onto the producers as part of EPR principles to cover the cost of the program end-of-life management of their products. The PRO's cost recovery mechanisms can be reflected in the agency's bylaws.

Rationale

Under an EPR model, producers are responsible for covering the cost of the system as is necessary to meet its requirements under the legislation this includes covering the costs of the agency that provides oversight and monitors compliance.

Ontario's RPRA provides a digital registry for producers to monitor their requirements under the individual producer responsibility mandate, to submit any necessary documentation and to register as a producer.^{82 83}

Legislative Recommendation

Producers shall cover the government agency costs for administration and oversight required to enable producers to meet their obligations set in the legislation.

Curbside Considerations Impact Mitigation and Benefits

In places where curbside recycling programs are already in place, a primary source of opposition to the implementation of a new DRS is that valuable beverage containers migrating from existing curbside services to the DRS will reduce the volume and value of material collected at the curbside, and that this migration will likely result in an increase in net processing costs at the MRF due to the loss of some of the valuable material streams that provide income, leading to potential rate increases for ratepayers.

This concern is typically raised when stakeholders have in mind an old DRS and not those that are based on best-in-class principles. It is also often not viewed alongside other wider benefits of DRS, both of which are discussed in this section.

Curbside Considerations and Impact Mitigation

The following mechanisms within a best-in-class DRS enable existing curbside systems and private sector service providers to be part of and/or benefit from a DRS:

- **Access to Unclaimed Deposits:** As proposed, if MRFs pull out DRS material and have it verified through a counting center, they are entitled to the value of the whole deposit, in the same way as a consumer would be, to help support the operation of their facility. MRFs in Alberta segregate deposit material in this way. The system should not provide payments using a weight-based assessment of the number of containers in a bale using audit data, as this is often inaccurate. In order to get a true understanding of the number of DRS containers, it is preferable to have actual numbers of containers verified through counting centers, this is more accurate and cost effective.
- **Provision of Services:** MRF operators or haulers could bid to provide services to the PRO. Functions that they could provide include:
 - o **Counting Center:** The MRF could provide the operation to sort, count and verify the numbers of beverage containers that are collected through the redemption options without automatic verification. The service could be paid on a per container basis. This could be carried out on the same site as an MRF under strict contracting requirements to ensure that the integrity of the counting center function is held and that there is no opportunity for fraud.
 - o **Collection:** Haulers could provide a collection and transport function on behalf of the PRO, such as for bag drop sites, RVMs, etc. There is opportunity to provide specific collection services to commercial establishments (such as restaurants) and, in doing so, claim the deposit on collected containers.
 - o **Redemption Center:** Private waste management companies could also apply to operate a redemption center under the program.

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- o Bag Drop Location: Municipalities and operators of public or private recycling drop-off locations or transfer stations could locate a bag drop kiosk, generating a revenue stream that would be provided in the form of a handling fee.
- Beneficiary of funding generated from unclaimed deposits when targets are not met: As set out above, unclaimed deposits associated with underachievement of targets should be set aside and placed in a fund that is used to invest in improvements in MRF infrastructure, allowing existing MRFs to better manage the evolving packaging stream and resulting in an even greater increase in the state's recycling rate.

The economic value of these measures will be assessed as part of the Phase III report.

Wider Benefits

Supplementing Existing Recycling Services and Increasing Access

Single Family

Around 2.8 million (89%) of Washington State's 3.2 million households have access to residential curbside collection of recyclables. That leaves 9% of single-family homes without access to curbside recycling. Another 10% of single-family households must voluntarily subscribe and pay for recycling service separately from garbage service, creating a potential disincentive for recycling participation among households in areas where subscriptions are optional.⁸⁴ Furthermore, curbside recycling services are not consistent in terms of the materials able to be recycled or the number of streams into which recyclables are sorted. A DRS will provide a valuable alternative to drop-off services for those households without curbside recycling, to which they are already making trips to recycle, and it will create economic incentives for all households to participate in beverage container recycling.

Multi-Family

Access to curbside recycling is more limited to residents of multifamily residences, who are less likely to have access to recycling collection service than households in single-family dwellings. In places where recycling subscription is optional, current regulations allow property managers or owners—not tenants—to decide whether or not to subscribe. Approximately 25% of Washington State households that live in multifamily dwellings do not have reliable access to recycling (though they may have some access to drop-off collection), including 15% that reside in areas where no multifamily recycling service is available and 10% that live in areas where optional subscriptions are decided by property managers or owners.⁸⁵

Commercial

On the commercial side, all businesses in Washington State are encouraged to find their own recycling collection services but commercial recycling is not mandatory. In some cities, commercial recycling is provided to eligible businesses as part of municipal or contracted solid waste collection service.⁸⁶ Elsewhere in the state, businesses that wish to recycle must make separate arrangements for recycling collection and must pay separately for the service, if required. A DRS provides equitable access for all residents across the state to be able to redeem their containers, regardless of sector.

