

**BOTTLE BILL  
REDEMPTION/COLLECTION  
ANALYSIS**

**Prepared for:**

**Vermont Department of  
Environmental Conservation**

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## **Introduction**

DSM was contracted by the Vermont Department of Environmental Conservation to analyze the potential impact of changing the existing beverage container deposit return system. The changes include the method by which distributors pay into the system, and the removal of the requirement for redemption centers to sort containers by brand, and that distributors be required to pick up the empty containers. Instead, the state, or a third party contracted by the state, would be responsible for managing the redemption system.

This report is a first attempt to evaluate what the new system might look like and what the cost might be on a per container basis. It is based on limited data, requiring significant heroic assumptions, and as such should be viewed as a feasibility level analysis which would require substantial refinement should the State determine to move forward with this plan.

## **Overview of Existing System**

In brief, the current redemption system works as follows.

The deposit originates with the distributor (who may or may not be a bottler), who delivers product to retailers throughout the state including:

- Grocers and large retailers (e.g. Sam's Clubs and Costco);
- Convenience stores;
- Restaurants and bars including lodging establishments such as bed and breakfasts (known as "on-premise" sale and consumption); and,
- Licensed redemption centers.

The distributor charges the retailer a price for the product that includes the cost of the five-cent deposit for the container. In all exchanges but on-premise accounts, the retailer charges, collects, and accounts for beverage sales by including a separate 5-cent per container deposit as a cost to the customer. For on-premise accounts, the price of the beverage does not separately show a deposit since the container remains with the establishment.

The retailer must return a 5-cent deposit to the consumer for each empty container returned of any brand that the retailer sells. Redemption centers accept, and refund 5 cents, for all brands carrying a Vermont deposit. Redeemed containers must be sorted and stored by brand for pickup. The retailer or redemption center then arranges pickup of the empty sorted containers from the distributor or distributor's agent (third party) and is paid back both the deposit and a 3-cent handling fee per container (total 8 cents) after accounting practices verify the return.

Current accounting of returns is done by brand and by distributor as is collection of empty containers. This adds to the cost of the redemption system because it requires additional counting and segregation of containers of the same material type (e.g., aluminum, PET) that would otherwise be mixed together. As a result, a retailer or redemption center may be serviced for collection of empties by as many as seven different agents. Some larger redeemers (retailers, redemption centers or on-premise accounts) may be serviced by a third party that spots a trailer at the location while some of the smaller retailers and redemption centers are serviced directly by the distributor at the time of product delivery. In some cases a large account may be serviced both by a trailer spotted at the location, and by a distributor at the time of product delivery.

In all cases, the empty containers are brought back to a processing facility for either baling (aluminum and PET), crushing or bulking (glass). Different distributors use different processing facilities based on geographic location. Some distributors process and market their own material.

DSM has no data on the percent of material that goes through a third party processor but suspects that it is less than half of the total material as of the date of this report.

### **Changes in the System – Assumptions for Analysis**

To perform an economic analysis, data must be available, or assumptions must be made about costs of the current system for comparison against the estimated costs of the new system.

Unfortunately, data on costs and system components for the existing redemption system are not readily available, and are spread among many different players. In addition, based on observations and research completed for this analysis, it is clear that the collection and handling system varies greatly, both among redemption centers and distributors, and among the many different parties who collect the redeemed containers. In addition, there is no uniform system of collection or of preparing containers for redemption.

For example in some locations there may be sufficient container volume to warrant spotting a trailer but there may not be space on the redemption center's lot. In other cases, the redemption center may not have a loading dock so glass bottles must be handled in cases instead of gaylords. In this example, the bottles must be sorted by brand into cases, and then shrink wrapped to pallets instead of separated by color into gaylords and filled to a predetermined level (some redemption centers report 60 cases, others 70 cases). If the gaylord must be filled with bottles after the truck arrives and brand accounting is done simultaneously, the collection stop time can increase significantly.

Therefore, while the system changes are outlined in general below, without accurate documentation of the current collection system and processing locations by volume, there is no way to conclusively model the costs of the current system against costs of the new system.

### **Accounting, Reporting and Payment System**

The new system would require that bottlers/distributors pay into one system (state fund) the deposit (and possibly also the handling fee) for each beverage (unit) sold that is covered under the current bottle deposit law. This deposit is then built into the price of the beverage to the retailer.

When retailers sell any beverages covered under the law, they would continue to collect and retain a deposit from the consumer. And when retailers and redemption centers receive empty containers from consumers, they would continue to pay out a deposit and account for it, reporting regularly (conceivably monthly) on deposits returned through a newly established state reporting system. The deposits paid out would be checked (or audited) against the number of returned containers per redeemer. The new state fund would pay back the deposit returned by the retailer/redemption center, along with a handling fee. In the case of on-premise accounts, they too would report on containers returned for redemption, but in this case they would not collect or pay out any deposit, only submit a report for the deposit reimbursement based on the number of containers they return.

