

March 9, 2023

Maryland General Assembly
House Office Building, Room 251
Annapolis, Maryland 21401

Testimony regarding information on HB 1089 “An Act Concerning Maryland Beverage Container Recycling Refund and Litter Reduction Program”

Dear Chairman Delegate Barve, Vice Chair Delegate Stein, and Members of the Committee:

My name is Mike Noel, and I am a Director of Public Affairs at TOMRA. TOMRA provides a range of technology and services for recycling and reuse systems, maximizing resource productivity and minimizing virgin resource extraction. We are known for pioneering advanced technology for the collection, sorting stages of recycling and reusing materials. We have over 50 years’ experience operating in more than 40 jurisdictions with container Deposit Return Systems (DRS or “bottle bills”) around the globe, including all ten U.S. states with deposit laws.

Thank you for the opportunity to submit testimony on HB 1089, *An Act Concerning Maryland Beverage Container Recycling Refund and Litter Reduction Program*. TOMRA is commenting on an informational basis to share the principles that high-performing deposit systems share in common. Also, at the end of this document, I include answers to DRS FAQs including how Reverse Vending Machines work.

Technology and Services Provided by TOMRA

TOMRA Collection (Deposit Return Systems for refillable/reusable and one-way beverage containers)

In deposit systems, TOMRA serves as a “system operator” meaning we provide multiple services that empower deposit-return systems. Those services include providing collection technology like Reverse Vending Machines, container validation, clearing deposits and handling fees, aggregating data from across the redemption network and providing container pick-up and processing services.



TOMRA Sorting

In addition, TOMRA provides advanced optical sorting technology to the facilities that handle curbside and drop-off recyclables (Material Recycling Facilities or “MRFs”). This technology enable curbside recycling operations to produce material of a higher quality and market value, increasing their recyclability. Many state of the art recycling facilities coming online today include TOMRA technology. We offer technology and services in over 80 markets around the world.

Our goal is for 40% of all plastic packaging globally to be collected for recycling by 2030, up from 14% today.

Introduction

Deposit Return Systems for beverage containers were invented by the beverage industry itself. Back when most beverages came in refillable containers, the beverage industry wanted their bottles back due to the cost of the bottle itself. So they charged consumers a deposit and managed a reverse logistics operation to collect, wash and refill bottles.

As the industry shifted to one-way containers after WWII, beverage container litter became an increasing concern for the public. This sparked the advent of legislated DRS and today ten U.S. states and about 40 more jurisdictions around the world use such systems to manage beverage container litter and recycling.

Deposit return systems provide two main functions:

