Cost of Curbside Recycling for Beverage Containers

Recycling isn’t FREE

As all recycling professionals know, recycling isn’t a zero-cost service, even though it is often provided for “free” to households. Providing recycling for “free” is a deliberate policy decision made by municipalities to incentivize participation by residents and businesses.

However, these more detailed aspects about recycling costs are less well-known:

- The cost breakdown between the collection stage of recycling and the processing stage at a materials recovery facility (“MRF”)
- The cost breakdown between individual material types within the recycling stream

What about the claim that aluminum and PET are “valuable” in curbside recycling programs, and the implication that these two materials will somehow “pay for” curbside recycling?

This type of claim is misguided for three main reasons:

- First, the claim ignores the fact that aluminum and PET are only a small part of the overall curbside mix. (See Figure 1, below.)
- Second, the myth emphasizes the scrap value of materials, but ignores the fact that there are costs associated with collecting the materials and bringing them to market.
- Third, this claim is usually made in the context of comparing curbside recycling to container deposit programs for beverage containers, and beverage containers only. Why then mention only PET and aluminum, but not bring up glass, which is by far the greatest proportion, by weight, of beverage containers? (See Figure 2, below.)

Figure 1. Average Composition of Curbside Recyclables

- Glass 17%
- Paper 54%
- Plastic 10%
- Steel 4%
- Aluminum 3%
- Residual 8%

Figure 2. US Sales of Beverage Containers by Weight

- Glass Bottles 69%
- PET Bottles 16%
- HDPE Bottles 5%
- Foil Pouches 0%
- Aseptic Boxes 0%
- Gable-Top Cartons 2%
- Aluminum Cans 8%
There is a net cost of more than $600 per ton for collecting and processing PET bottles in curbside recycling programs: example from Ontario’s Blue Box Program

It has been well-known among solid waste and recycling professionals for decades that collection of plastics and other lightweight materials is more expensive than collection of denser and more easily compacted materials on collection routes. At MRFs, processing costs vary between material types as well. To illustrate the relative cost of collection and processing PET for recycling, we use data from the Province of Ontario, Canada.

Multi-material curbside recycling is offered to 99% of single-family residential households in the Province of Ontario and is half-funded through an Extended Producer Responsibility (EPR) model. The following excerpt, from the nonprofit Stewardship Ontario website, describes the financing of their packaging EPR program:

“Stewardship Ontario collects fees from Industry Stewards—the companies that are the brand owners, first importers or franchisors of the products and packaging materials that end up in curbside Blue Boxes …. These fees help to fund the costs of collecting, transporting, recycling and safely disposing of waste across the province. Stewards share responsibility for the Blue Box Program with municipal governments, contributing approximately $100 million per year (half the cost).”

The stewards collectively determine their share of costs through a financial model that uses activity-based-costing and has been peer-reviewed. According to Stewardship Ontario, “The methodology for the activity-based cost allocation study has been developed over many years with stakeholders including municipalities, material and packaging suppliers and stewards. The methodology was reviewed by a third party, KPMG, in 2007 in conjunction with EEQ and MMSM.” Costs are allocated for labor, capital, and operating costs for collection and processing.


<table>
<thead>
<tr>
<th>Table 1. Province of Ontario Blue Box Program Costs</th>
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<tbody>
<tr>
<td>Aluminum Cans</td>
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<tr>
<td>PET Bottles</td>
</tr>
<tr>
<td>HDPE Bottles</td>
</tr>
<tr>
<td>Clear Glass</td>
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<tr>
<td>Colored Glass</td>
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</tbody>
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Source: Stewardship Ontario, data used to set fees, 2018
Sheet: Table 2, Gross and Net Costs
All Canadian dollars multiplied by .77 to convert to US dollars
Conversion made for Metric tonnes to US tons
Note: negative “net cost” value for aluminum means that aluminum is recycled with a net profit

Table 1, above, provides a detailed breakdown of the gross collection and processing costs for common beverage container material types in recycling programs. The table also provides figures for revenues from sales of scrap material, as well as the net cost of recycling. The value shown for aluminum, -$290, indicates that recycling of aluminum in curbside programs carries a net profit, while all other materials are recycled at a net cost. As shown in Table 1, PET revenues cover only 23% of the cost of collecting and sorting PET. On a net cost per ton basis, PET bottles are about thirteen times more expensive to collect and process than glass bottles.
Percentage of System-wide Costs Attributable to Beverage Containers

In the Ontario system, aluminum net revenues are only enough to offset 1.5% of system-wide recycling costs, while PET bottle costs are 14% of system-wide costs. Glass bottles comprise 2.2% of system-wide costs. Ontario has a container deposit system for all alcoholic beverages, which mainly reduces the amount of glass containers in curbside, and reduces aluminum cans in curbside by about 40%. Table 2, below, summarizes cost contributions for the 3 major beverage container material types.