The extra deposit (and potentially handling fees) from gross units sold minus units redeemed, the escheats, would remain in the state fund to help pay for the cost of the streamlined collection system. For example, at an 85 percent return, 15 percent of the deposit (and potentially handling fees) paid into the system would remain in the state fund to pay for operations.

The State (or a third party) would manage the system, including accounting for both containers sold and returned through the system. This would involve the following:

- maintenance of records from distributors on units sold;
- payment for containers returned;
- accounting of distributors payments into the system;
- monthly reconciliation; and,
- an annual auditing function.

These tasks would require full time staffing which would have to be paid for through the state fund. While some cost savings for accounting would be realized by distributors, who would no longer need to reconcile the handling fee and deposits paid out, there was no way for DSM to quantify these savings.

#### **Sorting at Redemption Center or Retail Operation**

Sorting would no longer be necessary by brand but only by material type. Glass bottles would continue to be placed in mother case cartons or gaylords, and plastic bottles and aluminum cans would continue to be stored separately in clear plastic bags. Case and bag counts would remain the same at 24, 120 and 240 respectively (note smaller counts for 1 and 2-liter plastic bottles) however since no sorting by brand would be necessary, all brands of aluminum beer and soft drink containers could be included in the same bag.

There are assumed to be some savings in labor costs for the retailer and redemption center, as well as the distributors, but DSM did not attempt to estimate the savings for this analysis.

#### **Pickup of Empties**

Full case cartons and bags would be picked up by the State contractor or third party on a regular or on-call basis depending on the volume per establishment. For purposes of this analysis, collection frequency was assumed to be based on the average weekly (or monthly) number of beverage containers available for pickup. As in the current system, in some cases it would make sense to spot a trailer at the redemption center for loading cases and bags. At the other end of the spectrum, a separate shed might be necessary for small retailers or on-premise accounts to store materials until a sufficient volume warranted collection. The smallest locations would need to call in for pickups and a pickup would not occur until a minimum quantity was accrued. (See *Analysis Assumptions* below.) Material collected would be brought to designated processing locations.

#### **Processing of Material**

It is assumed that all material would be processed by existing third party materials recovery facilities already operating in Vermont. Processing locations would be selected by geographic location and cost. For this analysis it has been assumed that processing locations would include Windham, Rutland and Chittenden counties and that material would be processed at a cost of \$15 per ton for PET and aluminum, and \$35 per ton for glass. Revenue was assumed to be 65 cents, 17 cents and .5 cents per pound for aluminum, PET and glass respectively, shared 50/50 with the processor.

#### **Collection System Assumptions**

Given the changes described above and the information provided to DSM on the current quantities of material collected for redemption, the following assumptions for a streamlined collection system are outlined below.

- **Number of containers handled through system:** Based on 2004 data on units sold and returned, DSM assumed that approximately **230 million containers** would be handled through the collection system. However, DSM suspects a slight drop in redemption due to the inconvenience of the new collection system since some locations would be serviced less frequently under the new system. For example, there would no longer be the option for a small retailer to return empty containers every time a distributor's truck arrives.
- **Trucks used:** Based on data on the existing system provided by TOMRA to DSM, forty-eight (48) yard trailers would be used for collection on all collection routes. While TOMRA reports that these trailers can carry a maximum load of about 4,000 cases of beverage containers, they typically return with an average load of 2,200 cases based on current average volumes collected.
- **Number and location of redemption sites:** The State does not maintain data, and conflicting information was provided by some distributors to DSM, on the total number of possible redemption points or actual pickup locations. This is critical to the cost analysis. Therefore, DSM conducted a confidential survey of distributors on the number of locations from which they, or a third party, collect containers. A total of five distributors participated in the survey however survey responses varied significantly from a high of over 2,100 locations to a low of 35 locations. The differences in number of locations is likely due to the number of small generators, such as licensed bed and breakfasts that serve beer, wine, and/or liquor and small, rural general stores. Most of these smaller operations are picked up by a distributor when product is delivered.

DSM has been informed that 75% of the material comes from 100 of the largest locations. For this analysis, DSM assumed that while all possible redemption points can remain in the system, the smallest locations can only participate if they accumulate at least 50 cases of glass or 10 bags of aluminum cans or PET bottles when they call in for a pickup. This is the current call-in policy for TOMRA (the largest third party pickup agent) and DSM believes this is a reasonable minimum quantity to minimize collection costs. DSM also assumed that the total number of pickup locations in the state would be 1,700 for the purposes of this analysis. Finally in the absence of good data on redemption locations, DSM assumed an equal number of redemption locations throughout the state based on county population.