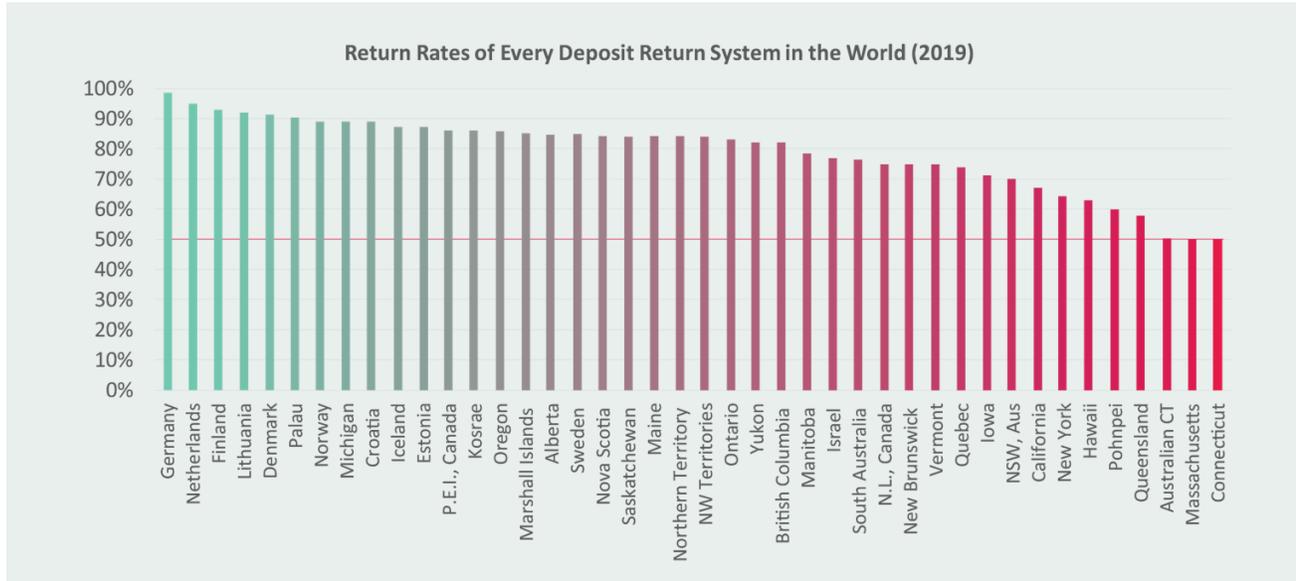
1. **Achieving superior collection rates** – Giving waste a value by making container eligible for a cash refund, has a direct impact on the collection rates of beverage containers. The latest available data shows that containers without a deposit have an average recycling rate of 22% whereas containers with a deposit have a 66% recycling rate.¹ And in states with a flat ten-cent deposit, the average deposit container recycling rate is 88%.²
2. **Preserving the high quality of recyclable material, ensuring it is effectively recycled** – Curbside and deposit collection systems complement each other to achieve a circular economy. Since deposit systems are often compared to curbside collection systems it is important to note DRSs separate beverage containers by material type. This essentially eliminates contamination meaning virtually all containers collected in a DRS can be recycled. Many curbside systems today have embraced “single-stream” collection where all recyclable material is mixed together in one bin. The combination of material and inevitable consumer confusion over recyclability leads to contamination. In a deposit system, since the material has retained its high quality, containers are most often recycled back into beverage containers or other food-grade quality packaging instead of “down-cycled” to another product that cannot be recycled again.

¹ Testimony to Connecticut Environment Committee. Container Recycling Institute, 2021. Accessible via: <https://www.cga.ct.gov/2021/ENVdata/Tmy/2021SB-01037-R000319-Collins,%20Susan,%20President-Container%20Recycling%20Institute-TMY.PDF>

² Bottlebill.org. Refers to Michigan and Oregon pre-COVID (2019), due to significant disruptions to redemption access during the pandemic which have affected redemption behavior.

The Shared Principles of High-Performing Deposit Return Systems

While deposit systems are known for achieving 90% recycling rates or more for beverage containers, not all DRSs are achieving their potential.



"Global Deposit Book 2020," Reeloo. 2020. : If 2019 data was not available, latest year is shown. 5

Since multiple states, the entire EU and about eleven more jurisdictions around the world are actively evaluating modernizing or creating their own Deposit Return Systems, TOMRA took a step back to evaluate the best practices that the high-performing deposit return systems in existence today share in common. By “high performing” we mean systems that achieve around 90% recycling rates for deposit containers or higher. The following can be helpful as you evaluate various proposals when designing your program.

