# Processing Fee/Handling Fee Cost Survey

## 2014 Processing Fee Final Report


California Department of Resources Recycling and Recovery

**February 28, 2014**

Contractor's Report
Produced Under Contract By:
Crowe Horwath

STATE OF CALIFORNIA

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Governor

**Matt Rodriquez**
Secretary, California Environmental Protection Agency

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Publication # DRRR-2014-1495

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*Prepared as part of contract number DRR12043.1 for $1,723,455, including other services.*

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February 28, 2014

Ms. Amy Yhnell
Department of Resources Recycling and Recovery
*(Division of Recycling, Recycling Program Operations Branch)*
801 K Street, 17th Floor
Sacramento, California 95814

Regarding: **Processing Fee Final Report**

Dear Ms. Yhnell:

On behalf of all the team members who worked on the Processing Fee and Handling Fee Cost Surveys, Crowe Horwath LLP (Crowe) is pleased to submit this Processing Fee Final Report. The Cost Survey was performed under contract by Crowe for CalRecycle.

The processing fee cost survey was a major primary-data, economic cost survey of California certified recycling centers. This survey was used to estimate California statewide, weighted–average, 2012 certified recycler costs per ton for aluminum, glass, PET #1, and HDPE #2, as well as calculate estimated costs to recycle for bi-metal and plastics #3 to #7. Recycler center costs were surveyed in 2013, using recycler center calendar year 2012 financial statements. Recycler center costs measured by this survey were used for the processing fee calculation, effective January 1, 2014.

This Processing Fee Final Report describes the tasks conducted by Crowe in completing the processing fee cost survey. The Final Report includes a description of: (1) the cost survey methodology, (2) cost per ton calculations and results, (3) processing fee and processing payment calculations.

The Crowe team appreciates the opportunity to conduct this major economic cost survey for CalRecycle. Formulating processing fees is a large cost–accounting and statistical challenge, rivaling the technical requirements of state-of-the-art, activity-based costing techniques and statistical survey methodologies, used by private industry.

A project of this magnitude requires a high degree of communication and collaboration by all involved. We wish to thank CalRecycle management and staff for their support throughout this entire project. If you have any questions concerning this draft report, please feel free to contact either myself, or Ms. Wendy Pratt, at (916) 492-5173, in Sacramento.

Very truly yours,

Edward R. Kaempf

Edward R. Kaempf
Director

# Table of Contents

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CalRecycle

# Executive Summary

# Executive Summary

The processing fee and handling fee cost surveys were performed under contract by Crowe Horwath LLP, for the California Department of Resources Recycling and Recovery (CalRecycle). This Processing Fee Final Report provides estimates of the cost per ton to recycle aluminum, bi-metal, glass, and plastic (for seven different resin types) beverage containers. This report also summarizes tasks that Crowe, and their subcontractors, conducted in order to obtain the final, statewide, weighted-average, processing fee recycler costs per ton.

This executive summary is organized as follows:

A. Processing Fee Cost Survey Background
B. Processing Fee Cost Survey Results
C. Processing Fee Cost Survey Tasks
D. Processing Payments and Processing Fees

## A. Processing Fee Cost Survey Background

In 1986, the Legislature enacted the California Beverage Container Recycling and Litter Reduction Act (AB 2020). This “bottle bill” program is the only one of its kind in the nation in terms of this unique program structure.

A major subprogram within AB 2020 is processing fees on beverage manufacturers, which are paid to recyclers as processing payments to help cover costs of recycling. Processing fees are arguably one of the more complex aspects of AB 2020.

Most recyclers in the AB 2020 program are required to redeem all beverage container material types. Scrap values of glass, plastics, and bi-metal are not sufficient to cover their cost of recycling. These non-aluminum beverage container recycling costs are subsidized by paying recyclers a processing payment. The cost to recycle beverage containers is determined by a processing fee cost survey.

Public Resource Code Section 14575 directs CalRecycle to calculate processing payments and fees. Processing payments are defined as the difference between the statewide, weighted-average cost of recycling a beverage container material in the AB 2020 program, including a reasonable financial return, and the scrap value for the material. The processing fee is imposed on beverage manufacturers, and along with supplemental funds from unredeemed containers, these two sources of funds are used to derive processing payments to recyclers.

If an AB 2020 material scrap value is high enough to cover recycling costs, including a reasonable financial return, no processing fee is imposed. If a material scrap value is less than the statewide, weighted-average recycling costs, including a reasonable financial return, then a processing fee is supposed to make up this difference, or net cost.

The 2012 processing fee cost survey documented in this report was used to estimate California statewide, weighted-average, 2012 certified recycler costs per ton, for four (4) beverage container material types, and the percent change in HDPE #2 cost per ton between 2010 and 2012. Recycler center costs were surveyed and analyzed in 2013 (mid-April through mid-November), using recycler center calendar year 2012 financial statements. Recycler center costs measured by this survey were used for the processing fee calculation, effective Jan. 1, 2014.

This overall 2012 processing fee cost survey was larger than the previous processing fee cost surveys (151 unique sites for 2012 versus 129 unique sites for 2010). Also, for the majority materials (aluminum, glass, and PET #1) and for HDPE #2, this 2012 survey was larger than the prior 2002, 2004, 2006, and 2008 cost surveys. The Crowe team completed 151 recycler cost surveys during twenty-four (24) weeks (April 25, 2013, to Oct. 11, 2013) of field work to obtain these cost survey results.

This processing fee cost survey consisted of one stratified random sample. This processing fee cost survey was consistent with prior cost surveys in terms of quantitative information obtained for each recycling site. Finally, this cost survey generally was the most accurate cost survey undertaken to-date by CalRecycle, and previously by the Department of Conservation, exceeding the already high levels of accuracy obtained in previous processing fee cost surveys.

## B. Processing Fee Cost Survey Results

The statewide recycler costs per ton for the 10 material types in the beverage container recycling program are presented in **Table ES-1,** below. Table 1 compares 2012 costs per ton to 2010, 2008, 2006, 2004, and 2002 costs per ton, the five most recent, prior cost surveys in which CalRecycle and Department of Conservation measured recycler costs. **Table ES-2,** on the next page, provides the two-year percent change in cost per ton between cost surveys.

As compared to 2010 costs per ton, the 2012 costs per ton for aluminum increased 14 percent, glass increased 3 percent, and PET #1 increased 5 percent. As compared to 2010 recycling volumes, the 2012 recycling volumes for aluminum increased 4 percent, glass increased 6 percent, and PET #1 increased 15 percent.

The increase in aluminum cost per ton was the largest percent increase in the cost per ton of aluminum over the last five prior cost surveys. The 2012 aluminum cost per ton is the highest ever estimated aluminum recycling cost. Among the four surveyed materials, aluminum had the smallest percentage increase in tons recycled, with a 4 percent increase in tons recycled between 2010 and 2012. Furthermore, the percent share of aluminum tons recycled declined to its lowest level over the six cost surveys. In 2012, aluminum tons made up 16.1 percent of the tonnage of CRV material recycled by processing fee recyclers, as compared to a high of 21.4 percent in 2002. The historical trend of PET #1 gradually taking aluminum share that had stabilized between 2008 and 2010 appears to have returned in 2012.

**Table ES-1**
**Statewide Recycler Costs per Ton, by Material Type**
**(2012, 2010, 2008, 2006, 2004, and 2002)**

| | Material Type | 2012 Statewide Costs per Ton | 2010 Statewide Costs per Ton | 2008 Statewide Costs per Ton | 2006 Statewide Costs per Ton | 2004 Statewide Costs per Ton | 2002 Statewide Costs per Ton |
|---|---|---|---|---|---|---|---|
| 1 | Aluminum | **$609.81** | $537.06 | $559.23 | $516.13 | $465.90 | $418.95 |
| 2 | Glass | **92.88** | 89.76 | 81.60 | 94.98 | 82.45 | 79.81 |
| 3 | PET #1 | **462.79** | 440.61 | 426.76 | 477.73 | 493.31 | 479.63 |
| 4 | HDPE #2 | **612.50** | 611.62 | 501.67 | 500.64 | 671.73 | 645.91 |
| 5 | Bi-Metal | **771.88** | 770.80 | 632.22 | 883.55 | 607.03 | 508.18 |
| 6 | PVC #3 | **963.49** | 962.14 | 789.16 | 731.37 | 1,583.72 | 1,064.52 |
| 7 | LDPE #4 | **1,374.50** | 1,372.58 | 1,125.80 | 1,858.09 | 1,889.50 | 3,324.89 |
| 8 | PP #5 | **1,233.10** | 1,231.38 | 1,009.99 | 787.83 | 809.42 | 1,478.77 |
| 9 | PS #6 | **763.80** | 762.73 | 625.60 | 623.11 | 3,051.82 | 6,137.30 |
| 10 | Other #7 | **836.86** | 835.69 | 685.44 | 741.93 | 1,264.47 | 759.32 |

**Table ES-2**
**Percent Change in Statewide Recycler Cost per Ton, by Material Type**
**(2012, 2010, 2008, 2006, 2004, and 2002)**

| Material Type | | Two Year Percentage Change (2010 to 2012) | Two Year Percentage Change (2008 to 2010) | Two Year Percentage Change (2006 to 2008) | Two Year Percentage Change (2004 to 2006) | Two Year Percentage Change (2002 to 2004) |
|---|---|---|---|---|---|---|
| 1 | Aluminum | **+14%** | -4% | +8% | +11% | +11% |
| 2 | Glass | **+3%** | +10% | -14% | +15% | +3% |
| 3 | PET #1 | **+5%** | +3% | -11% | -3% | +3% |
| 4 | HDPE #2 | **0%** [a] | +22% [a] | 0% | -25% | +4% |
| 5 | Bi-Metal | 0% | +22% | -28% | +46% | +19% |
| 6 | PVC #3 | 0% | +22% | +8% | -54% | +49% |
| 7 | LDPE #4 | 0% | +22% | -39% | -2% | -43% |
| 8 | PP #5 | 0% | +22% | +28% | -3% | -45% |
| 9 | PS #6 | 0% | +22% | 0% | -80% | -50% |
| 10 | Other #7 | 0% | +22% | -8% | -41% | +67% |

[a] The 0% percentage change from 2010 to 2012, and the 22% percentage change from 2008 to 2010 are rounded. Between 2010 and 2012, the actual HDPE percent change, which was used to calculate bi-metal and plastics #3 to #7 cost per ton, was 0.14%. Between 2008 and 2010, the actual HDPE percent change for the same calculation was 21.92%.

The glass cost per ton to recycle increased 3 percent from 2010 to 2012. This 2012 cost increase is lower than the significant 10 percent cost increase between 2008 and 2010. Glass volumes increased 6 percent between 2010 and 2012, following the general increase in glass volumes since 2002. Glass cost per ton, now at $92.88, is close to what it was in 2006 ($94.98 per ton), but higher than it was in 2008 and 2010. Glass costs per ton continue to be relatively stable, in the approximately $80 to $95 per ton range. Similar to aluminum, in 2012 glass made up its lowest historical percent share of CRV material recycled. In 2012, glass made up 60.9 percent of tons of CRV material recycled, compared to a high of 67.8 percent in 2002.

The 5 percent increase in the cost per ton to recycle PET #1 still results in the third-lowest PET #1 cost per ton since 2002. For PET #1, the costs per ton have generally fluctuated year to year within a relatively narrow band ($425 to $495 per ton). The 5 percent increase in PET #1 cost per ton is slightly larger, on a percentage basis, than any prior increase. However, the cost per ton to recycle PET #1, at $462.79, is still in the mid-range of its historical costs.