- **Pickup quantities:** For purposes of this analysis, pickup was assumed to occur on a regular schedule according to volume. Average pickup volumes per type of location are shown below:

Type of Redeemer	Number of Redemption Locations	Containers Collected Per Pickup (units)	Average Annual (units)
<b>Large Redeemer</b>			
Spot Trailer	40	58,000	1,735,700
Scheduled Pickup	60	33,380	1,735,700
<b>On-premise/Other</b>			
Scheduled Bi-weekly	800	2,230	58,000
Scheduled Monthly	400	1,800	21,600
Call in	400	1,200	12,000

### Analysis

DSM analyzed collection costs based on geographic location assuming that costs would be higher in more rural counties without existing processing capability.

Key assumptions for estimating collection costs include:

- A tractor-trailer unit costs \$550 per eight-hour day.
- A driver can pick up between 1.75 and 3 full, spotted trailers per day depending on the location of the trailer and the distance to the MRF.
- For all locations where trailers are not spotted, the tractor-trailer would make one trip per day serving a maximum of 10 locations over an 11-hour day. Per day costs for the 11-hour day are assumed to be \$700.
- An additional \$50 - \$100 per day was added for operating trailers in counties located long distances from MRFs to account for the additional drive time to the MRF.

Based on the truck operating costs and the assumptions regarding the number of collection points, Table 1 below shows collection costs per county using population to estimate total redemption per county. A contingency of 10% was added to the number of truck trips in locations where trailers are not spotted to account for seasonal or weekly fluctuation in redemption quantities that must be picked up.

**Table 1.  
Collection Costs by County**

County	Population 2004	Redemption (containers)	Redemption Locations (#)			Truck Trips				Cost	
			Large	On- premise	All other	Spot Trailer	Pickup	10% Contingency	Total	Spot Trailer	Pickup
Addison	36,865	13,700,000	6	65	30	71	185	203	274	\$15,590	\$142,234
Bennington	36,956	13,800,000	6	66	30	71	186	205	276	\$19,629	\$153,506
Caledonia	30,464	11,300,000	5	54	24	58	152	168	226	\$18,369	\$134,076
Chittenden	149,286	55,600,000	24	264	120	288	750	825	1,112	\$52,724	\$577,240
Essex	6,654	2,500,000	1	12	5	13	34	37	50	\$4,064	\$29,663
Franklin	47,556	17,700,000	8	84	38	92	239	263	354	\$28,773	\$196,888
Grand Isle	7,643	2,800,000	1	13	6	14	38	42	56	\$4,552	\$31,146
Lamoille	24,418	9,100,000	4	43	20	47	123	135	182	\$14,793	\$101,225
Orange	29,189	10,900,000	5	52	24	56	147	162	218	\$17,719	\$121,247
Orleans	27,372	10,200,000	4	48	22	53	138	151	204	\$16,581	\$121,025
Rutland	63,616	23,700,000	10	113	51	123	320	352	474	\$22,474	\$246,054
Washington	59,068	22,000,000	10	105	48	114	297	326	440	\$31,293	\$244,719
Windham	44,284	16,500,000	7	78	36	85	222	245	330	\$15,647	\$171,303
Windsor	58,023	21,600,000	9	103	47	112	291	320	432	\$30,724	\$240,270
	<b>621,394</b>	<b>231,400,000</b>	<b>100</b>	<b>1100</b>	<b>500</b>	<b>1,197</b>	<b>3,120</b>	<b>3,432</b>	<b>4,629</b>	<b>\$292,933</b>	<b>\$2,510,591</b>

Other costs that must be added to the system are the accounting and administrative costs. These are likely to be high, given the need to manage collection routes for, and reconcile, as many as 1,700 accounts per month, as well as potentially manage payments from more than 25 distributors. DSM assumed these to be roughly 10% of collection costs or about \$300,000 per year which would cover the cost of an annual audit, dispatching and accounting staff and troubleshooting collection problems.

In addition, DSM assumed the need for some on-going equipment costs to increase the efficiency of the collection system. These could be investments in equipment at the redemption locations to make pickup more efficient (pallet jacks or partial payment for forklift equipment leases) or containers for the trucks. These costs are estimated to average between \$80 and \$200 per location totaling another \$176,000 (rounded) to the annual costs.