Increasing Diversion and Reducing Trash Costs

When a DRS is implemented, containers will move from the trash, litter and curbside systems into the DRS due to the monetary incentive to redeem them for the deposit refund. The financial benefits associated with less litter and also fewer containers being disposed are rarely considered; this will be done as part of the Phase III report. Currently in Washington State, the residential recycling rate for PET bottles—the majority of which are likely to be beverage containers—is 35.6%, which means the large majority of these are disposed, for which there is a financial cost.

Beverage containers, specifically plastics containers, can be voluminous and difficult to compact and as such, while not weighing very much, take up space in both curbside bins and vehicles. The removal of these materials could, for example, enable residents who currently dispose of their beverage containers in the trash to reduce the size of their garbage containers through participation in a DRS, and thus save money on their monthly garbage bills. Depending on the volume reductions achieved from implementation of a DRS, municipalities may be able to consider moving to biweekly garbage and/or recycling collections, offering further service cost reductions.

Environmental and Social Benefits

Social

A DRS will require new infrastructure, in both collection and sorting, that will create jobs across the state as well as provide additional tax revenue and contribute gross value added (GVA) to Washington's gross domestic product (GDP) through increased spending associated with direct, indirect and induced jobs.

This infrastructure will require the hiring of contractors to provide the collection and sorting functions necessary to operate the system. Fair contracting practices can be built into the legislation that will highlight minority and employee-owned companies and prevent a race-to-the-bottom in terms of price setting.⁸⁷ Ensuring the hiring of small businesses and paying wages that allow those businesses to operate profitably will be reflected through transparent procurement processes and public reporting of procurement metrics.

Geographical coverage requirements ensure that all residents, whether they live in urban centers or rural locations, will be able to easily and conveniently recoup their container deposits. Special attention to equitable access will be paid to ensure that the opportunity to return is not restricted to residents that have access to cars, with redemption options plotted along public transportation routes. Siting redemption points near retailers will amplify this effect, as retailers are situated to maximize access to residents.

Environmental

Environmental impacts associated with the introduction of a deposit return system arise from the following processes:

1. Recycling of additional beverage containers.

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2. Reduction in disposal of beverage containers.
3. Additional collection and transportation of containers to recyclers.
4. Reduction of greenhouse gas emissions associated with points 1 and 2.
5. Reduction in land and marine litter and their associated impacts.
6. Increase in quality feedstock for recycled content.
7. Creation of redemption infrastructure that could potentially be used for refillable containers in the future.

Greenhouse Gas Emissions

When disposed, beverage containers represent a substantial loss of valuable, recyclable material and accumulation of greenhouse gas (GHG) emissions associated with their production, use, and disposal. Collecting used beverage containers and recycling them into feedstock for new products is an essential step in embracing circular economy practices and reducing future GHG emissions. While the majority of beverage containers do not give rise to GHG emissions if disposed of in landfills, there are substantial environmental benefits result from recycled material displacing the use of virgin materials. This substitution delivers significant embodied energy savings resulting primarily from reduced resource extraction. As an example, metals make up approximately 5% of the waste stream but account for a third of its associated carbon emissions when embodied energy is considered.⁸⁸

Land and Marine Litter

DRSs have been proven to reduce littering of beverage containers by up to 80%, based on a comparative review of the effect of DRSs on littering behavior.⁸⁹ As most marine litter emanates on land and plastic beverage bottles were reported as the fifth most common item recovered from beach clean-ups in 2018,⁹⁰ a DRS can work to reduce both land and marine litter.

Recent years have seen a growing awareness and knowledge of the impact that single-use plastic items, including beverage containers, are having on our marine environment. A 2016 report by the World Economic Forum indicated that by 2050, plastic will outweigh fish in the sea.⁹¹ Washington's long coastline and network of islands also makes a strong case for a focus on reducing marine pollution.