The historical trend of increasing PET #1 recycling volumes overall, and as compared to aluminum and glass, continued in 2012. This is compared to 2010, when PET #1 recycling volumes and shares appeared to be stabilizing. The 15 percent increase in tons of PET #1 recycled between 2010 and 2012 was significantly greater than the 3 percent increase between 2008 and 2010, but still far less than the 46 percent increase seen between 2002 and 2004, and again between 2006 and 2008. The share of tons of CRV material recycled continued to shift from aluminum and glass, to PET #1. PET #1 percentage of all tons of CRV material recycled increased to an all-time high of 20.4 percent. Since the 2002 cost survey, the share of PET #1 containers recycled has more than doubled, from its initial value of 9.9 percent.

Costs per ton for HDPE #2 essentially remained unchanged, a no-cost change that occurred while HDPE #2 volumes increased 12 percent. HDPE #2 is the only one of the four CRV materials for which cost per ton did not increase. The cost to recycle HDPE #2 is dependent on overall plastic recycling costs, and largely influenced by the commingled rate. The HDPE #2 commingled rate was higher in 2012 as compared to

2010 (fewer non-CRV containers), which may have contributed to a stable, rather than increasing, HDPE #2 cost per ton. The HDPE #2 cost per ton of $612.50 is well within its historical range.

This is the second processing fee cost survey that the cost per ton for bi-metal and plastics #3 to #7 was indexed to the percentage change in HDPE #2 cost per ton. Senate Bill (SB) 1357 (Statutes of 2008) provides that CalRecycle shall adjust the costs of recycling for material types that make up less than 5 percent of the total number of containers recycled by the percentage change in the most recently measured cost of recycling HDPE #2 beverage containers (even if HDPE #2 makes up less than 5 percent of total containers recycled).

In calendar year 2012, HDPE #2 made up only 1.9 percent of all beverage containers recycled. Bi-metal and plastics #3 through #7 made up between 0.0001 percent and 0.03 percent of containers recycled. Thus, while HDPE #2 recycling is minimal as compared to aluminum, glass, and PET #1, it is still substantial as compared to the other six minority material types. The cost per ton to recycle bi-metal and plastics #3 to #7 was based on the calculated 0.14 percent increase in HDPE #2 costs per ton between 2010 and 2012. Thus, for the 2012 cost per ton for each of these six minority materials (bi-metal, PVC #3, LDPE #4, PP #5, PS #6, and Other #7), cost per ton increased by calculating 1.0014 times the respective minority material cost per ton calculated in 2010.

Regulations require that the cost per ton be estimated at an 85 percent confidence interval (CI), and CalRecycle policy further specifies a 10 percent maximum error rate. For the fifth consecutive survey, the 2012 sampling plan was based on a more accurate 90 percent confidence interval, and a 10 percent error rate. In 2012, the only materials for which error rates were applicable were aluminum, glass, PET #1, and HDPE #2. In all four cases, the error rates were well below the 10 percent error rate at the 90 percent confidence level threshold. The 2012 error rates were lower than in 2010, with the exception of HDPE #2, which was slightly higher than the HDPE #2 error rate in 2010.

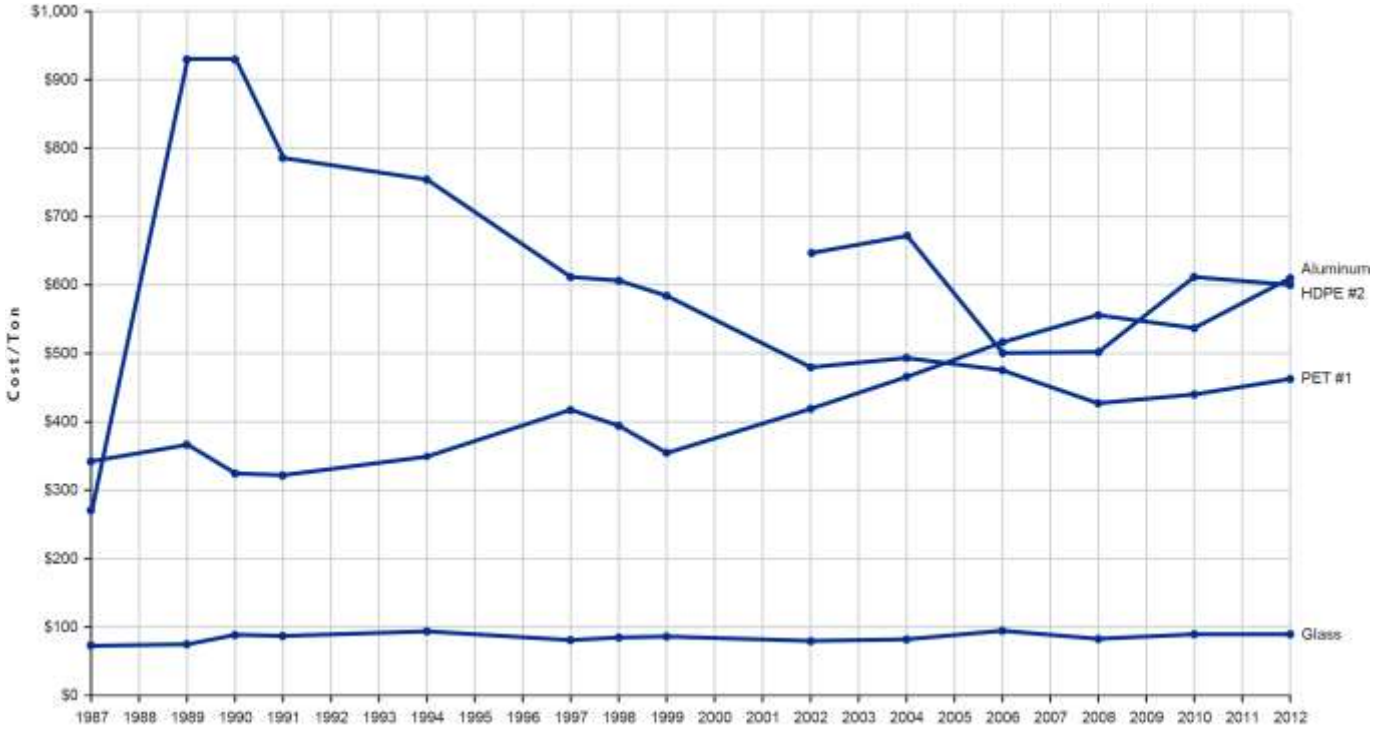
This cost survey represented the 14th time that the state determined the cost of recycling since inception of the Beverage Container Recycling Program in 1987. The historical costs per ton for aluminum, glass, PET #1, and HDPE #2 are illustrated in **Figure ES-2,** on the following page. This figure illustrates the increase in aluminum cost per ton over the six prior cost surveys; the relative stability of glass cost per ton; and relatively flattening out of what had been a significant secular decrease in PET #1 cost per ton since 1989.

## C. Processing Fee Cost Survey Tasks

Below we summarize seven of the major tasks that the Crowe team conducted for the processing fee cost survey.

- **Developed and documented the sample design framework, and randomly selected recycling centers for the cost survey.** We determined the number of recycling centers to be selected for the stratified random sample used to measure costs of aluminum, glass, PET #1, and HDPE #2 recycling. Following the sample design, Crowe randomly identified certified recycling centers selected to participate in the cost survey.
- **Updated and calibrated the Labor Allocation Cost Survey Model**. We used a 14-worksheet, Excel-based computer model to allocate recycling center costs to beverage container material types based on labor allocations. Crowe updated the cost survey model to reflect 2012 container per pound and CRV payment information, as well as procedural changes to the cost survey. In addition, we calibrated the Indirect Cost Allocation Sub-Models for Aluminum/Bi-Metal and All-Plastics with 2012 survey information. These sub-models, now incorporated into the Labor Allocation Cost Survey Model, ensure rational allocation of costs and labor to bi-metal and plastic resins HDPE #2, PVC #3, LDPE #4, PP #5, PS #6, and Other #7. While the survey no longer directly measures the cost per ton for bi-metal and plastics #3 to #7, the sub-model is still utilized to help determine aluminum, PET #1, and HDPE #2 costs per ton.

**Figure ES-2**
**Historical Costs per Ton (Without Financial Return)**
**(1987 to 2012)**




- **Updated the Cost Survey Training Manual**. The Training Manual (more than 700 pages of reference material) consisted of 16 modules, each with detailed descriptions of cost survey background information, procedures, practice exercises, and case studies. We updated the Training Manual to reflect our practical experience in conducting the 2010 cost survey, as well as procedural changes that have occurred since the Training Manual had a major revision at the beginning of the 2002 cost survey.
- **Conducted (1) a 64-hour training session for 10 new members of the cost survey team; and (2) a 24-hour refresher training session for five highly experienced returning members of the cost survey team.** This training for 15 team members, conducted in Crowe's Sacramento training facilities, included lectures, background reading, sample exercises, and practical case-study problem-solving.
- **Scheduled, conducted, and completed 151 recycling center on-site visits.** During 24 weeks between April 25, 2013, and Oct. 11, 2013, we conducted on-site visits, which were selected using the statistical sample frame developed by Crowe. Throughout the scheduling and site visits, the Crowe team built upon the field working relationships established in 2011 with the program's recyclers. These on-site working relationships were important to the success of this cost survey, and should carry over into future cost surveys. All of the cost surveys were conducted by a team of one or two auditors, including accountants and/or recycling experts. It typically took between two to four hours to complete the on-site survey. In addition to the on-site time, usually more than eight hours of additional time was required after each site visit to analyze data, and to follow-up with each recycler to obtain complete financial and labor information.
- **Developed and implemented an intensive quality control procedure.** Our quality control procedures included 13 hours, and five different levels of review (site team review, independent

manager review, CPA partner review, business analyst review, and project director review), for each site file. This review took place before the site files were released for data processing and data analysis. These quality assurance steps ensured that each site file was complete and accurate, and ensured that all results from the labor allocation model and the indirect cost allocation sub-models were accurate. In total, more than 30 hours generally were spent for each completed recycler site, including the site team and quality control hours.

- **Analyzed the primary database and determined final costs per ton by material type**. Using an automated process, Crowe extracted results from each of the 151 completed labor hour allocation cost models. Crowe developed an Excel workbook to calculate total costs by material type, total tons by material type, and costs per ton, for each of the four beverage container material types. Crowe also calculated the percent change in HDPE #2 cost per ton between 2010 and 2012, which was used to calculate the 2012 cost per ton for bi-metal and plastics #3 to #7. Calculations used one of two different methods, depending on the material and sample characteristics: (1) weighted-average by strata (aluminum, glass, PET #1, and HDPE #2), or (2) indexing the 2012 cost per ton on the percent change in HDPE #2 cost per ton between 2010 and 2012 (bi-metal and plastics #3 to #7). Using defined and documented statistical procedures, Crowe calculated error rates at a 90 percent confidence interval for the four relevant material types.

## D. Processing Payments and Processing Fees

The processing payment is defined as the difference between the statewide, weighted-average cost of recycling (as determined by this survey), multiplied by a reasonable financial return, and the average scrap value paid to recyclers. The processing payment is paid by CalRecycle to processors, who then pass the payment on to recyclers, based on the weight of material redeemed.