Finally, privatizing the system includes incorporating profit into the costs. There is some degree of risk to the contractor to take on collection from these smaller locations. This includes challenges such as driver shortages, increase in fuel costs and weather, etc. An additional 15 percent of the net costs of the system are included to account for this profit.

Table 2 presents estimated total costs, based on the assumptions described above. All costs have been rounded to emphasize the degree of uncertainty associated with these estimates.

**Table 2**  
**Total Estimated Collection and Administrative Costs**

<b>Annual Collection Costs</b>		
Large Redeemers - Spot Trailers		\$290,000
Routes		\$2,510,000
	<b>Subtotal</b>	<b>\$2,800,000</b>
<b>Other Costs</b>		
Equipment		\$176,000
Administration (10%)		\$300,000
	<b>Subtotal</b>	<b>\$476,000</b>
	<b>Total</b>	<b>\$3,276,000</b>
<i>Cost Per Unit Redeemed</i>		<i>\$0.014</i>

Table 3 illustrates the net impact on total costs associated with subtracting processing revenues (based on today's material values), adding profit (assuming a private contractor manages collection), and subtracting escheats (based on 2004 data supplied by Northbridge Environmental). Table 3 presents net system costs separately assuming that only the deposit is paid out initially (which DSM believes would mimic the existing system), and assuming that the deposit and handling fee are both paid out initially and are therefore available on all non-redeemed containers.

As illustrated by Table 3, net costs for the State to manage the system, are roughly \$2.6 million per year (based on current beverage sales), or 1.1 cent per redeemed container, before using escheats to cover these costs. Subtracting the value of escheats on the 5 cent deposit only, based on a reported 85% return rate, yields a net cost of \$400,000 (rounded). Subtracting the value of escheats assuming that 8 cents per container is paid on all containers sold yields a net revenue to the State of roughly \$850,000.



Processing Costs/Revenues	Tip Fee (\$/lb)	Revenue (\$/lb)	50% Revenue (\$/lb)	Total Lbs (lbs)	Net Revenue (\$)
Al	0.0075	0.65	0.325	4,071,793	\$1,292,794
Glass	0.0175	0.005	0.0025	29,672,041	-\$445,081
PET	0.0075	0.17	0.085	2,368,207	\$183,536
<b>Total Processing Revenue</b>					<b>\$1,031,250</b>
<b>Collection Costs (from Table 2)</b>					<b>\$3,279,529</b>
<b>Collection Minus Processing Cost Per Unit Redeemed</b>					<b>\$2,248,279 \$0.010</b>
Profit (15%)					\$337,242
<b>Total, All In Costs Cost/Unit Redeemed</b>					<b>\$2,585,521 \$0.011</b>
Less Deposit Escheats (85% return)					\$2,187,611
<b>Net Cost</b>					<b>\$397,910</b>
Less Handling Fee Escheats					\$1,245,052
<b>Net Revenue</b>					<b>\$847,141</b>

## Conclusions and Recommendations

Based on the assumptions described above and DSM's limited understanding of the number of redemption locations, it is our conclusion that a State run (or contracted) system for collection of all redeemed containers, with no counting by brand, would cost between 1 and 1.2 cents per redeemed container.

After accounting for escheats (based on the 5-cent deposit only), the net cost to the system would be roughly \$400,000 per year, based on reported return rates of 85 percent, or approximately 0.2 cents per returned container. If escheats included both the deposit and the handling fee the State would realize net revenues of roughly \$850,000, at the same 85 percent return rate.

Estimated system costs account for costs of collection, processing and administration of a system that serves all existing redeemers in the State. These estimated system costs do not account for cost savings under the new system that might be accrued at other points in the system, including:

- Savings to distributors (including larger players such as Coca Cola Bottling Company of Northern New England, Pepsi-Cola Bottling Company of Burlington, Farrell Distributing, Baker Distributing, Liter Beverage) who no longer will have to backhaul containers on their trucks, or review and pay out deposit and handling fees directly based on containers returned.
- Savings to retailers and redemption centers that no longer need to sort and store by brand, as well as administrative savings associated with one pickup number to call for collection (or one collection agent to deal with for pickup).

However, it is also possible that the return rate would fall slightly (perhaps by around 5 percent), due to the need for small accounts whom are currently having their containers collected by the distributors during delivery of product, to store minimum quantities before pickup (50 cases or 10 bags).

Finally, it should be noted that the system analyzed assumes that all existing accounts would be served by the new system, with no backhauling by distributors. Because backhauling for very small accounts is probably the most efficient method of collecting redeemed containers, these very small accounts add significant costs to the new system analyzed. As a result, it is likely that a detailed discussion of this new system should include a discussion as to the viability of not serving these very small accounts, even though this would result in marginally lower redemption rates.