Recycled Content

Recycled content laws, in addition to delivering sound environmental outcomes on their own, help make the case for DRS. Increasing the demand for recycled content will increase the business case for this beverage container recovery system that can produce a greater, cleaner supply of the recyclable materials in great demand for use as recycled content. According to Sen. Udall, 47% of the plastic containers recycled in the country come from the 10 states with DRS laws.⁹² This constitutes the majority of the feedstock for domestic plastic manufacturing using recycled content. Washington is moving toward recycled content legislation, as evidenced by the legislature passing House Bill 2722 in 2020, which received widespread legislative and industry support and was only vetoed in response the fiscal impacts of the Covid-19 pandemic.⁹³ This legislation is likely to be taken up again and passed, in which case Washington will need a steady supply of material that can be used to feed the market for recycled material.

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Globally, DRSs are being increasingly seen as the only reliable measure to reduce the impact of single use plastics bottles, and to ensure that high grade material is available for brands to meet their minimum recycled content commitments.

Refillables

While refillable bottles are relatively common in other areas of the globe for beer (23% in Latin America, 30% in Asia),⁹⁴ over the course of the twentieth century, refillable bottles for beer and soft drinks went from the norm to virtually nonexistent in the United States.

The emergence of PET in the 1970s precipitated the decline of refillable containers, which were typically glass, as the more resilient plastic allowed soft drinks to retain their carbonation and offered other perceived comparative advantages, such as lighter weight allowing for more cost-effective deliveries and cheaper prices with the fall of the price of oil.⁹⁵ Though those perceived advantages contributed to the shift toward more plastic, refillable glass bottles can be used an average of 30 times and may provide environmental advantages that can be obtained in a local market, such as the craft beer industry in the Pacific Northwest.

DRSs can facilitate the use of refillable containers on the market. The Packaging Ordinance in Germany obligates producers to be responsible for the end-of-life management of their packaging including hitting targets for recycling and refilling.⁹⁶ The new Austrian DRS will include legally-binding quotas for refillables (the Austrian government intends to require that 25% of beverages be sold in refillable bottles beginning in 2023 - increasing to 40% in 2025 and 55% in 2030).⁹⁷ Both Alberta and B.C. use the infrastructure of redemption options and transport of deposit containers to facilitate the return of refillable containers in the provinces.⁹⁸

OBRC in Oregon is also pioneering the return of refillable bottles in the state, introducing an industry standard bottle (ISB) that is redeemed through the same redemption system as non-refillable deposit containers and is being adopted by local craft breweries, further reducing waste and encouraging the management of material further up the waste hierarchy. As of 2019, there were 407,840 refillable glass bottles in circulation, being bottled through 10 producers, all local craft breweries.⁹⁹

A DRS can lay the groundwork for a potential re-introduction of refillable bottles through a local or regional infrastructure network that allows local manufacturers to easily recover their containers while providing a convenient system for redemption to consumers.

The Phase III report will quantify the economic, environmental and social costs and benefits of a DRS in Washington to a range of stakeholders.

APPENDICES

A.1.0 Recommended EPR System Conditions

From the draft “Recommendations for Managing Plastic Packaging Waste in Washington,” published on August 14, 2020.

- Full producer funding and individual producer liability.
- Apply EPR across all packaging and paper types.
- Clearly define the roles and responsibilities of all stakeholders.
- Create progressively increasing material-specific performance standards.
- Require registration and reporting by producers.
- Create collection/accessibility standards to ensure convenient, equitable access for all residents.
- Carefully consider the level of operational responsibility and control that municipalities wish to retain.
- Transfer responsibility for post-collection and reprocessing to producers.
- Empower and sufficiently fund a regulatory agency to carry out rigorous oversight and enforcement.¹⁰⁰

Further detail on the recommendations, rationale, necessary infrastructure and associated changes to existing legislation can be found in the report, at:

https://www.ezview.wa.gov/Portals/_1962/Documents/PlasticsPackaging/Recommendations%20for%20Managing%20Plastic%20Packaging%20Waste%20in%20Washington_DRAFT_08142020.pdf.

A.2.0 Definitions of Stakeholders and Responsibilities

A.2.1 Alberta

[“Beverage Container Recycling Regulation, Alberta Regulation 101/1997”](#)

“beverage” means any liquid that is a ready-to-serve drink and is not exempt from this Regulation;

“container” means a bottle, can, plastic cup or paperboard carton or a package made of metal, plastic, paper, glass or other material, or a combination of them, that contains or has contained a beverage;

“Manufacturer” means a person who manufactures a beverage and includes:(i)a person who carries on the business of filling containers with a beverage; and(ii)a person who imports a beverage in a container into Alberta for the purpose of distribution or sale in Alberta;

“retailer” means a person who sells beverages in containers to consumers

A.2.2 California

[“California Beverage Container Recycling and Litter Reduction Act”](#)

Convenience Zones:

Containers under the California DRS can be returned by consumers in three ways:

1. At convenience zone recycling centers (located within a certain radius of large supermarkets)
2. At traditional recycling centers (which accept large volumes of material), or
3. Via curbside recycling programs, though no deposit can be redeemed in this case.