The processing fee, earlier in the history of the beverage recycling program, was equal to the processing payment, and was paid to the state by beverage manufacturers on every container sold. Over time, the processing fee has been modified. Currently, when funds are available in the Beverage Container Recycling Fund, the amount of processing fee paid by beverage manufacturers is reduced, based on the recycling rate of the material. The difference between the processing fee paid to CalRecycle, and the processing payment paid to recyclers, is made up with funds from the California Beverage Container Recycling Fund (Fund), essentially from CRV paid on unredeemed containers.

**Table ES-5,** below, illustrates the Jan. 1, 2014, per ton processing payments, and per container processing fees. Processing fees for all materials are higher in 2014 as compared to 2012.

**Table ES-5**
**Processing Payments and Processing Fees**
**Jan. 1, 2014**[a]

| Material | Processing Payment (per Ton) | Processing Fee (per Container) |
|---|---|---|
| 1. Aluminum | None | None |
| 2. Glass | $94.72 | $0.00182 |
| 3. PET #1 | 117.26 | 0.00016 |
| 4. HDPE #2 | 317.56 | 0.00215 |
| 5. PVC #3 | 1,066.50 | 0.03895 |
| 6. LDPE #4 | 1,263.96 | 0.01017 |
| 7. PP #5 | 1,219.73 | 0.04505 |
| 8. PS #6 | 772.55 | 0.00223 |
| 9. Other #7 | 852.64 | 0.08660 |
| 10. Bi-Metal | 801.93 | 0.03671 |

[a] Jan. 1, 2014, processing payments for all other materials (glass, bi-metal, and plastics #2 to #7) increased between 2010 and 2012. Processing fees are paid by beverage manufacturers on each beverage container sold. Processing fees for all materials are higher in 2014 as compared to 2012.


CalRecycle

Section 1

# Processing Fee Cost Survey Methodologies

# 1. Processing Fee Cost Survey Methodologies

This section describes the cost survey methodologies, from establishing the survey sample frame, to the quality control procedures, and all the supporting tasks in between. There are nine key tasks described in this section:

A. Survey Design
B. Survey Scheduling, Logistics, and Confidentiality
C. Training Manual Updates
D. Surveyor Training
E. Cost Model Updates
F. Calibration of the Indirect Cost Allocation Sub-Models
G. Site and Survey Tracking
H. Cost Survey Procedures
I. Quality Control and Confidentiality Procedures.

## A. Survey Design

Crowe Horwath LLP (Crowe) personnel, for the fifth time, developed the survey design for the cost survey. Crowe generally utilized the survey design methodology that we developed for the previous cost survey.

The purpose of the survey design was to identify the specific recycling centers surveyed during 2013, to estimate California, statewide weighted-average, 2012 certified recycler center costs per ton, for four beverage container material types. Recycler center costs were surveyed in 2013, using recycler center calendar year 2012 financial statements. Recycler center costs measured by the cost survey were used for the processing payment and processing fee calculations, effective Jan. 1, 2014.

The population of recycling centers eligible for the cost survey was defined as all recycling centers: (1) not receiving handling fees between January 2012 and December 2012, (2) certified and operational on or before March 1, 2012, (3) reported redemption volume between January 2012 and December 2012, and (4) not subsidized by the Department of Rehabilitation. There were 1,032 recycling centers in this total traditional recycling center population.

For the current 2012 cost survey, a significant change was made in adjusting the population and the sample for RCs being investigated by CalRecycle. For this current cost survey, CalRecycle provided Crowe a list of all RCs being investigated, prior to Crowe determining the required sample size and selecting the sample of RCs. Based on our discussions with CalRecycle, for the current survey, we removed all 269 RCs being investigated from the full population, creating a “reduced” population of 763 RCs not being investigated (1,032 minus 269). We used the reduced population of RCs not being investigated to determine the required sample size, to select the sample of RCs to be surveyed, and to determine statewide, weighted-average cost per ton results.

To measure calendar year 2012 costs, the survey design consisted of one key component:

- A statistically defensible, stratified random sample, drawn from the 763 qualifying recycling centers not being investigated by CalRecycle. Three strata were defined by the total annual volume (tons) of glass handled by a site. This stratified random sample was used to measure the costs of California Redemption Value (CRV) aluminum, glass, PET #1, and HDPE #2 recycling. There were 151 recyclers in this sample.

**Table 1-1**
**Stratum Definitions for Processing Fee Recyclers**
**(2012)**

| Stratum | Annual Glass Volume |
|---|---|
| 1 | Greater than, or equal to, 550 tons |
| 2 | Greater than, or equal to 150 tons, up to 549 tons |
| 3 | Less than 150 tons |

All 151 recyclers were treated equivalently in terms of scheduling, site visits, and quality control. This survey was the second consecutive survey time in recent years that the state has not determined costs per ton for all 10 beverage container material types. Senate Bill 1357 (SB 1357, Statutes of 2008) states that CalRecycle shall adjust the costs of recycling for material types that make up less than 5 percent of the total number of containers recycled by the percentage change in the most recently measured cost of recycling HDPE #2 beverage containers (even if HDPE #2 makes up less than 5 percent of total containers recycled). In calendar year 2012, HDPE #2 made up only 1.9 percent of all beverage containers recycled. Bi-Metal and plastics #3 through #7 made up between 0.0001 percent and 0.025 percent of containers recycled.

To increase precision, and confidence, in random sample results for all recycling centers, while minimizing overall sample size, the traditional recycling center reduced population was divided into three strata, based on glass volume, as shown in **Table 1-1,** above. These strata definitions were identical to the strata definitions for the previous processing fee cost survey.

Departmental regulations require that the cost per ton be estimated at an 85 percent confidence interval, and CalRecycle policy further specifies a 10 percent maximum error rate. For the fifth time, the sampling plan was based on a more accurate and statistically conventional and accepted, 90 percent confidence interval, with a 10 percent error rate.

## Sample Design Results

For the processing fee cost survey, Crowe scheduled, conducted, and completed 151 recycler site visits and cost analyses. This processing fee cost survey was larger than previous processing fee cost surveys (151 unique sites for 2012, versus 129 unique sites for 2010). This processing fee cost survey was consistent with prior cost surveys in terms of quantitative information obtained for each recycling site.

**Table 1-2,** on the next page, provides a comparison of the error rates for the relevant material types. As there were no longer samples (or a census) required for bi-metal and plastics #3 to #7, there were no error rates for any of these minority materials in 2012 and 2010. This 2012 cost survey error factor was generally better in achieving the already high level of accuracy obtained in previous processing fee cost surveys. In all cases, 2012 error rates were well below 10 percent at the 90 percent confidence level. This degree of accuracy reflects experience of the survey teams, in addition to the extensive quality control processes built into this cost survey.

**Table 1-3,** on the next page, provides the sample size and method for each of the material types. The costs per ton for the four materials – aluminum, glass, PET #1, and HDPE #2 – were calculated from a stratified random sample. Aluminum had 151 unique sites surveyed. Glass had 147 unique sites surveyed. PET #1 had 148 unique sites surveyed. HDPE #2 had the least number of unique sites surveyed, with a total of only 144 sites. The difference in number of sites surveyed between the four materials was due to the fact that not all recyclers in the sample handled all four material types.

**Table 1-2**
**Sample Error Rates for Processing Fee Recyclers**
**(2012, 2010, 2008, 2006, 2004, and 2002)**

| Material Type | | 2012 Error Rate (90% CI) | 2010 Error Rate (90% CI) | 2008 Error Rate (90% CI) | 2006 Error Rate (90% CI) | 2004 Error Rate (90% CI) | 2002 Error Rate (90% CI) |
|---|---|---|---|---|---|---|---|
| 1 | Aluminum | **5.71%** | 6.27% | 5.66% | 6.61% | 5.55% | 7.82% |
| 2 | Glass | **5.24%** | 7.52% | 6.19% | 8.17% | 7.35% | 9.21% |
| 3 | PET #1 | **5.18%** | 7.56% | 6.39% | 8.05% | 7.33% | 9.77% |
| 4 | HDPE #2 | **7.63%** | 7.33% | 8.27% | 8.97% | 7.47% | 9.78% |
| 5 | Bi-Metal | N/A | N/A | 6.89% | 8.31% | 9.83% | 7.57% |
| 6 | PVC #3 | N/A | N/A | 100% Sample | 100% Sample | 100% Sample | 100% Sample |
| 7 | LDPE #4 | N/A | N/A | 100% Sample | 100% Sample | 100% Sample | 100% Sample |
| 8 | PP #5 | N/A | N/A | 100% Sample | 100% Sample | 100% Sample | 100% Sample |
| 9 | PS #6 | N/A | N/A | 100% Sample | 100% Sample | 100% Sample | 100% Sample |
| 10 | Other #7 | N/A | N/A | 9.53% | 9.95% | 100% Sample | 100% Sample |

**Table 1-3**
**Sample Sizes and Sample Method by Applicable Material Type for Processing Fee Recyclers**
**(2012)**

| Material Type | | 2012 Sample Size | 2012 Sample Method |
|---|---|---|---|
| 1 | Aluminum | **151** | Stratified Random Sample |
| 2 | Glass | **147** | |
| 3 | PET #1 | **148** | |
| 4 | HDPE #2 | **144** | |

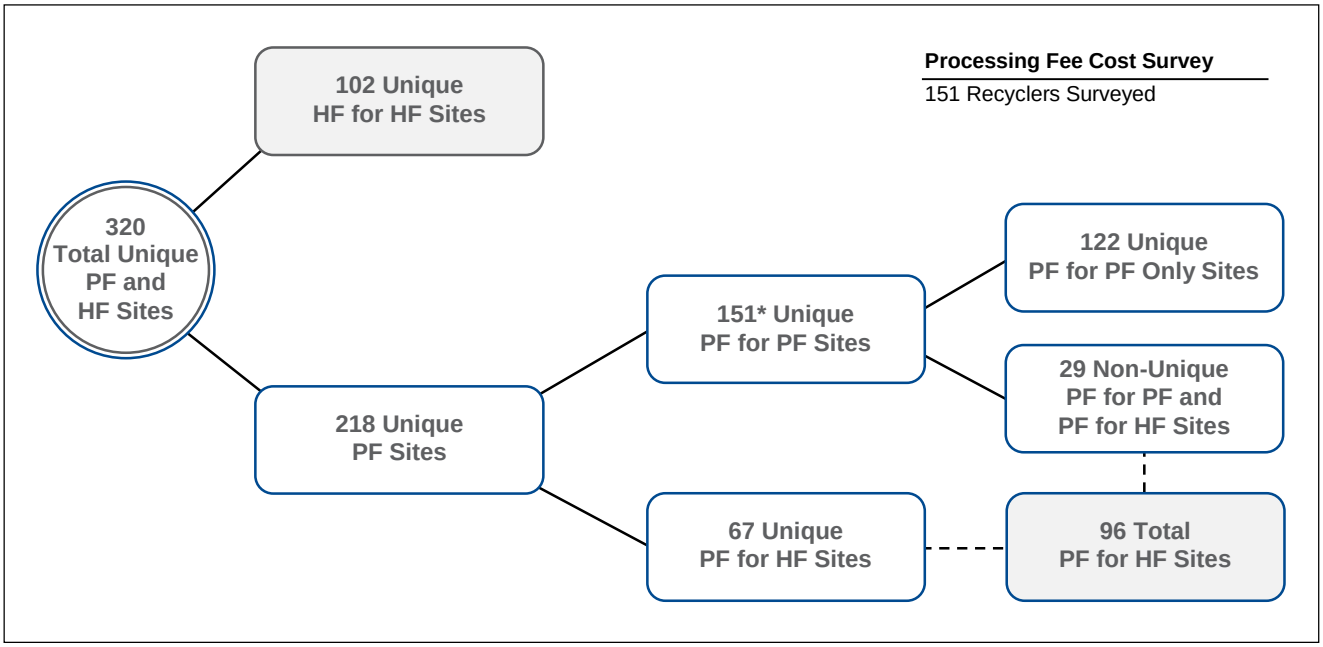
| Material Type | | 2012 Sample Size | 2012 Sample Method |
|---|---|---|---|
| 5 | Bi-Metal | N/A | None required |
| 6 | PVC #3 | N/A | None required |
| 7 | LDPE #4 | N/A | None required |
| 8 | PP #5 | N/A | None required |
| 9 | PS #6 | N/A | None required |
| 10 | Other #7 | N/A | None required |

This processing fee cost survey was part of a broader combined processing fee and handling fee cost survey that included 218 processing fee recyclers and 102 handling fee recyclers. The final 218 processing fee recyclers included 151 unique sites for the processing fee cost survey, and 67 additional unique sites surveyed for the handling fee cost survey. **Figure 1-1,** on the next page, illustrates the total number of processing fee and handling fee recyclers surveyed, and the number of recyclers in the processing fee cost survey.