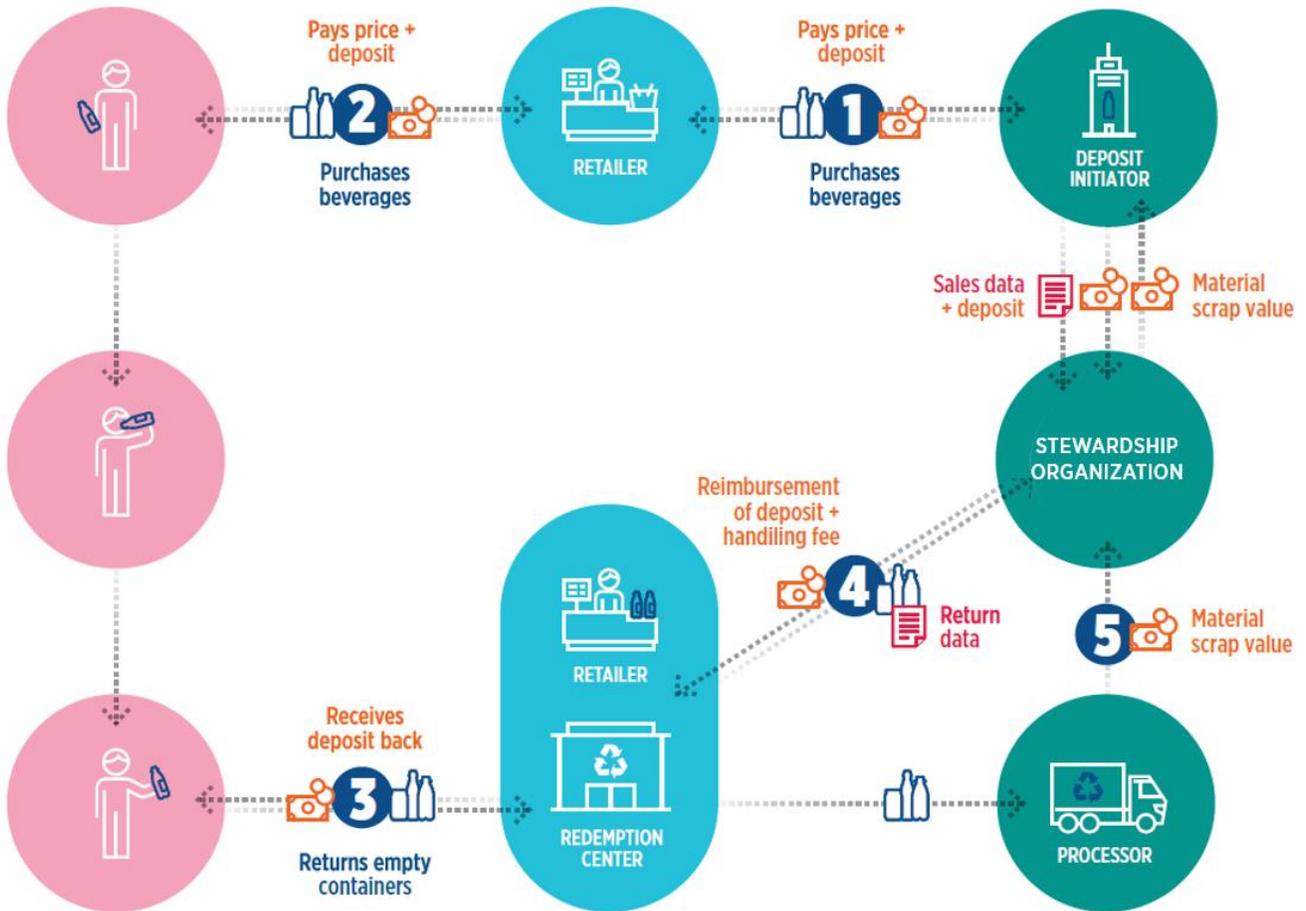
Principles shared among high-performing deposit return systems include:

- **Circularity** - Financial incentives and penalties exist to ensure containers are effectively recycled not ‘downcycled’.
- **Performance Targets** - Frame conditions set in statute ensure performance including targets for collection, recycled content and a minimum number of redemption points, plus a meaningful deposit and broad scope.
- **Convenient Refund** - The redemption system is easy, accessible and fair for everyone.
- **System Management** - Producers finance and manage infrastructure and operations within the frame conditions set by government; with use of unredeemed deposits and commodity revenues.
- **System Integrity** - Trust and transparency are built into the system’s processes and enabled by product registration, data-management, a clearinghouse, and redemption specifications.

Frequently Asked Questions regarding Deposit Return Systems

How does a typical Deposit Return System managed by a central Stewardship Organization work?

Below is a diagram of how a centralized DRS works at a high level. Keep in mind, “deposit initiator” is the legal term for the business that first sells the container in the state. Typically, this is a beverage distributor or importer.