All recycling centers are required to be operational for at least 30 hours per week, whether staffed or using RVMs.

Convenience zones are a half-mile radius in most cases and three miles in some rural areas. Exemptions to the requirements for both handling fees and working hours are available for recycling centers in rural areas.

A convenience zone may be exempt from the requirement to have a recycling center within its boundaries if one or more mandated conditions are met in accordance with PRC 14571.8.

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- Ease of access to redemption center by consumers.
- Reasonable distance to next closest recycling center.
- Consumers in area predominantly use curbside program for recycling.
- Recycling centers in the area fail to meet a sufficient volume for economic viability.¹⁰¹

Assembly Bill 54 (Ting, Chapter 793, Statutes of 2019) was signed into law on October 12, 2019. Two components of this bill impact some dealers, or retailers that sell beverage containers. AB54 provides immediate and temporary relief to specified dealers in unserved convenience zones. These dealers, identified in AB54, are temporarily relieved from their requirements per PRC 14571.6 to either (a) redeem empty CRV containers in store or (b) pay \$100/day fee to the department if a dealer meets the criteria in either PRC 14572.3 or 14571.6(c):

PRC 14572.3 highlight:

Until March 1, 2020, dealers located in a convenience zone that was served by a recycling center that closed between August 1, 2019 and September 1, 2019 at the initiation of the recycler shall be exempt from the dealer requirement per 14571.6 (a) and (b).

14571.6 (c) highlights:

Until July 1, 2020, a dealer located in an unserved convenience zone is exempted from dealer requirements per PRC 14571.6 (a) and (b) if the following are met:

- a completed application for a recycling center located anywhere in the convenience zone is pending, and
- the dealer and the recycling center submit a letter to the department stating that the recycling center intends to service that convenience zone.

A.2.3 Oregon

[“ORS 459A.702: Applicability of ORS 459A.700 to 459A.744”](#)

[“ORS 459A.710: Practices required of dealers and distributors”](#)

[“ORS 459A.715: Refusal of dealer or distributor to accept or pay refund in certain cases”](#)

[“ORS 459A.735: Full-service redemption centers”](#)

[“ORS 459A.738: Convenience zones”](#)

[“ORS 459A.744: Bottle Bill Fund”](#)

Definitions:

“Dealer” means every person in this state who engages in the sale of beverages in beverage containers to a consumer, or means a full-service redemption center approved under ORS 459A.735 (Full-service redemption centers).

“Distributor” means every person who engages in the sale of beverages in beverage containers to a dealer in this state including any manufacturer who engages in such sales.

“Manufacturer” means every person bottling, canning or otherwise filling beverage containers for sale to distributors, importers or dealers.¹⁰²

Retailer Obligations:

(a) Except as provided in paragraph (b) of this subsection, a dealer may not refuse to accept from any person any empty beverage containers that contained the kind of beverage sold by the dealer, or refuse to pay to that person the refund value of a beverage container as established by ORS [459A.705 \(Refund value\)](#).

(b) A dealer that occupies a space of less than 5,000 square feet in a single area may refuse to accept from any person any empty beverage containers of the kind, size and brand that the dealer does not sell.

(2) A distributor or importer may not refuse to accept from a dealer any empty beverage containers of the kind, size and brand sold by the distributor or importer, or refuse to pay the dealer the refund value of a beverage container as established by ORS [459A.705 \(Refund value\)](#).

(3) The manufacturer, distributor or importer of any beverage sold in this state shall ensure that all dealers or redemption centers in this state that redeem beverage containers are paid the refund value for those beverage containers and that those beverage containers are collected from the dealer or redemption center in a timely manner. [Formerly [459.830](#); 2007 c.303 §2]

Convenience Zones:

Oregon Law allows for up to two “convenience zones” surrounding a redemption center. If a retailer falls within these zones, they can pay a fee to the redemption center rather than choose to accept deposit containers themselves.

- Zone 1 is the sector within a radius of not more than two miles around the redemption center.
- Zone 2 begins at the border of Zone 1 and extends out to a radius of not more than 3-1/2 miles around the redemption center.

These distances are maximums and redemption center zones may not always extend to the full distance. Also, a redemption center may only have a Zone 1.

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Additionally, if the Oregon Liquor Control Commission (OLCC) may approve a store for an exemption from paying the redemption center or from providing equivalent services if the store sold fewer than 100,000 individual beverage containers during the prior calendar year.