## B. Survey Scheduling, Logistics, and Confidentiality

A significant component of the cost survey involved scheduling site visits and the communication interface with recyclers chosen from the sample frame. Two staff-people at Crowe were employed during the project start-up and survey months (April through December) to coordinate scheduling, and communicate with recyclers.

**Figure 1-1**
**Processing Fee and Handling Fee Cost Survey Sample (2012)**




*29 PF sites within the 151 also were within the handling fee cost survey PF for HF sites, for a total 96 (67+29) PF sites used for the cost per container calculation.

Because conducting a cost survey fundamentally entails the collection of proprietary financial information, sensitivity to stakeholder relations is essential. Without willing and active cooperation from the selected recycling center operators, determining the real costs of beverage container recycling would be exceptionally difficult, and the results would be hard to support. Our approach was to communicate with site operators and managers from the start of the process to help them understand what the cost survey entailed, what information we were seeking to obtain, and, perhaps most importantly, to correct misunderstandings about the purpose of the cost survey.

The first stage of recycler communication was a letter, on CalRecycle letterhead, informing the recycler that they were selected to participate in the processing fee cost survey. The letter also identified the expectations of the recycler, and introduced Crowe as CalRecycle's cost survey contractor. Introduction letters were sent to all selected recyclers starting in May 2013. In the second stage of communication, a Crowe scheduling coordinator established telephone contact with the recyclers to schedule site visits.

The survey team contacted the recycler directly, one or two days before the site visit, for final visit confirmation. Site visits were generally conducted by a team of two surveyors, including accountants and/or recycling experts. Each survey team included at least one member with experience on prior cost surveys. Survey teams made their own travel arrangements.

The scheduling coordinators conducted many behind the scenes tasks to ensure overall success of the project. For example, to reduce travel expenses, the coordinators utilized specialized mapping software to efficiently schedule consecutive site visits first within regions, and then within nearby locations. Scheduling coordinators also sent additional letters and emails to many recyclers to confirm site visit logistics.

The coordinators also were tasked to optimize site visit efficiency, matching the varying schedules of fifteen site survey team personnel, diverse geographic locations, and availability of the recycling centers. During any given week, up to three different survey teams were simultaneously in the field. In most cases, one site visit, with some telephone follow-up, was sufficient to obtain all the information needed to complete the survey of each site. A few sites required repeated telephone follow-up.

The coordinators also implemented and maintained a secure file transfer protocol (SFTP) site within Crowe's domain for transfer and storage of all cost survey recycling center site files. The SFTP site is a computing network protocol for accessing and managing files on remote systems, allowing our cost survey team members to securely access files in the field. Unlike standard file transfer protocol (FTP), SFTP encrypts both commands and data, preventing passwords and sensitive information from being transmitted over a network.

To ensure confidentiality of recyclers' proprietary information, every Crowe and subcontractor employee who worked on the processing fee cost survey contract signed individual Confidentiality Agreements warranting that they would not disclose any information made available by each certified recycler. Also, each company contractor – Crowe Horwath LLP (Prime Contractor); Richardson & Company (Subcontractor); Geiss Consulting (Subcontractor); Encina Advisors, LLC (Subcontractor); and Leon E. Tuttle, CPA, and Dennis Nelson, CPA (Disabled Veteran Business Enterprise Subcontractors) – also signed company Confidentiality Agreements.

## C. Training Manual Updates

The first Processing Fee Cost Survey Training Participant Manual was prepared by NewPoint Group in 1995 to support the cost survey training provided to Division of Recycling (DOR) staff. This manual contained hundreds of example case studies, problem sets, quizzes, sample financial documents, handouts, reading assignments, and procedures to develop skills needed to conduct successful processing fee cost surveys.

Because the training manual was originally prepared in 1995, it required extensive revisions and adjustments, which were made prior to the 2002 cost survey. For the current cost survey, Crowe reviewed the training modules, and when appropriate, revised work assignments needed to support the in-classroom and self-study training modules.

The updated training manual consisted of three volumes:

- Participant Manual, Volume 1 (the primary training manual, approximately 700 pages in length)
- Supplemental Materials Manual, Volume 2 (background reading and support materials)
- Field Manual, Volume 3 (a summary version of the site visit procedures).

After completion of the training program, Crowe made further revisions to the three training manual volumes, to reflect actual classroom experience, discussions, and questions. The training manuals, which have been provided to CalRecycle as one of the project hard copy reports, reflect these updates.

## D. Surveyor Training

Successfully completing the processing fee cost survey site visits required knowledge of recycling, recycling practices, the beverage container recycling program, the specific procedures of site visits, auditing, and financial cost-accounting. The Crowe-trained surveyor team consisted primarily of accountants and recycling experts.

Five of the 15 individuals who conducted site visits for this survey had previous experience in the 2002, 2004, 2006, 2008, and/or 2010 processing fee cost surveys, had completed the full 64-hour training

session, and in some cases also completed a 24-hour refresher training in prior years. These surveyors already had extensive experience in auditing and financial accounting procedures, as well as practical site-visit and recycling program experience. These five returning team members still completed another 24-hour refresher course in 2013. The 10 new survey team members completed the full 64-hour training program in 2013.

Classroom training consisted of 60 hours of in-class lectures, reading materials, study exercises, and problem solving. In 2013, for the third time, we included an additional four hours of field training, as part of the 64 total hours of training. The classroom training was held at the Crowe offices, and all training was conducted over a two-week period, during the last half of April 2013.

The field training consisted of a four-hour field trip to a Sacramento-area recycling center to tour the site and conduct the site survey. The field trip was held on the seventh day of the eight-day training, and consisted of the actual site-visit component of a cost survey at a recycling center that had been randomly selected for the cost survey. An experienced Crowe team member conducted the cost survey, with the training class observing and asking questions. This field training provided new team members with valuable on-site experience prior to their first site visits, and provided a refresher for those that had previously conducted site visits.

For the classroom component of the training, Crowe prepared and presented a PowerPoint slide presentation for each of 16 modules in the Training Manual. About 40 percent of the 60 hours of training was spent in lecture, 20 percent for in-class study, and 40 percent on study exercises, problem-solving, and discussion. A significant segment of both the full and refresher training sessions were spent reviewing actual site files from the 2010 cost survey. This review allowed team members to better understand the many variations of financial information and other complicating issues they would likely face in the field. The training session included extensive role-playing interviews, as well as a graded final exam for all participants. The classroom training was led by an experienced Crowe Director, with support from CalRecycle staff and Crowe CPAs.

## E. Cost Model Updates

The labor allocation cost model (cost model) is a Microsoft Excel workbook consisting of 14 worksheets. The model was first developed by NewPoint Group to improve the methodology of the 1995 cost surveys. Since that time, it has been updated and revised to accommodate legislative and regulatory changes, as well as upgrades of Excel. In 2000, NewPoint Group and the DOR conducted a significant model revision to add plastic resins #2 to #7 to the model, and to upgrade to Excel 1997, which replaced old Excel macros with Visual Basic programming.

The current version of the cost model represents several legacy generations (and layers) of modifications and updates, including a significant number of improvements that were made immediately following the 2002, 2004, 2006, 2008, and 2010 cost surveys. Prior to conducting the current cost survey, Crowe reviewed and updated the cost model to reflect 2012 container per pound and CRV payment information, as well as procedural changes to the cost survey.

## F. Calibration of the Indirect Cost Allocation Sub-Models

As a result of the introduction of new containers to the Beverage Container Recycling Program in 2000, the 2002, 2004, 2006, and 2008 cost surveys included calculating cost per ton for 10 different material types: six plastic resins, in addition to PET #1, glass, aluminum, and bi-metal. A key task of the 2002 cost survey project was to develop a costing methodology for plastics #2 to #7 and bi-metal. For this 2012 cost survey, we still applied this same indirect cost allocation sub-model procedure to determine costs per ton for the minority material types that was developed in 2002, and used again in 2004, 2006, 2008, and 2010.

While the 2010 and 2012 surveys no longer directly measured the cost per ton for bi-metal and plastics #3 to #7, the sub-model was still utilized to help determine aluminum, PET #1, and HDPE #2 costs per ton.

The purpose of the two sub-models, the Indirect Cost Allocation Sub-Model for All Plastics, and the Indirect Cost Allocation Sub-Model for Aluminum/Bi-Metal, was to separate the individual majority and minority material costs from the larger indirect cost categories: all plastics and aluminum/bi-metal. Using operational and material handling factors, the sub-models provide a consistent, site-specific, and sub-material specific approach, for determining the costs per ton for both the high-volume majority materials, and low-volume minority materials.

Four operational/material handling factors (weight of containers, number of containers, volume/size of containers, and commingled rate), along with a weighting allocation across these factors, formed the basis of the indirect cost allocation sub-models for the two majority, and seven minority, materials (glass does not require a sub-model). The sub-models were integrated into the Labor Allocation Cost Model for each site.

## G. Site and Survey Tracking

For this cost survey, Crowe developed and utilized a reporting system, which included a row of descriptive information on each of the 320 surveyed, and 18 dropped, processing fee and handling fee recycling sites. Information in the reporting system included: RC and PR numbers; recycler name; county; recycler type; recycler sample(s) and strata; site survey team members; and entry dates and initials for each of nine stages of the survey process, from mailing the initial letter, to scheduling, to final review approval.

At any point in time during the surveys, the Crowe business analyst could quickly identify how many sites were in each of nine status completion states, and where each individual site was in the site completion process. Crowe also utilized the site status reporting system to help prepare monthly progress reports for CalRecycle.

## H. Cost Survey Procedures

There were three phases of an individual cost survey:

- **Pre-site visit** – model population, data review, and travel logistics
- **On-site visit** – site tour, cost survey, and labor interviews
- **Post-site visit** - data entry, analysis, and follow-up.

### Pre-Site Visit

Before conducting the on-site cost survey, the survey team obtained all available information about that site. Crowe entered recycling volumes for 2012 into the cost model Excel file for each site. The survey team evaluated the beverage container tons information to identify the approximate size and scope of the survey. Much of the pre-site visit time was spent on travel logistics and mapping.

### On-Site Visit

Each site visit typically lasted from two to four hours, depending on the size and complexity of the site. The primary data-gathering effort took place during the site visit. Survey teams carefully followed procedures outlined in the Training Manual. The survey team first toured the site with site management to view and inquire about the site's operations, such as materials handled, equipment, recycling procedures, and material shipping.

