Introduction

There are more than 50 container deposit programs in the world, including 10 in U.S. states and 12 in Canadian provinces. Most of these state-, provincial-, and country-level deposit systems exist side-by-side with hundreds of local curbside recycling programs. The deposit systems and the curbside and drop-off programs are operated separately, however, and the three types of programs have their own funding sources.

This report has been prepared by the Container Recycling Institute (CRI) for the following purposes:

1. To unravel the complexity of the types of payments that California curbside and drop-off programs receive for beverage containers,
2. To explain the formulas used in each of the four types of CalRecycle payments,
3. To quantify the payments, individually and collectively, on a dollar-per-ton basis and total dollar basis, and
4. To quantify total revenues, as well as estimated costs and profits for beverage containers handled through curbside and drop-off programs.

We must emphasize that this paper provides information on payments for beverage containers only, and does not include costs or revenues for other materials that are typically included in curbside recycling programs. Also, note that per-household service fees were not estimated or included in this analysis.

Summary of Findings

The operators of curbside and drop-off programs in California received $183 million in revenue from CalRecycle payments and scrap sales for CRV beverage containers in 2017. The estimated cost for handling these containers was $43 million, leading to a calculation of $140 million in gross profits (326%). Profit percentages varied by container type, as shown in Table 1.

<table>
<thead>
<tr>
<th>Container Type</th>
<th>Revenue: CalRecycle payments + scrap value (million)</th>
<th>Cost to recycle (million)</th>
<th>Net profit (million)</th>
<th>Percent profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>$45</td>
<td>$5</td>
<td>$40</td>
<td>800%</td>
</tr>
<tr>
<td>Glass</td>
<td>$58</td>
<td>$21</td>
<td>$37</td>
<td>173%</td>
</tr>
<tr>
<td>PET</td>
<td>$74</td>
<td>$14</td>
<td>$60</td>
<td>427%</td>
</tr>
<tr>
<td>HDPE</td>
<td>$6</td>
<td>$3</td>
<td>$4</td>
<td>141%</td>
</tr>
<tr>
<td>Total</td>
<td>$183</td>
<td>$43</td>
<td>$140</td>
<td>326%</td>
</tr>
</tbody>
</table>

1 CRV is an acronym for California Redemption Value. The CRV is a deposit of 5¢ or 10¢ (based on container size) for most carbonated and non-carbonated beverages sold in California.
How Curbside and Drop-Off Recycling Programs Are Typically Funded in Other States and Countries

As of 2017, approximately 73% of the U.S. population had access to curbside recycling programs. In rural areas where curbside programs are not economical, residents often have access to drop-off programs. Both curbside and drop-off recycling programs are primarily funded by ratepayers or taxpayers. This funding is supplemented with revenues from the sale of the recyclables the programs collect, and sometimes from state grant programs.

Outside of California, curbside and drop-off programs do not typically receive payments from beverage container deposit programs. In rare cases, operators of curbside or drop-off recycling programs are able to separate deposit beverage containers and deliver them to the deposit system operator for the refund. For example, curbside programs in Hawaii and British Columbia operate this way. In many countries, packaging materials are collected through curbside recycling programs that are paid for by producers (brand owners) through extended producer responsibility programs (EPR for packaging).

How Curbside Recycling Programs Are Funded in California

According to CalRecycle, 88% of CRV container recycling occurred at redemption centers in 2017, and the remaining 12% occurred through curbside and drop-off programs.

Like curbside and drop-off recycling programs elsewhere, those in California sell recyclables for scrap value, and also receive a “fee for service” from cities or ratepayers. An unusual feature of the California deposit law also allows curbside and drop-off recycling programs to receive several types of payments from the state’s beverage container recycling program. Table 2 shows the various forms of payments and revenues that curbside and drop-off recycling programs receive in California.

**Table 2. Types of Payments from CalRecycle and Other Parties, 2017**

<table>
<thead>
<tr>
<th>Payments from CalRecycle</th>
<th>Payments from Other Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CRV deposit revenue from 5¢ or 10¢ refunds ($127.7 million)</td>
<td>1. Material (scrap) revenues from selling recyclables ($13.6 million)</td>
</tr>
<tr>
<td>2. Administrative fees ($1 million)</td>
<td>2. Per-household service fees from municipalities or ratepayers (i.e., monthly bill) (not quantified)</td>
</tr>
<tr>
<td>3. Processing payments ($26 million)</td>
<td></td>
</tr>
<tr>
<td>4. Curbside supplemental payments ($15 million)</td>
<td></td>
</tr>
</tbody>
</table>

"Quality incentive payments" made by CalRecycle directly to glass processors: $9.8 million

The following sections of this report describe the four types of payments that CalRecycle makes to curbside and drop-off programs, in addition to the material (scrap) revenue the programs receive from selling recyclables. Note that per-household service fees are not included or quantified. This paper compares the sum of these revenue streams to average costs for collecting and sorting beverage containers through curbside and drop-off programs, and calculates net profit by itself and as a percentage of costs on a material-specific basis.