Redemption centers must also serve participating grocery stores that are 5,000 or more square feet in size and located in up to two convenience zones. Each person responsible for the operation of one or more redemption centers shall pay an annual registration fee of \$3,000 per redemption center to the OLCC.¹⁰³

Bottle Bill Fund:

The Bottle Bill Fund is established in the State Treasury, separate and distinct from the General Fund. Interest earned by the Bottle Bill Fund shall be credited to the fund. Moneys in the fund are continuously appropriated to the Oregon Liquor Control Commission and may be used to pay the costs of the commission in carrying out the duties of the commission under ORS [459A.700](#) ([Definitions for ORS 459A.700 to 459A.744](#)) to [459A.744 \(Bottle Bill Fund\)](#). [2019 c.366 §8]

A.2.4 Maine

Definitions:

"Distributor" means a person who engages in the sale of beverages in beverage containers to a dealer in this State and includes a manufacturer who engages in such sales.

"Manufacturer" means a person who bottles, cans or otherwise places beverages in beverage containers for sale to distributors or dealers.¹⁰⁴

A.2.5 Vermont

Definitions:

"Beverage" means beer or other malt beverages and mineral waters, mixed wine drink, soda water and carbonated soft drinks in liquid form and intended for human consumption. As of January 1, 1990 "beverage" also shall mean liquor.

"Container" means the individual, separate, bottle, can, jar, or carton composed of glass, metal, paper, plastic, or any combination of those materials containing a consumer product. This definition shall not include containers made of biodegradable material.

"Distributor" means every person who engages in the sale of consumer products in containers to a dealer in this State including any manufacturer who engages in such sales. Any dealer or retailer who sells, at the retail level, beverages in containers without having purchased them from a person otherwise classified as a distributor, shall be a distributor.

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"Manufacturer" means every person bottling, canning, packing, or otherwise filling containers for sale to distributors or dealers

"Redemption center" means a store or other location where any person may, during normal business hours, redeem the amount of the deposit for any empty beverage container labeled or certified pursuant to section 1524 of this title.¹⁰⁵

Convenience Zones:

The Vermont beverage container law was passed with the aim to ‘reduce litter, increase recycling, reduce waste disposal costs, create local jobs and save energy.’¹⁰⁶ The criteria for retailer exemption in Vermont is to enable the system to meet the requirements of 10 V.S.A. § 1523(b), but retailers to qualify for exempt status from beverage container redemption if they are in a convenience zone by filling out a form and gaining approval.¹⁰⁷ *“Exemption will be granted if there is an alternative redemption location within 5 miles of the retailer.”*

A.3.0 Recycling Definition

The new EU definition of recycling is as follows:

“any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.”¹⁰⁸

This definition works in tandem with the calculation methodology outlined in referred to in Article 6c(1)(a) the packaging and packaging waste directive and shown in Table A 1.¹⁰⁹

Table A 1: EU Calculation Methods for "Recycled" Materials

Packaging Material	Calculation Point
Glass	Sorted glass that does not undergo further processing before entering a glass furnace or the production of filtration media, abrasive materials, glass fiber insulation and construction materials
Metals	Sorted metal that does not undergo further processing before entering a metal smelter or furnace
Paper/board	Sorted paper that does not undergo further processing before entering a pulping operation
Plastics	Plastic separated by polymers that does not undergo further processing before entering palletization, extrusion, or molding operations; Plastic flakes that do not undergo further processing before their use in a final product.

Source: Annex II, COMMISSION IMPLEMENTING DECISION (EU) 2019/665 of 17 April 2019 amending Decision 2005/270/EC establishing the formats relating to the database system pursuant to European Parliament and Council Directive 94/62/EC on packaging and packaging waste

Study Sources

Primary sources consulted for this study include, but may not be limited to:

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- Cascadia Consulting Group
- Canadian Stewardship Services Alliance
- City of Enumclaw
- City of Olympia
- City of Seattle
- City of Spokane
- City of Tacoma
- City of Vancouver
- Container Recycling Institute
- Corporate Policy Group LLC
- Department of Environmental Protection, State of Maine
- Directorate-General for the Environment, European Commission
- DPG Deutsche Pfandsystem GmbH
- Infinitum
- Kelleher Environmental Associates
- King County, Washington
- Love Environment
- Oregon Beverage Recycling Cooperation
- Millette Environmental
- Recology
- RecycleBC
- Recycling Council of Alberta
- Reloop
- Sanitary Service Company Inc.

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- TOMRA
 - Waste Management, Inc.
 - Zero Waste Europe
-

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