1 Retailer buys container

Retailer buys the bottle from the ‘Deposit Initiator’ for the price of the beverage plus a 10-cent deposit per container.

2. Consumer buys container	Consumer pays for the bottle and a 10-cent deposit per container from the Retailer
3. Consumer returns container for full deposit refund	Consumer returns bottle to a Retailer or Redemption Center and receives their deposit money back in full
4. Repayment to retailer or redemption center	Deposit Initiator repays Retailer or Redemption Center the 10-cent deposit and a “handling fee” for any eligible containers redeemed. Redemption data ensures accurate accounting.
5. Container pick-up	Deposit Initiators pick-up and recycle their bottles either directly, through a 3 rd party contractor, or collectively through services provided by the Stewardship Organization.
6. Sale of recyclable commodity to initiate final recycling	Containers are sorted and prepared for market at a Processing Facility before being sold to recyclers where they are most commonly made into new beverage containers. Deposit initiators or the Stewardship Organization (depending on the law) retain the revenue from the sale of their own container material.
7. Distribution of unredeemed deposits	Deposits from containers that consumers chose not to redeem are distributed to the state, individual deposit initiators, the Stewardship Organization or shared among these entities. Each state handles this differently depending on their context, however high-performing deposit systems use the unredeemed deposits to reinvest in the DRS.

How does the container, deposit and handling fee exchange work at the individual retailer level?

Below is an example of how it would work at a specific retailer.

1. Joe’s Supermarket bought **10** deposit containers from the deposit initiator. Joe’s Supermarket paid for the price of the containers plus a dime deposit for each or \$1.00 in total deposits. At this point, the store is ‘out’ \$1.
2. Then the store sells 10 deposit containers to a consumer. The consumer pays the store the price of the containers, plus \$1 in deposits. (The store is now ‘whole’).
3. Then a consumer comes and redeems **20** deposit containers. Joe’s Supermarket pays the consumer \$2 in deposits. Now the store is out \$2 in deposits.
4. Joe’s Supermarket gives a report to the deposit initiator showing they accepted for redemption 20 of their containers. (This step is done automatically by Reverse Vending Machines). The deposit initiator removes the containers and repays Joe’s Supermarket the \$2 in deposits and the handling fee for the 20 containers. In terms of deposits paid and repaid, the store is now ‘whole’.

What services does a Reverse Vending Machine (RVM) provide?

Modern deposit systems have embraced RVMs because they provide benefits to multiple stakeholders in the deposit system such as:

- **Reducing the cost of redemption services, particularly labor costs** – Manually accepting containers for redemption requires staff to accept containers from consumers and sort containers by size and material type, and typically by distributor and brand to ensure the appropriate deposit initiator is charged for the containers redeemed. RVMs automate this entire process, dramatically reducing the labor required. For a redemption center handling a significant level of volume this can reduce labor costs by 75%. For a retailer it can mean freeing up team members to stock shelves or better serve customers, while only occasionally maintaining RVMs.
- **Reducing the cost of container transportation** – Container compaction provides an important value within deposit systems. By compacting (or crushing) containers, PET bottles are reduced in size to a ratio of around 2.5 : 1 and aluminum cans around 6 : 1. This saves storage space for retailers and truck space for deposit initiators. Now more containers can fit on the same number of trucks. For example, converting a redemption center in Maine from manual, uncompacted redemption to automated, compacted redemption saved 63% in annual pick-up costs from that location.
- **Reducing the greenhouse gas emissions of container transportation** – Given compaction reduces the number of trucks necessary to pick-up the same number of containers, RVMs also help to reduce the greenhouse gas footprint of a deposit system in significant ways.
- **Mitigating cross-border unauthorized redemption** – RVMs reject containers that are not registered in the system, helping to mitigate against unauthorized cross-border redemption. Compaction again serves an important service by ‘cancelling’ out the container from any repeat redemption. RVMs transmit data in near real-time which triggers ‘spike reports’ of any unusual redemption activity. System operators use this data to investigate any potentially fraudulent behavior.
- **More accurate container counts leading to more revenue for redemption providers and less ‘shrink’ for deposit initiators** – RVMs verify and count every container redeemed, designating the container as belonging to the deposit initiator who registered it in the system. If containers are not registered, they are rejected. Automated counting is more accurate than manual counting which is prone to error, so redemption providers appreciate how RVMs ensure they are paid for every container they accept. Over the course of a year, this can lead to significant revenue opportunities. In the same way, deposit initiators appreciate how RVMs accurately designate containers to each deposit initiator, ensuring one company is not paying the handling fees of another.