---

3 CalRecycle Beverage Container Recycling Home Page: [https://www.calrecycle.ca.gov/BevContainer](https://www.calrecycle.ca.gov/BevContainer)
Block 1. CRV Revenue per Ton

Block 1 of Appendix A shows how adjusted CRV revenue per ton is calculated for materials recycled through curbside and drop-off programs, as estimated for 2017. Two elements comprise this revenue:

**CRV per pound** (column A of Appendix A): Consumers voluntarily forfeit the deposit refund when they place CRV bottles and cans in curbside or drop-off bins. In accordance with the state’s deposit law, curbside and drop-off program operators are eligible to receive CRV payments from CalRecycle by submitting weight records to CalRecycle via appropriate documentation. CalRecycle calculates “refund value per segregated pound” payments based on statewide survey data. The calculation accounts for average container weights and for the average mix of bottles and cans with a CRV of 5¢ (<24 oz.) or 10¢ (≥24 oz.).

**Administrative fees** (column B) are paid by recycling processors to certified curbside and drop-off programs, and are calculated at ¾ of 1% of the CRV. (Some programs may also receive a 1.75% “processor” administrative fee, which we ignore in this analysis.)

Combined, these yield **adjusted CRV revenue per pound** (column C). Multiplying by 2,000 yields **Adjusted CRV revenue per ton** (column D).

Block 2. Other State Revenue per Ton

Block 2 of Appendix A shows two additional categories of payments paid by CalRecycle to curbside and drop-off operators: processing payments made on glass and plastic, and curbside supplemental payments made for all materials.

**Processing payments** (column E): Per-ton processing payments serve as the main payment vehicle from CalRecycle to the state’s redemption centers. They are determined by CalRecycle annually and adjusted not more often than every three months. In calculating these payments, CalRecycle surveys operating costs at more than 300 redemption centers in California and determines average costs. Processing payments are meant to bridge the gap between scrap revenues and redemption centers’ costs (i.e., allowing them to break even), and to provide them with a “reasonable financial return” (i.e., allowing them to make a modest profit). Costs and scrap values are studied and determined for each container material type.

CalRecycle has not published collection and processing costs for handling beverage containers through curbside programs in California. So, by default, the agency uses one set of processing payments to pay all types of operators, including redemption centers and operators of curbside and drop-off programs.

For 2017, average processing payments are shown in Appendix A, column E. Aluminum cans are not eligible for processing payments because their natural market value is higher than the cost of handling the containers; that is, aluminum cans naturally turn a profit.

**Curbside supplemental payments** (column F): A total of $15 million is allocated annually by CalRecycle to curbside and drop-off program operators. CalRecycle calculates a per-unit payment amount each year based on the number of containers collected through curbside programs that year.
The combined value of these two additional state revenue sources is shown by material and program type in Appendix A, column G.

**Block 3. Total State Revenue per Ton**

Block 3 of Appendix A combines adjusted CRV revenue per ton (column D) with processing payments (column E) and curbside supplemental payments (column F) to get Total State Revenue per Ton (column H).

**Block 4. Scrap Revenue**

Block 4 of Appendix A shows average scrap revenues per ton of CRV units recycled. Curbside and drop-off operators sell containers to processors and receive scrap revenues in return. These values fluctuate with changing market conditions. The scrap values shown in column I are averages of the 12 monthly scrap values provided by CalRecycle for 2017.

For all materials except aluminum, there are separate scrap values for materials collected by curbside programs and drop-off programs. This is due to the generally higher quality of source-separated drop-off material versus partially commingled (dual stream) or totally commingled (single stream) curbside scrap that often contains contaminants even after processing at a materials recovery facility (MRF).

Curbside glass is color-mixed and often contaminated. CalRecycle data show that curbside glass had a negative scrap value averaging -$21 per ton in 2017; this means that curbside operators had to pay processors to take the glass off their hands. The average scrap value for drop-off glass was also negative (-$19), but slightly better than curbside glass.