Another key on-site task was reviewing the financial information with site management, or a financial officer, to identify and categorize allowable and non-allowable costs for calculating processing fees, direct and indirect costs, and beverage container indirect (BCI) and all materials indirect (AMI) costs.

The next key task was conducting structured labor allocation interviews to determine the allocation of each employee's time first to recycler, processor, or other business, then to direct yard labor or all other labor, and finally by CRV material type or other non-CRV material type. The cost model used this labor allocation information to allocate indirect costs and wages.

### Post-Site Visit

After the site visit, the survey team spent from four to 10 or more hours further compiling the site data, entering information into the cost model, completing the Site Memorandum and site file, and reviewing the site file. In many cases, site managers did not have all the necessary information available at the site visit, and the survey team had to telephone the recycler to request additional information, or to ask specific questions about the data.

Following the site visit, the team entered the labor information for each employee, as well as the cost summary and direct cost information, into the cost model. Once the data were entered into the cost model, the model calculated costs per ton for each of the CRV material categories recycled at the site. Finally, the survey team compiled and checked all work papers, and conducted a reasonableness check of survey results before passing the site file on to a manager for the first of several independent office review steps.

## I. Quality Control and Confidentiality Procedures

Data quality control (QC) was a primary focus of the cost survey project. Quality control procedures included five separate levels of review, and totaled on-average 13 hours per site. These data QC procedures were essential to ensure that the cost survey results were fair, equitable, accurate, reasonable, justifiable, and defensible.

This extensive quality control process, with five different individuals or staff teams, determined that each site file was complete and accurate. Site files that did not meet all the quality control criteria were returned to the original survey team for corrections, if appropriate. Crowe approved data for the final cost per ton calculations described in Section 2 after this extensive series of quality control reviews was complete.

Confidentiality was important for the cost survey. The data from each recycling site were not to be disclosed, as release of the data could potentially be compromising to a recycling business. As a result, Crowe developed formal policies regarding confidentiality. Each project team member signed an Employee Confidentiality statement, and in addition, each project team firm signed a similar statement. Records from each site were maintained securely at the Crowe offices after they were completed, and financial printouts and worksheet drafts with site-specific information were shredded. The final site files were delivered to CalRecycle for their secure record retention. Computers were protected against unauthorized access through use of security software that requires a password to use our laptops. All electronic files related to site visits were stored on a secure file transfer protocol (SFTP) site within Crowe's domain, accessible by password only, to survey team members.


CalRecycle

Section 2

# Processing Fee Cost Calculations and Results

# 2. Processing Fee Cost Calculations and Results

This section describes the calculations used, and the final results for, the statewide, weighted-average cost per ton for recycling each of the ten beverage container material types in the California Beverage Container Recycling program. This section is organized as follows:

A. Cost Calculations
B. Cost Results
C. Comparison of Cost Results.

## A. Cost Calculations

The statewide statistical methodology (stratified weighted-average cost) used for the cost per ton calculations for aluminum, glass, PET #1, and HDPE #2 was pre-determined by sample design.[1] For this 2012 processing fee cost survey, Crowe Horwath LLP (Crowe) utilized only one type of sample design, a stratified random sample based on tons of glass recycled.

For the stratified random sample, Crowe used a weighted-average by strata calculation to determine cost per ton. We calculated the cost per ton for the remaining six material types (bi-metal and plastics #3 to #7) based on the percent change in HDPE #2 costs per ton between the 2010 and 2012 cost surveys. **Figure 2-1,** on the next page, illustrates the two calculation approaches we used for determining processing fee recycler costs per ton for 10 beverage container material types.

### Approach A: Aluminum, Glass, PET #1, and HDPE #2

Most recyclers in the total population accept and recycle these four material types.[2] As a result, for these materials, we used a weighted (by stratum) average statewide cost per ton. There were 151 recyclers in the random sample, divided into three strata. Within each of the three sample strata, we determined the total sample costs and the total sample tons. CalRecycle provided the 2012 tons data for both the sample and population. The next step was to calculate the average cost per ton by stratum, equal to the sample stratum cost divided by the sample stratum tons. Next, we multiplied this figure by the stratum population tons, to determine the total population[3] costs for each stratum, for each material type. Finally, we determined the statewide, weighted-average cost per ton by summing the three strata total population costs, then dividing by the total population tons. The approach is illustrated in Figure 2-1A. **Figure 2-2,** on page 2-3, provides an example of the actual step-by-step calculation for glass cost per ton.

### Approach B: Bi-Metal and Plastics #3 to #7

This 2012 cost survey was the second time since 2002 (the first was the 2010 cost survey) that the state did not calculate material-specific costs per ton for bi-metal and plastics #3 to #7. Senate Bill 1357 (SB 1357, Statutes of 2008) states that CalRecycle shall adjust the costs of recycling for material types that make up less than 5 percent of the total number of containers recycled by the percentage change in the most recently measured cost of recycling HDPE #2 beverage containers (even if HDPE #2 makes up less than five percent of total containers recycled). Thus, the cost per ton to recycle bi-metal and plastics

[1] The Beverage Container Recycling Act specifies that cost per ton calculations be based on a statewide, weighted-average. The Act eliminated the calculation of a simple average (taking the average of each site, and dividing by the total number of sites).

[2] Somewhat fewer recyclers accept HDPE #2, but the number of HDPE #2 recyclers is still quite large, although the tons are significantly less than for the other three materials, aluminum, glass, and PET #1.

[3] For purposes of calculating the statewide, weighted-average cost per ton, the "total population" is equal to the reduced population, with investigated sites removed.

#3 to #7 was based on the calculated 0.14 percent change in HDPE #2 costs per ton between 2010 and 2012. For the 2012 cost per ton for each of these six minority materials (bi-metal, PVC #3, LDPE #4, PP #5, PS #6, and Other #7), cost per ton increased by calculating 1.0014 times the respective minority material cost per ton measured in 2010. The approach is illustrated in Figure 2-1B.

## Financial Return

By statute, recycling costs per ton used to determine the processing fees and payments are to include a reasonable financial return. CalRecycle regulations require that the financial return figure, which is multiplied by the cost per ton, is the "average return on costs for the Scrap and Waste Materials Industry (SIC 5093), as determined from data contained in the most recent Dun and Bradstreet Standard Three Year Norm Report" (California Code of Regulations, §2975).

**Figure 2-1**
**Cost per Ton Calculations for Processing Fee Recyclers**
**(2012)**

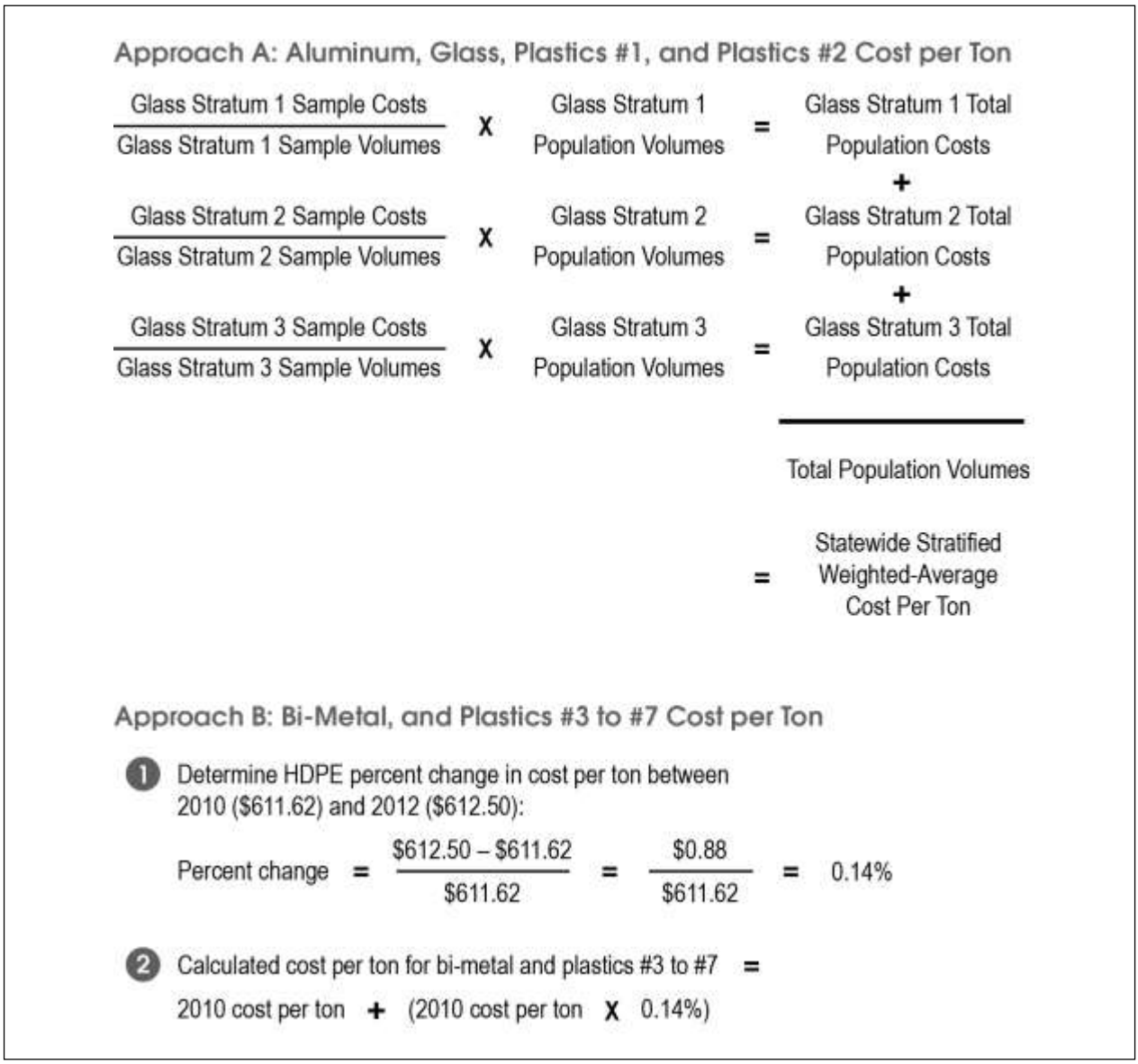
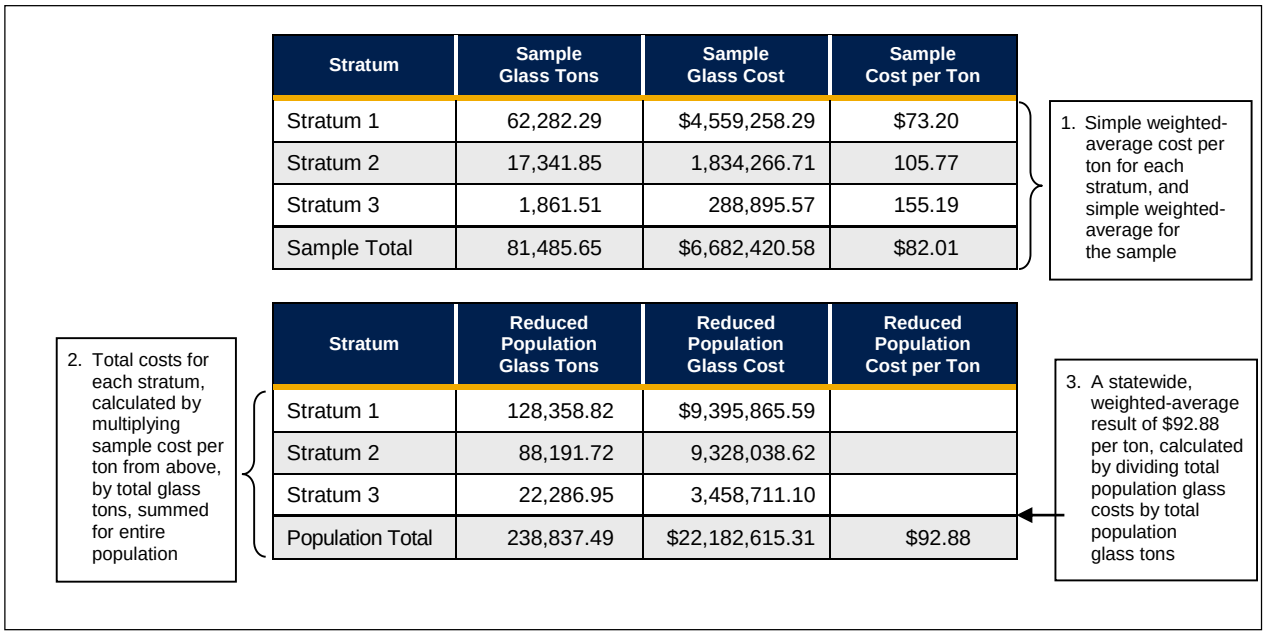