For these reasons, modern deposit systems have found ways to incentivize or scale the use of RVMs throughout their deposit systems. Norway and Sweden both pay a higher handling fee to redemption providers that utilize RVMs, whereas California and Quebec have made available millions in grant funding for RVMs. Connecticut took a different approach by mandating all beverage stores above 7,000 square feet to provide at least two RVMs for public use.

What container sizes and material types do RVMs accept?

RVMs accept aluminum, glass and plastic beverage containers. Due to their shape and weight, cartons and pouches are not handled well by commercially available RVMs and TOMRA does not recommend their inclusion in a deposit system.

RVMs accept containers that are 4 oz up to and including 3 liters. Due to the odd shape of some non-carbonated beverages larger than 2.5 liters, TOMRA recommends accepting non-carbonated containers equal to 4 oz. and up to and including 2.5 liters. We recommend accepting carbonated beverage containers equal to 4 oz. and up to and including 3 liters. If policymakers are concerned about litter from a specific beverage category that falls outside these size specifications such as liquor miniature containers (commonly known as “nips”), we recommend excluding the other beverage categories to minimize manual redemption. For example in 2019, Maine specifically added liquor nips to the state’s deposit system. While there is not a commercially available RVM that can automatically accept these containers due to their small size, Maine redemption providers accept them manually and store them in small boxes or bags.

How do RVMs help mitigate against cross-border redemption?

Cross-border redemption is not a significant issue in the deposit systems that have prioritized addressing it. RVMs reject containers that do not match the Universal Product Code provided by the deposit initiator when registering their product. To be effective this means that a deposit initiator applies a UPC to containers that are only sold in the designated deposit state. Therefore containers bought in another state that do not bear such a barcode cannot be redeemed via RVMs in the deposit state. For manual redemption, deposit initiators might put a visible marking to identify deposit or non-deposit containers so redemption providers can recognize non-deposit items.

In practice most deposit systems leave it up to deposit initiators to decide whether they will use a state-specific/unique UPC or a “universal” barcode that is utilized in multiple jurisdictions. Deposit initiators then decide whether it is worth investing in a label change and adjustments to inventory management processes. In some instances where the deposit value is very meaningful, the government has passed enabling legislation to facilitate deposit initiators to align on an industry-wide solution. For example in Germany where the deposit value is 27 cents and therefore the unauthorized redemption risk is relatively high, Deutsche Pfandsystem GmbH (DPG) was established in 2005 by the retail, beverage producer and beverage container production industries to define and establish the organizational and judicial basis of implementing a nationwide deposit return system for non-refillable beverage containers in Germany. Part of DPG’s role includes managing system integrity such as aligning on a container security marking and related protocols. Producers ended up recommending a special security ink be applied to each deposit container.

Examples of state-specific markings and barcodes utilized in New York and Connecticut