A comparison: Now that we have identified the sources of CalRecycle payments and market-based scrap revenues, it is interesting to compare them on a per-ton basis by material, averaged across curbside and drop-off programs. As Figure 1 shows, CalRecycle payments vastly overshadow market-based payments for all four container materials, but most sharply for plastic.

**Block 5. Profit per Ton**

To better understand curbside operators’ finances, the gross cost of recycling must be subtracted from gross revenues, as shown in Appendix A, Block 5, Profit per Ton.

Gross revenue per ton is shown in column J. It is the sum of the total state revenue per ton (column H), and scrap revenues per ton (column I). Note that curbside and drop-off operators generally also receive payments from ratepayers and/or taxpayers, but that is beyond the scope of this paper.
Gross cost per ton is shown in column K. While CalRecycle has extensively surveyed redemption centers’ operating costs, the agency has not similarly published average costs for collecting and sorting beverage containers through curbside or drop-off programs. Therefore, CRI has used the 2017 redemption center cost per ton to recycle from CalRecycle’s June 2018 Fact Sheet.

We observed that the redemption center costs are generally similar to curbside recycling costs, because we compared these costs to an annual cost study from Ontario, Canada. The “Activity Based Cost Allocation Study” is a peer-reviewed net cost assessment of Ontario’s curbside collection programs, which serve 99% of single-family households in that province.

Table 3 compares the CalRecycle costs to those of Ontario’s curbside Blue Box program. CalRecycle’s published redemption center costs are moderately lower than those of Stewardship Ontario for aluminum and HDPE, significantly lower for PET ($485 vs. $892), and moderately higher for glass.

Profit per ton in dollars, Block 5 in Appendix A is simply gross cost per ton (column K) minus gross revenue per ton (column J).

Profit margins (column M) are percentages that result from dividing profits per ton (column L) by gross costs per ton (column K).

In other words, in 2017 curbside operators received about nine (9) times as much as it cost them to recycle aluminum cans, and three (3) times as much as it cost them to recycle glass bottles.

Block 6. Statewide Profits for CRV Containers

CalRecycle reports that in 2017, 185,262 tons of aluminum, plastic, and glass beverage containers were recycled statewide through curbside programs, and an additional 40,814 tons were recycled through drop-offs. When the material-specific tonnages (column N) are multiplied by the material-specific profits per ton (column L), we get $109 million in curbside program profits and $31 million in drop-off program profits (column O).

Related Issues Not Included in This Analysis

---


Additional revenues: Note that the above derivations do not include ratepayer fees or taxpayer-funded municipal contract revenue. In theory, CalRecycle payments to curbside and drop-off operators have already been “priced into” ratepayer fees. If so, California ratepayers are paying less than they would be in a town with similar operational parameters in a different state, because the CRV payments are covering some of the private or municipal hauler and processor costs. However, we cannot be sure this is happening.

Individual Commingled Rate Program: Another feature of the California deposit law allows curbside program operators to conduct their own “container- per-pound” surveys and apply to CalRecycle to receive higher refund values than the standard rates. In 2018, 143 programs applied for and received larger-than-average payments as a result of documenting a greater number of containers per pound in their programs. This process resulted in “container-per-pound rates” that were a mixture of standard rates and rates that were as much as double the standard rates. Taken together, this “Individual Commingled Rate Program” likely results in millions of dollars of additional payments to curbside programs – above and beyond what is documented in this report.

Quality Incentive Payments: In addition, CalRecycle makes “quality incentive payments” of up to $60 per ton directly to private beneficiators. These are companies that buy bottles from curbside and drop-off programs, and clean and color sort them into cullet that meets the end-use specifications of bottle or fiberglass manufacturers. CalRecycle allocates up to $10 million annually for this purpose; in 2017, $9.8 million was disbursed, which averaged out to approximately $53 per ton of CRV glass recycled. These payments are not shown in Appendix A.

Contamination: Based on its measurements of the amount of contamination in bales from curbside programs, CalRecycle estimates that the current system of providing CRV and other payments based on bale weights, coupled with the quantity of non-CRV items in bales, results in over-payments of $10 million per year. That is, these payments are being made not for the recyclable metal and plastic, but for the contaminants themselves present in bales of PET, HDPE, and aluminum.

Summary

Adding the total curbside program profits ($109 million) to the total drop-off program profits ($31 million) yields $140 million in curbside and drop-off profits statewide (column O), or a weighted average profit of $621 per ton.

These numbers are meant to be directional and illustrative, not definitive. Actual profits can vary based on material type, changing scrap market conditions and consumer patterns, location, and the operational particulars of each curbside and drop-off program. We believe these estimates can serve as useful guideposts in any evaluation of CalRecycle’s payment mechanisms to curbside and drop-off programs.