**Figure 2-2**
**Weighted-Average by Strata Calculation Example for Processing Fee Recycler Glass Cost per Ton**
**(2012)**




The reasonable financial return (RFR) used for this cost survey was 4.1 percent, based on an average (median) return on costs for SIC 5093 in 2012, as determined by Dun & Bradstreet. This RFR is slightly higher than the RFRs of the past two years (3.94 percent in 2012 and 3.12 percent in 2013).

The cost to recycle used to determine processing fees and processing payments for Jan. 1, 2014 also included a cost of living adjustment (COLA) of 1.2 percent. This was the first time that CalRecycle has utilized a COLA in the cost of recycling calculation. The addition of a COLA was a mechanism to account for the fact that the 2012 cost data was already over a year old when the processing fees and processing payments went into effect on Jan. 1, 2014.

## B. Cost Results

The costs per ton to recycle for each of the 10 material types, with, and without the reasonable financial return, are summarized in **Table 2-1,** on the next page. Table 2-1 also shows the 2012 survey sample size for each of the four relevant material types.

**Table 2-2,** on the next page, provides the costs per ton (without financial return) in rank order. The costs per ton fall into six general cost ranges. Glass has the lowest cost, less than $100 per ton. PET #1 is alone in the $400 range. Aluminum and HDPE #2 costs are in the next range of above $600 per ton. Three of the minority materials, PS #6, bi-metal, and Other #7, are in the next cost range, $700 to $800 per ton. PVC #3 is in its own cost range, above $900 per ton. Finally, PP #5 and LDPE #4 are in the highest cost range, at more than $1,200 per ton.

**Table 2-1**
**Statewide Costs per Ton to Recycle for Processing Fee Recyclers**
**(2012)**

| Material | Cost per Ton without Financial Return | Cost per Ton with Financial Return and COLA[a] | N Sample Number of Sites[b] |
|---|---|---|---|
| 1. Aluminum | $609.81 | $642.43 | 151 |
| 2. Glass | 92.88 | 97.85 | 147 |
| 3. PET #1 | 462.79 | 487.55 | 148 |
| 4. HDPE #2 | 612.50 | 645.26 | 144 |
| 5. Bi-Metal | 771.88 | 813.17 | NA |
| 6. PVC #3 | 963.49 | 1,015.03 | NA |
| 7. LDPE #4 | 1,374.50 | 1,448.02 | NA |
| 8. PP #5 | 1,233.10 | 1,299.06 | NA |
| 9. PS #6 | 763.80 | 804.66 | NA |
| 10. Other #7 | 836.86 | 881.63 | NA |

[a] The reasonable financial return (RFR) is 4.1% and the COLA is 1.2%.

[b] Overall, 151 sites were completed to obtain these results. The cost per ton for bi-metal and plastics #3 to #7 was determined by the percent change in HDPE cost per ton.

**Table 2-2**
**Statewide Costs per Ton in Rank Order for Processing Fee Recyclers**
**(2012)**

| Material | Cost per Ton without Financial Return |
|---|---|
| 1. Glass | $92.88 |
| 2. PET #1 | 462.79 |
| 3. Aluminum | 609.81 |
| 4. HDPE #2 | 612.50 |
| 5. PS #6 | 763.80 |

| Material | Cost per Ton without Financial Return |
|---|---|
| 6. Bi-Metal | 771.88 |
| 7. Other #7 | 836.86 |
| 8. PVC #3 | 963.49 |
| 9. PP #5 | 1,233.10 |
| 10. LDPE #4 | 1,374.50 |

## Error Rates and Confidence Intervals for Costs per Ton

The California Beverage Container Recycling and Litter Reduction Act, §14575, requires CalRecycle to conduct “a survey of a statistically significant sample of certified recycling centers, excluding those receiving a handling fee.” In the California Code of Regulations, a “statistical sample” is defined as an estimate with an 85 percent confidence level (§2000 (a) (47)). Internal CalRecycle policy further establishes a 10 percent maximum error rate.

In developing the sample design, Crowe determined that, rather than set the sample to achieve an 85 percent confidence interval and then add oversample, it would be more statistically accurate to set the confidence interval higher, at 90 percent. Thus, the sample size was developed, based on 2002 cost survey results, to achieve a 90 percent confidence interval with a 10 percent error rate. Only after the survey was complete could we determine whether the actual specifications of a 90 percent confidence interval, and the target of a 10 percent error rate, were met.

**Table 2-3**
**Sample Error Rates for Processing Fee Recyclers, by Material Type**
**(2002, 2004, 2006, 2008, 2010, and 2012)**

| Material Type | Error Rate at 90% Confidence Interval | | | | | |
|---|---|---|---|---|---|---|
| | 2002 | 2004 | 2006 | 2008 | 2010 | 2012 |
| Aluminum | 7.82% | 5.55% | 6.61% | 5.66% | 6.27% | **5.71%** |
| Glass | 9.21 | 7.35 | 8.17 | 6.19 | 7.52 | **5.24%** |
| PET #1 | 9.77 | 7.33 | 8.05 | 6.39 | 7.56 | **5.18%** |
| HDPE #2 | 9.78 | 7.47 | 8.97 | 8.27 | 7.33 | **7.63%** |
| Other #7 | N/A | N/A | 9.95 | 9.53 | N/A | N/A |
| Bi-Metal | 7.57 | 9.83 | 8.31 | 6.89 | N/A | N/A |

The analysis of the final data shows that, for the sixth time, the processing fee cost survey met and exceeded all a priori statistical requirements (the surveys of 2002, 2004, 2006, 2008, and 2010 recycler costs also met and exceeded these requirements). In all cases the error rate at the 90 percent confidence level was below 10 percent. The error rate at the 90 percent confidence interval for each of the four relevant materials is provided in **Table 2-3,** above. For comparison, Table 2-3 also provides the error rates at the 90 percent confidence interval for each of the five (or six) relevant material types from the 2002, 2004, 2006, 2008, and 2010 processing fee cost surveys.[4]

The 2012 cost survey generally achieved a similar high degree of statistical confidence as the five previous cost surveys. This degree of accuracy reflects extensive experience of the survey team, in addition to extensive quality control processes built into this cost survey. The Crowe methodology continued to include substantial site file oversight and quality control review. Five levels of review were conducted for each site, and some site files were sent back to the original survey team for additional investigation, and often times revisions, before they were finally approved.

## C. Comparison of Cost Results

**Table 2-4,** on the next page, provides a summary comparison of the cost per ton results for the 2002, 2004, 2006, 2008, 2010, and 2012 cost surveys. Cost per ton for aluminum reversed a trend of increasing since 2002, with a slight decrease between 2008 and 2010. Cost per ton for aluminum then increased in 2012. Cost per ton for glass increased between 2002 and 2006, dropped closer to historic levels in 2008, and then increased in 2010 and again in 2012. Cost per ton for PET increased slightly between 2002 and 2004, decreased in 2006, and again in 2008, and increased slightly in both 2010 and 2012. Cost per ton for HDPE increased slightly between 2002 and 2004, dropped significantly in 2006, and was stable in 2008. In 2010, HDPE cost per ton increased closer to 2002 and 2004 levels, and remained essentially unchanged in 2012.

[4] The bi-metal error rate at the 90 percent confidence interval is slightly higher in 2004, as compared to 2002. However, for the first time, the 2004 bi-metal sample was a statistically valid random sample drawn specifically for bi-metal, as opposed to the "hybrid" sample of available sites that was used in 2002 to determine bi-metal costs per ton. In 2004, 2006, and 2008, the bi-metal sample has consisted of a statistically valid random sample drawn specifically for bi-metal. The 2006 cost survey was the first time that we utilized a random sample (rather than a census) for Other #7, and thus the first time that we calculated error rates for this plastic resin. We again utilized a random sample for Other #7 in this 2008 cost survey. For the 2010 and 2012 cost surveys, costs per ton for plastics #3 to #7 and bi-metal were based on the percent change in HDPE #2 cost per ton between the prior processing fee cost survey (in this case, 2010) and the current cost survey (in this case, 2012).

**Table 2-4**
**Summary Comparison of Cost Survey Results for Processing Fee Recyclers**
**(2002, 2004, 2006, 2008, 2010, and 2012)**

| Material Type | Statewide Cost per Ton[a] | | | | | |
|---|---|---|---|---|---|---|
| | 2002 | 2004 | 2006 | 2008 | 2010 | 2012 |
| 1. Aluminum | $418.95 | $465.90 | $516.13 | $559.23 | $537.06 | $609.81 |
| 2. Glass | 79.81 | 82.45 | 94.98 | 81.60 | 89.76 | 92.88 |
| 3. PET #1 | 479.63 | 493.31 | 477.73 | 426.76 | 440.61 | 462.79 |
| 4. HDPE #2 | 645.91 | 671.73 | 500.64 | 501.67 | 611.62 | 612.50 |
| 5. Bi-Metal | 508.18 | 607.03 | 883.55 | 632.22 | 770.80 | 771.88 |
| 6. PVC #3 | 1,064.52 | 1,583.72 | 731.37 | 789.16 | 962.14 | 963.49 |
| 7. LDPE #4 | 3,324.89 | 1,889.50 | 1,858.09 | 1,125.80 | 1,372.58 | 1,374.50 |
| 8. PP #5 | 1,478.77 | 809.42 | 787.83 | 1,009.99 | 1,231.38 | 1,233.10 |
| 9. PS #6 | 6,137.30 | 3,051.82 | 623.11 | 625.60 | 762.73 | 763.80 |
| 10. Other #7 | 759.32 | 1,264.47 | 741.93 | 685.44 | 835.69 | 836.86 |

[a] Without reasonable financial return (RFR).

Recycler costs per ton for processing fees were first determined in 1987, after the passage of AB 2020. The initial cost of recycling survey for 50 recyclers represented the first time that such costs had been measured and calculated.