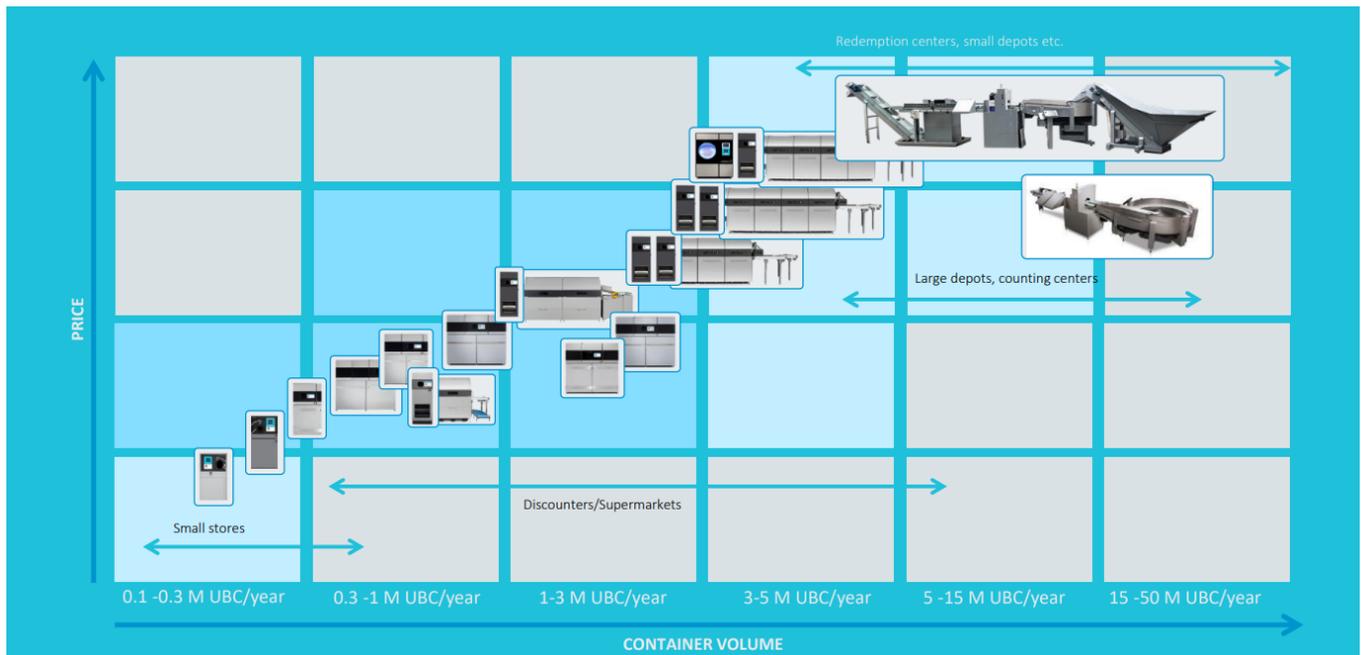
State law cannot mandate the use of state-specific barcodes due to Interstate Commerce laws, however legislation can incentivize the use of such methods through, for example, providing participating deposit initiators with a greater share of the unredeemed deposits.

What type of data does an RVM record?

RVMs record data to identify containers redeemed and match them with the deposit initiator that registered the product in the machine’s cloud database. This includes the container’s material type, shape, weight, and Universal Product Code. The machine also records when the container was redeemed, how many containers were redeemed before cashing out. Online machines also track whether the machine is operational and if not, what type of error has occurred. This enables maximum uptime where the RVM operator and retailer or redemption center partner to get the machine up and running again.

How large are reverse vending machines?

There are many RVM types and styles on the market today. The appropriate solution depends on a retailer or redemption center’s needs – in particular the level of redemption volume, size of location, and priority placed on labor costs. As you can see below TOMRA offers a range of reverse vending solutions.



TOMRA's portfolio of Reverse Vending solutions extends from small to large depending on redemption volume and vendor preferences.

For small retailers, they may want one small machine that accepts all three material types. The M1 accepts aluminum, glass and plastic containers and has the following dimensions:

- H: 5.5'
- W: 3.2'
- D: 2.1'



TOMRA M1

On the other end of the spectrum, a thriving redemption center or a retailer that has embraced redemption as a service to consumers and is redeeming about 3 million units a year may opt for an R1 and T9. Together, these machines accept aluminum, glass and plastic containers (with an option to accept refillables through an opening for crates) and has the dimensions below. Note that the consumer only see the portal and consumer interface of the machines below. The rest of the machine is located in a back room.

- H: 5.9' – 6.4'
- W: 6.3' (R1 = 4.3', T9 = 2')
- D: 11' (or more if additional storage requested)



TOMRA R1



Can RVMs accept multiple materials or only one material?