## Appendix A. Revenues, Costs, and Profits to California Curbside and Drop-off Programs, 2017

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Material</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
<th>Block 5</th>
<th>Block 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adjusted CRV Revenue Per Ton</td>
<td>Other State Revenue Per Ton</td>
<td>Total State Revenue per ton (= D + G)</td>
<td>Scrap Revenue</td>
<td>Profit per ton</td>
<td>Profit Statewide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CRV per pound</td>
<td>Administrative fees per pound</td>
<td>Adjusted CRV revenue per pound</td>
<td>Processing payment per ton</td>
<td>Curbside supplemental payments per ton</td>
<td>Subtotal, other state revenue per ton</td>
</tr>
<tr>
<td>Curbside</td>
<td>Aluminum</td>
<td>$1.60</td>
<td>$0.0120</td>
<td>$1.612</td>
<td>$3,224</td>
<td>$3,839</td>
<td>$1,416</td>
</tr>
<tr>
<td></td>
<td>Glass</td>
<td>$0.11</td>
<td>$0.0008</td>
<td>$0.107</td>
<td>$2.14</td>
<td>$99.87</td>
<td>$27</td>
</tr>
<tr>
<td></td>
<td>PET</td>
<td>$1.00</td>
<td>$0.0075</td>
<td>$1.008</td>
<td>$2.015</td>
<td>$225.11</td>
<td>$210</td>
</tr>
<tr>
<td></td>
<td>HDPE</td>
<td>$0.48</td>
<td>$0.0035</td>
<td>$0.484</td>
<td>$967</td>
<td>$267.37</td>
<td>$69</td>
</tr>
</tbody>
</table>

Subtotal, curbside programs 185,262 $109

| Drop-off    | Aluminum | $1.50 | $0.0113 | $1.511 | $3,023 | n/a | $322 | $3,415 | $1,416 | $4,830 | $555 | $4,276 | 771% | 2,381 | $10.2 |
|             | Glass    | $0.10 | $0.0008 | $0.103 | $2.06 | $99.87 | $26 | $125 | $331 | ($19) | $311 | $116 | $195 | 168% | 30,645 | $6.0 |
|             | PET      | $0.93 | $0.0070 | $0.937 | $1,874 | $225.11 | $223 | $448 | $2,322 | $167 | $2,489 | $485 | $2,004 | 413% | 7,166 | $14.4 |
|             | HDPE     | $0.53 | $0.0040 | $0.534 | $1,068 | $267.37 | $87 | $374 | $1,442 | $248 | $1,690 | $630 | $1,090 | 168% | 702 | $0.7 |

Subtotal, drop-off programs 40,814 $31

Total, curbside and drop-off programs 226,077 $140

---

**Column notes and sources:**

A. "Refund Value per Segregated Pound," Attachment 1 Table 3 "California Recycling Program Rates" CalRecycle. [https://www.calrecycle.ca.gov/docs/Zr/BevContainer/Notices/2016/2017PrmRate.pdf](https://www.calrecycle.ca.gov/docs/Zr/BevContainer/Notices/2016/2017PrmRate.pdf)
B. Processors pay certified curbside programs and drop-off programs three fourths of one percent of the CRV. See California Public Resources Code, Division 12.1, 14573.5.
C. CRV per pound (A) plus administrative fees per pound (B).
D. Adjusted CRV revenue per pound (column C) multiplied by 2000.
F. Curbside supplemental payments totaling $15 million annually are made to curbside and drop-off operators according to volume (2.2 billion tons collected). The per ton amounts shown here were derived by dividing $15 million by the number of containers collected from each source and container type.
G. Summary of other state revenues: columns D, E, F, and G.
H. Total state revenue per ton: adjusted CRV revenue (column D) plus subtotal, other state revenue (column G).
J. Sum of adjusted CRV revenue per ton (column D) and Subtotal, other state revenue per ton (column G), and Average scrap value per ton (I).
L. Gross revenue per ton recycled (column J) minus gross cost per ton recycled (column K).
M. Profit per ton (column L) divided by gross cost per ton (column K).
N. Includes bis-metal cans and other plastic resin types. Data source: personal communication with Mark Oldfield, Deputy Director, CalRecycle Public Affairs Office, January 15, 2019.
O. Tons of containers recycled through curbside and drop-off statewide (column N) multiplied by profit per ton recycled at curbside and drop-off (column L).

© Container Recycling Institute, August 2019