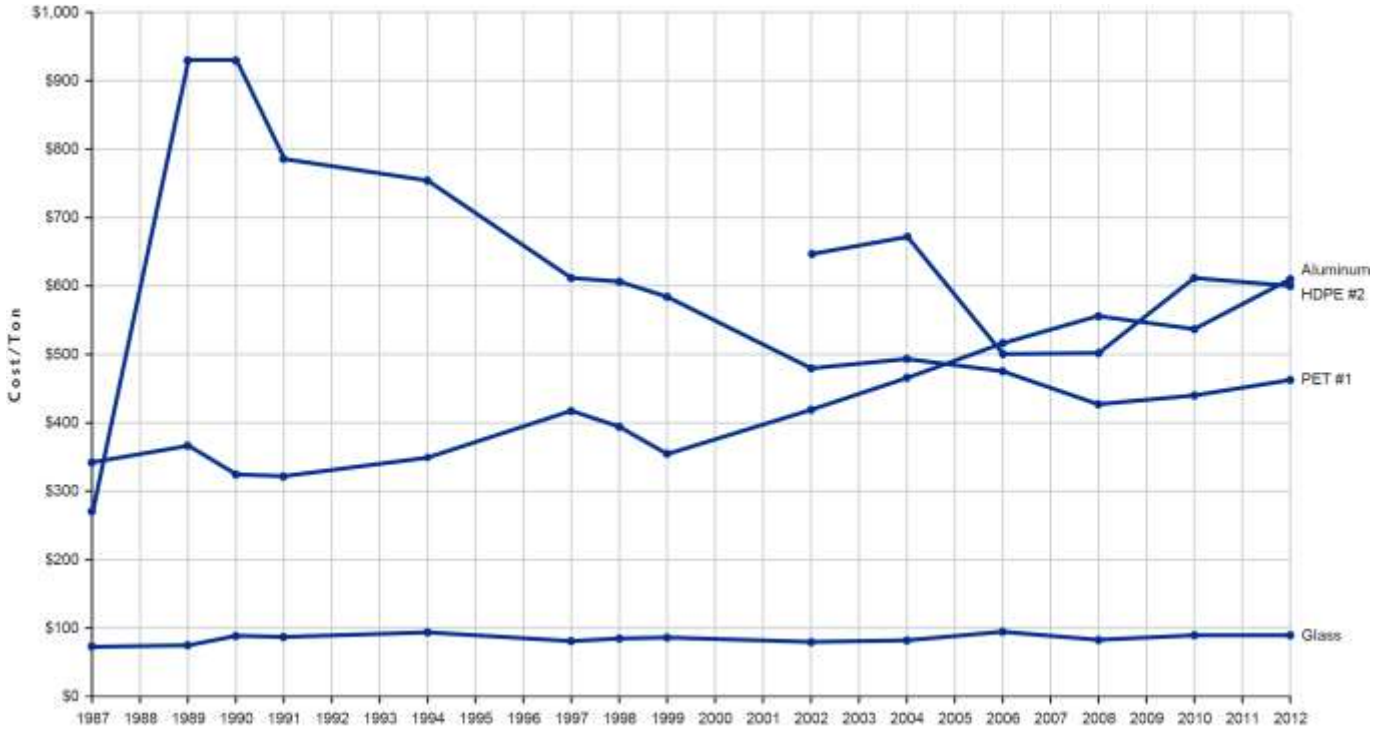
Over the last 26 years, the Department of Conservation and, since 2010, CalRecycle have developed and refined the processing fee cost survey methodology. The current high degree of accuracy of the cost survey reflects many years' experience and evolution of the cost survey process. Cost per ton results from the earliest years of the program represented far fewer recyclers, and used a much less refined costing methodology. However, even in the early years, California's cost per ton studies provided far greater detail than any other existing studies, and represented state-of-the-art research for that time.

**Figure 2-3,** on the next page, and **Table 2-5,** on page 2-8, provide the historical cost per ton results for all 14 years in which recycler cost surveys were conducted. These costs per ton reflect actual dollar values for the years in which they were determined, and thus have not been adjusted for inflation.

## Aluminum

The cost per ton to recycle aluminum stabilized in 2010, after an upward trend that began in 1999, but increased again in 2012. The 2012 cost per ton was the highest aluminum cost per ton yet recorded, at $609.81, 14 percent more than the 2010 cost per ton. This is the first time that the aluminum cost per ton was over $600. Through 2002, aluminum had fluctuated within a $100 range, from approximately $320 to $420 per ton. Since the 1999 cost survey, the cost per ton of aluminum has increased approximately $200. This significant increase has occurred during a long period of market shift from aluminum to PET #1. With this 2012 cost survey, costs to recycle aluminum increased, while market share decreased as compared to 2010.

**Figure 2-3**
**Historical Processing Fee Recycler Cost per Ton (without RFR)**
**(1987 through 2012)**




The 2012 aluminum cost per ton increased 14 percent from 2010 to 2012, the largest percent increase in cost per ton among aluminum, glass, PET #1, and HDPE #2. The aluminum cost per ton has been trending upward over time. However, the 2010 to 2012 increase was the largest percentage increase between cost surveys, to date. Data we examined from the 2010 and 2012 samples of processing fee recyclers identify several possible reasons for the increase in aluminum cost per ton: (1) declines in the relative share of aluminum tons recycled as compared to PET #1, (2) declines in overall recycling aluminum productivity, measured as the overall average aluminum tons recycled per sampled RC, and (3) increases of approximately 23 percent more labor hours recycling one ton of aluminum in 2012 than was spent in 2010.

## Glass

The cost per ton to recycle glass has been relatively stable over the 25 years of cost per ton results, varying within approximately $20 per ton. Between the 2004 and 2006 cost surveys, the cost per ton to recycle glass increased by a fairly significant 15 percent. Between the 2006 and 2008 cost surveys, the cost per ton to recycled glass decreased by 14 percent, back to approximately the 2004 cost per ton. This significant decrease in glass cost per ton to recycle was likely driven by a 24 percent glass increase in tons recycled between 2006 and 2008. Between 2008 and 2010, glass tons recycled decreased by a slight one percent, and glass recycling cost per ton increased by 10 percent to $89.76, slightly below the higher 2006 levels. Between 2010 and 2012, the glass tons recycled increased by 6 percent, and glass recycling costs per ton increased by 3 percent to $92.88, still slightly below the higher 2006 levels.

**Table 2-5**
**Historical Costs per Ton (Without Reasonable Financial Return) for Processing Fee Recyclers**
**(1987 through 2012)**

| Cost Survey Number | Year | Aluminum | Glass | PET #1 |
|---|---|---|---|---|
| 1 | 1987 | $342.09 | $72.52 | $270.29 |
| 2 | 1989 | 366.39 | 74.84 | 930.42 |
| 3 | 1990 | 324.32 | 88.69 | 930.42 |
| 4 | 1991 | 322.02 | 86.98 | 785.56 |
| 5 | 1994 | 349.07 | 93.75 | 754.16 |
| 6 | 1997 | 417.60 | 81.09 | 611.74 |
| 7 | 1998 | 394.41 | 84.85 | 606.62 |
| 8 | 1999 | 354.30 | 86.25 | 584.14 |
| 9 | 2002 | 418.95 | 79.81 | 479.63 |
| 10 | 2004 | 465.90 | 82.45 | 493.31 |
| 11 | 2006 | 516.13 | 94.98 | 477.73 |
| 12 | 2008 | 559.23 | 81.60 | 426.76 |
| 13 | 2010 | 537.06 | 89.76 | 440.61 |
| 14 | 2012 | 609.81 | 92.88 | 462.79 |

## PET #1

The cost per ton to recycle PET #1 has dropped substantially since the second cost survey in 1989. In 1987, when a cost per ton for PET #1 was determined for the first time, PET #1 recycling was not established, and the resulting cost per ton figure was extremely low compared to all the following years. For the fourth time since 1987, the 2012 PET #1 cost per ton to recycle was lower than the 2012 aluminum cost per ton to recycle.

Between 1990 and 2002, the cost per ton for PET #1 has secularly dropped each year, from more than $900 to less than $500. This large cost per ton reduction over time was likely related to improved recycling practices as PET #1 recycling has become a mainstream, established business. The historical declining PET #1 cost per ton also is likely due to significant increases in tons recycled.

After a one-time increase in the PET #1 cost per ton between 2002 and 2004, the cost per ton to recycle PET #1 decreased between 2006 and 2008, to a new all-time low of $426.76 per ton. In 2010, the cost per ton for PET #1 increased 3 percent, to $440.61. In 2012, the cost per ton for PET #1 increased 5 percent, to $462.79.

The cost per ton to recycle PET #1 appears to be stabilizing. This stabilization may be due in large part to more stable recycling tonnage. The PET #1 tons recycled by processing fee recyclers increased by between 34 percent and 46 percent between each of the four prior cost surveys. Between 2008 and 2010, PET #1 tons recycled increased by only 3 percent, while between 2010 and 2012, PET #1 tons recycled increased by 15 percent. Therefore, prior year-to-year cost savings due to greater economies of scale were diminished in 2010 and 2012.

**Table 2-6**
**Summary Comparison of Number of Surveyed Sites for Processing Fee Recyclers**
**(2002, 2004, 2006, 2008, 2010, and 2012)**

| Material Type | Number of Sites | | | | | |
|---|---|---|---|---|---|---|
| | 2002 | 2004 | 2006 | 2008 | 2010 | 2012 |
| 1. Aluminum | 136 | 117 | 123 | 116 | 129 | 151 |
| 2. Glass | 131 | 115 | 121 | 112 | 128 | 147 |
| 3. PET #1 | 132 | 115 | 122 | 115 | 129 | 148 |
| 4. HDPE #2 | 119 | 108 | 118 | 110 | 127 | 144 |
| 5. Bi-Metal | 65 | 52 | 40 | 40 | N/A | N/A |
| 6. PVC #3 | 23 | 14 | 12 | 11 | N/A | N/A |
| 7. LDPE #4 | 11 | 10 | 13 | 20 | N/A | N/A |
| 8. PP #5 | 11 | 12 | 14 | 21 | N/A | N/A |
| 9. PS #6 | 12 | 11 | 15 | 32 | N/A | N/A |
| 10. Other #7 | 49 | 67 | 40 | 40 | N/A | N/A |

## HDPE #2

This cost survey is only the sixth time that costs per ton for HDPE #2 have been measured. The cost per ton for HDPE #2 increased an insignificant 0.14 percent between 2010 and 2012, and remains closer to levels it had been in 2002 and 2004. HDPE #2 tonnage increased a minimal 1 percent between 2008 and 2010, and 12 percent between 2010 and 2012.

For 2012, HDPE #2 tons recycled are four times as high as their 2002 levels. HDPE #2 tons recycled are still much lower than tons of the other majority material types, but recent increases in HDPE #2 tonnage now is moving this former minority material to a new “sub majority” material status.

Costs per ton for bi-metal and plastics #3 to #7 were variable between 2002 and 2008. In 2010 and 2012, these costs per ton all reflected the percent change in HDPE #2 costs from the prior cost survey. For 2010, the HDPE #2 cost change was a 21.92 percent increase, and in 2012, the HDPE #2 cost change was a 0.14 percent increase.

**Table 2-6,** above, provides a summary comparison of the number of surveyed sites for each material type for the 2002, 2004, 2006, 2008, 2010, and 2012 cost surveys. The stratified random sample for this 2012 processing fee cost survey was larger than the five prior cost surveys.

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CalRecycle

Section 3

# Processing Payments and Processing Fees

# 3. Processing Payments and Processing Fees

This section describes how processing payments and processing fees are calculated; compares the 2004, 2006, 2008, 2010, 2012, and 2014 processing payments and processing fees; and examines scrap values. The section is organized as follows:

A. Processing Payment and Processing Fee Calculations
B. Scrap Values
C. Comparison of 2004, 2006, 2008, 2010, 2012, and 2014 Processing Payments and Processing Fees.