Individual RVMs can accept a single material or all three materials (aluminum, glass and plastic) depending on the machine model selected.

What happens to the container once a consumer places it in an RVM?

Dozens of cameras immediately analyze the item placed in the RVM's opening. The machine's recognition system evaluates the container's UPC, weight and shape against the information in the system's database in order to accept or reject the container for redemption. If it is recognized, the machine moves the container on a conveyor system to a storage bin where it is separated from other material types. Typically, the material is compacted within the machine to ensure it cannot be redeemed again and to reduce the cost and carbon emissions of container transportation.

Then the RVM automatically transmits the container's redemption data to RVM system operators who initiate billing of the appropriate deposit initiator for the retailer or redemption center accepting their containers.

Why do RVMs crush material?

To reduce the cost and carbon emissions of container pickup services and to eliminate the risk of repeat redemption. For more, see the question above on "What services does a Reverse Vending Machine provide?"

How are refillable/reusable containers handled in a deposit return system?

Multiple deposit systems in operation today take back both one-way and refillable beverage containers, particularly in Canada and across Europe. RVMs are capable of accepting refillable containers. Typically, a consumer will return refillable containers to the store in a uniform crate and place the crate in an opening in the RVM. The RVM analyzes the bottles and accepts or rejects them for redemption. The refillable containers are then transported to central washing and cleaning facilities before being distributed to refilling facilities, all by the deposit initiator or on the deposit initiator's behalf.

Who pays for reverse vending machines?

Typically the redemption provider, meaning the beverage retailer or redemption center, finances Reverse Vending Machines with help from handling fee revenue. RVMs are financed based on three methods: a) purchase (which is rare), b) monthly lease, or c) what is known as a "through-put lease". A throughput lease allows a retailer or redemption center to utilize RVMs at no or minimal upfront cost, where the RVM provider takes on the financial risk of providing the machine, as long as the retailer meets a minimal redemption volume. The RVM provider then takes a portion of the handling fee.

Conclusion

TOMRA supports well-designed high-performing extended producer responsibility programs for packaging. While deposit systems have become the proven solution to reducing plastic beverage container pollution, reducing litter and increasing recycling of all beverage containers, the design of such a system should include an analysis of how it would work within the context of any jurisdiction. This is why no two deposit systems are identical. They all have been adapted in some way to meet local needs. At the same time, there is a blueprint for success as we have shared here so hopefully these insights can be of use for the committee as your work continues.

Thank you for the opportunity to share our perspective. We welcome any follow-up inquiry.

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ABOUT TOMRA: TOMRA provides a range of advanced vision systems that utilize sensor-based technology to sort everything from bottles to blueberries allowing companies and consumers to reduce their waste footprint and providing a stream of clean valuable material to the ‘circular economy’.

TOMRA COLLECTION: With an installed base of approximately 83,000 systems in over 60 markets including all 10 U.S. states with deposit laws, TOMRA Reverse Vending is the world's leading provider of reverse vending and clearinghouse solutions. Every year TOMRA facilitates the collection of more than 41 billion empty cans and bottles and provides retailers and other customers with an effective and efficient way of collecting, sorting, and processing these containers. TOMRA's material recovery business includes the pick-up, transportation, and processing of used beverage containers in North America, as well as the subsequent brokerage of the processed material to recyclers. The revenue stream in this business area is derived from fees received from bottlers based on the volume of containers processed. Currently, TOMRA Material Recovery processes over 340,000 metric tons of containers annually. TOMRA has over five decades of experience in markets with deposit return laws in place.

TOMRA SORTING: TOMRA Sorting creates sensor-based technologies for sorting and process analysis within the recycling, mining, food, and other industries. TOMRA Recycling is a global leader in its field and has pioneered the automation of waste sorting. Its flexible sorting systems perform an extensive range of sorting tasks and can both prepare and sort various types of metals and waste for either material recycling or energy recovery. Currently TOMRA Sorting Recycling has an installed base of close to 5,960 units across more than 40 markets.