Table 2. Cost Contributions to Total System-wide Costs from Selected Materials, from Ontario Blue Box Pay-in-Fee Model Calculations, 2018

<table>
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<tr>
<th>Material Type</th>
<th>Percentage of Net Systemwide Curbside Collection Costs</th>
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<tbody>
<tr>
<td>Aluminum</td>
<td>-1.6%</td>
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<tr>
<td>Glass</td>
<td>2.2%</td>
</tr>
<tr>
<td>PET bottles</td>
<td>14%</td>
</tr>
<tr>
<td>Total of 3 beverage container material types</td>
<td>14.6%</td>
</tr>
</tbody>
</table>

Container deposit programs relieve municipalities of the operational burdens and financial costs of collecting beverage containers. Lost revenue from material that is currently collected in municipal recycling programs is relatively insignificant when compared to the avoided collection and disposal costs, as well as litter cleanup and storm drain cleanout costs related to beverage container litter reduction.

- According to an analysis conducted by DSM Environmental Services Inc. for the Massachusetts Department of Environmental Protection, an expanded bottle bill was estimated to reduce costs for municipalities in Massachusetts, even after netting out potential revenue losses. The final letter report estimated the total savings to be between $3.8 and $6.5 million dollars annually. Because material is diverted through the bottle bill, “the savings are primarily due to reduced collection and disposal costs.”

- Independent research from the Congressional Research Service (CRS), which prepares reports for the U.S. Congress, states that both a deposit return program and curbside recycling are necessary to achieve high recycling rates and that having both programs result in less costs for curbside recycling. Specifically, “Both systems can serve as elements of comprehensive recycling programs. Neither constitutes a comprehensive program by itself. Neither excludes the use of the other.”

“Deposit systems skim potential sources of revenue from curbside programs, but they also reduce the operating costs of curbside programs. Local governments would appear to achieve greater diversion of solid waste from disposal at a lower cost per ton if both a bottle bill and a curbside collection program were in place.”

- More recent research undertaken in Europe for the Campaign to Protect Rural England (a charity focused on preventing litter in rural England) takes a closer look at the notion that curbside recycling programs and deposit return are mutually exclusive. The report states that this argument is “pure speculation based on the unlikely scenario in which there is no effect on the logistics of the pre-existing system.” In fact, the findings suggest that if the recovery of beverage containers through a deposit return program is very high (as is currently the case in Vermont), then there is limited need to include bottles and cans in a curbside program. The curbside system can concentrate on optimizing the logistics of collecting the remaining materials such as newspaper, phone books, paper, cardboard, and other household-generated container packaging.

- In 1991, the Seattle Solid Waste Utility conducted its own analysis to determine the impact of a national bottle bill on the economics of the City’s recycling program, one of the oldest and most successful curbside recycling programs in the nation. The study, titled *Potential Impacts of a National Bottle Bill on Seattle’s Curbside Recycling Program*, found that 42% to 54% more beverage container tonnage would be diverted, while there
would be an overall net system savings to the city between $236,917 and $632,774. They concluded, "A bottle bill would divert additional tonnage with no significant impact to either City costs or curbside recycling profits."6

- In the Province of Ontario, Canada, The Beer Store has documented taxpayer savings of $40 million per year, due to the high recycling rate of the deposit-return program for alcoholic beverage containers.7

California Beverage Container Program Costs

Table 3, below, provides a detailed breakdown of the gross collection and processing costs for the three common beverage container material types in the California Beverage Container program. The table also provides figures for revenues from sales of scrap material, as well as the net cost of recycling. The table is for comparative purposes with the Ontario Blue Box Program Costs (see Table 1).

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<thead>
<tr>
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<tbody>
<tr>
<td>Aluminum Cans</td>
<td>$555</td>
<td>$1,386</td>
<td>-$831</td>
</tr>
<tr>
<td>PET Bottles</td>
<td>$485</td>
<td>$232</td>
<td>$253</td>
</tr>
<tr>
<td>Glass</td>
<td>$116</td>
<td>-$4</td>
<td>$120</td>
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*Source: CalRecycle Fact Sheet, June 2018
Numbers derived from the CalRecycle 2017 Processing Fee and Handling Fee Cost Surveys, June 2018
Note: negative “net cost” value for aluminum means that aluminum is recycled with a net profit

About CRI

CRI is a nonprofit organization and a leading authority on the economic and environmental impacts of used beverage containers and other consumer-product packaging. Its mission is to make North America a global model for the collection and quality recycling of packaging materials. We do this by producing authoritative research and education on policies and practices that increase recovery and reuse; by creating and maintaining a database of information on containers and packaging; by studying container and packaging reuse and recycling options, including deposit systems; and by creating and sponsoring national networks for mutual progress. CRI envisions a world where no material is wasted, and the environment is protected. It succeeds because companies and people collaborate to create a strong, sustainable domestic economy.

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2 US BMDA Data Set, CRI
5 www.cpre.org.uk
6 http://www.bottlebill.org/about/benefits/curbside.htm