## A. Processing Payment and Processing Fee Calculations

Section 14575(a) of the California Beverage Container Recycling and Litter Reduction Act specifies that: "if any type of empty beverage container with a refund value established pursuant to Section 14560 has a scrap value less than the cost of recycling, the Department shall, on January 1, 2000, and on or before January 1 annually thereafter, establish a processing fee and a processing payment for the container, by the type of the material of the container."

The original intent of the processing payments and processing fees was that each container type should cover its own cost of recycling. For example, if the scrap value for glass was not enough to cover the cost of recycling glass, then the processing fee, paid by beverage manufacturers and passed through to recyclers, would cover that additional cost. Thus, the processing fee would, in theory, create an incentive for beverage manufacturers to use material types that were less costly to recycle, and/or that did not have a processing fee. At the same time, the recycler, who was required to accept these materials because of the beverage container program, would not suffer a loss.

The processing payment is defined as the difference between the statewide, weighted-average cost of recycling (as determined by this cost to recycle survey), multiplied by a reasonable financial return, and the average scrap value paid to recyclers (for the period October through September of the previous year). The equation is as follows:

*Processing Payment = (Cost of Recycling x Reasonable Financial Return) – (Scrap Value)*

The processing payment is paid by CalRecycle to processors, who then pass the payment on to recyclers, based on the weight of material redeemed.

The processing fee, earlier in the history of the beverage recycling program, was equal to the processing payment, and was paid to CalRecycle by beverage manufacturers on every container sold. Over time, the processing fee has been modified, and currently, when adequate funds are available in the Beverage Container Recycling Fund, the amount of processing fee paid by manufacturers is reduced, depending on the recycling rate of the material. When funds are available, the difference between the processing fee paid to the Department, and the processing payment paid to recyclers, is made up with funds from the California Beverage Container Recycling Fund (Fund), essentially from CRV paid on unredeemed containers.

In 2003, AB 28 established the current system whereby unredeemed funds, when available, are used to subsidize the processing fee by a minimum of 35 percent, up to 90 percent, depending on the recycling rate (and availability of funds).

**Table 3-1**
**Processing Fee Reduction Factors with Adequate Funds**

| Recycling Rate | Percent of Processing Payment |
|---|---|
| 75 percent or above | 10 percent |
| 65 to 74 percent | 11 percent |
| 60 to 64 percent | 12 percent |
| 55 to 59 percent | 13 percent |
| 50 to 54 percent | 14 percent |
| 45 to 49 percent | 15 percent |
| 40 to 44 percent | 18 percent |
| 30 to 39 percent | 20 percent |
| Less than 30 percent | 65 percent |

**Table 3-2**
**Processing Fee Reduction Factors for**
**Jan. 1, 2014, Processing Fees**

| Material | Percent of Processing Payment |
|---|---|
| Glass | 10 Percent |
| PET #1 | 11 Percent |
| HDPE #2 | 10 Percent |
| PVC #3 | 65 Percent |
| LDPE #4 | 65 Percent |
| PP #5 | 65 Percent |
| PS #6 | 65 Percent |
| Other #7 | 65 Percent |
| Bi-Metal | 65 Percent |

Under current statutory requirements, the processing fee for a given container type is equal to a specified percentage of the processing payment, depending on the recycling rate in the previous fiscal year, as shown in **Table 3-1,** above. The fiscal year 2012/2013 recycling rates were used to determine the maximum processing fee reduction factors for glass, bi-metal, and plastic resins. **Table 3-2** shows the actual percent of processing payment for each material type. The percent of processing payment is multiplied by the processing payment for each material to determine the amount of processing fee paid by beverage manufacturers.

**Table 3-3,** on the following page, is a copy of the 2014 Processing Fees notice, published by CalRecycle on Dec. 13, 2013. The table provides components of the processing payment calculations, as well as the processing payments per ton and per pound; and the processing fees per container. Table 3-3 also documents the Section 14575(f) reduction in the processing fee for glass and PET #1.

**Table 3-3**
**Processing Fees Public Notice**
**(Dec. 13, 2013)**

**Table I**
**2014 Processing Fees**
**Effective January 1, 2014**
**Glass, Bimetal and Plastic**

| | Glass | Plastic | | | | | | | Bimetal |
|---|---|---|---|---|---|---|---|---|---|
| | | PET | HDPE | Vinyl | LDPE | PP | PS | Other | |
| Cost of Recycling per Ton with Reasonable Financial Return & COLA | $97.85 | $487.55 | $645.26 | $1,015.03 | $1,448.02 | $1,299.06 | $804.66 | $881.63 | $813.17 |
| Scrap Value per Ton | $3.13 | $370.29 | $327.70 | ($51.47) | $184.06 | $79.33 | $32.11 | $28.99 | $11.24 |
| **Processing Payments to All Participant Types** | | | | | | | | | |
| Processing Payment Per Ton Redeemed | $94.72 | $117.26 | $317.56 | $1,066.50 | $1,263.96 | $1,219.73 | $772.55 | $852.64 | $801.93 |
| **Processing Payment Per Pound Redeemed (To be used on DR6)** | $0.04736 | $0.05863 | $0.15878 | $0.53325 | $0.63198 | $0.60987 | $0.38628 | $0.42632 | $0.40097 |
| **Processing Fees to be Paid by Beverage Manufacturers** | | | | | | | | | |
| Manufacturers' Percentage of Processing Payment | 10% | 11% | 10% | 65% | 65% | 65% | 65% | 65% | 65% |
| Processing Fee Pursuant to Section 14575(f) | $0.00248 | $0.00038 | $0.00215 | $0.03895 | $0.01017 | $0.04505 | $0.00223 | $0.08660 | $0.03671 |
| Section 14575(j) Processing Fee Reduction | $0.00066 | $0.00022 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| **Processing Fee to be Paid by Beverage Manufacturers** | **$0.00182** | **$0.00016** | **$0.00215** | **$0.03895** | **$0.01017** | **$0.04505** | **$0.00223** | **$0.08660** | **$0.03671** |

## B. Scrap Values

CalRecycle is required to calculate the average scrap values paid to recyclers for the 12 months between Oct. 1 and Sept. 30, directly preceding the year for which processing payments and fees are calculated. For example, for the Jan. 1, 2014, processing payments and fees, the average scrap value used for the calculation covers the time period from Oct. 1, 2012, to Sept. 30, 2013.

Section 2955 of the California Code of Regulations specifies how CalRecycle shall conduct the scrap value survey. CalRecycle surveys all certified processors each month using a standard form, the Scrap Value Purchases Survey Form. Processors are required to complete the form and submit it to CalRecycle by the 10th of the following month. CalRecycle publishes average scrap values monthly, and reports the final annual (October through September) average scrap value for use in the processing payment and processing fee calculations, by Dec. 1.

The annual average scrap values for the ten beverage container material types from Oct. 1, 2012, through Sept. 30, 2013 are shown in **Table 3-4,** on the next page. These were the values used for the Jan. 1, 2014, processing payment and processing fee calculations.

**Table 3-4**
**Statewide Average Scrap Values for the Jan. 1, 2014, Processing Payment and Processing Fee Calculations**

| Material | Scrap Value (per Ton) |
|---|---|
| 1. Aluminum | $1,420.32 |
| 2. Glass | 3.13 |
| 3. PET #1 | 370.29 |
| 4. HDPE #2 | 327.70 |
| 5. Bi-Metal | 11.24 |
| 6. PVC #3 | (51.47) |
| 7. LDPE #4 | 184.06 |
| 8. PP #5 | 79.33 |
| 9. PS #6 | 32.11 |
| 10. Other #7 | 28.99 |

## C. Comparison of 2004, 2006, 2008, 2010, 2012, and 2014 Processing Payments and Processing Fees

In any given year, processing payments and processing fees reflect the combined results of the cost survey and scrap value survey. **Table 3-5,** on the next page, compares the processing payments for the nine relevant material types for the years following the six most recent cost surveys, i.e., for the Jan. 1, 2004, 2006, 2008, 2010, 2012, and 2014 processing payments to recyclers. **Table 3-6**, following Table 3-5, compares the percent change in the processing payment per ton between each succeeding cost survey.

The 2010 processing payments reflect the proportional reductions implemented in November, 2009. In 2012, for the first time in the history of the program there was no processing payment or processing fee for PET #1. PET #1 scrap values have since declined, and a PET #1 processing fee and processing payment was reinstated in 2013. Jan. 1, 2014 processing payments to recyclers for all materials except PP #5 and PS #6 increased between 2012 and 2014.

Processing fees are paid by beverage manufacturers on each beverage container sold. **Table 3-7,** on page 3-6, compares the per container processing fees for 2004, 2006, 2008, 2010, 2012, and 2014. **Table 3-8,** following Table 3-7, compares the percent change in the per container processing fees between each succeeding cost survey.

The 2010 processing fees reflect the proportional reduction in processing fee subsidies, resulting in the several-fold increase in processing fees for glass, PET #1, and HDPE #2, as compared to 2008. The Jan. 1, 2014 processing fees also includes the Section 14575(f) reduction in processing fees for glass and PET #1. The variability in processing fees for the minority materials is due to variations in the cost to recycle and scrap values.

**Figures 3-1, 3-2,** and **3-3,** beginning on page 3-7, compare the processing payments and processing fees for 2004, 2006, 2008, 2010, 2012, and 2014, for the three majority material types, glass, PET #1, and HDPE #2.

**Table 3-5**
**Comparison of Processing Payments (per Ton)**
**(2004, 2006, 2008, 2010, 2012, and 2014)**

| Material | Processing Payment per Ton | | | | | |
|---|---|---|---|---|---|---|
| | 2004 | 2006 | 2008 | 2010[a] | 2012 | 2014 |
| 1. Glass | $74.52 | $83.68 | $94.52 | $66.87 | $88.26 | $94.72 |
| 2. PET #1 | 330.41 | 226.39 | 197.68 | 249.44 | 0.00 | 117.26 |
| 3. HDPE #2 | 510.62 | 402.65 | 216.33 | 207.77 | 289.94 | 317.56 |
| 4. Bi-metal | 519.70 | 629.54 | 920.47 | 654.52 | 797.66 | 801.93 |
| 5. PVC #3 | 1,079.05 | 1,658.89 | 755.49 | 834.62 | 980.95 | 1,066.50 |
| 6. LDPE #4 | 3,395.76 | 1,511.58 | 1,919.68 | 1,189.57 | 1,248.65 | 1,263.96 |
| 7. PP #5 | 1,516.52 | 686.77 | 831.95 | 1,068.99 | 1,294.45 | 1,219.73 |
| 8. PS #6 | 6,293.42 | 3,085.51 | 871.41 | 650.27 | 786.51 | 772.55 |
| 9. Other #7 | 770.83 | 1,273.97 | 687.68 | 724.4 | 837.07 | 852.64 |

[a] Includes the proportional reduction required due to insufficient funds.

**Table 3-6**
**Comparison of the Percent Change in Processing Payments (per Ton)**
**(2006, 2008, 2010, 2012, and 2014)**

| Material | Percent Change | | | | |
|---|---|---|---|---|---|
| | 2004 to 2006 | 2006 to 2008 | 2008 to 2010 | 2010 to 2012 | 2012 to 2014 |
| 1. Glass | 12% | 13% | -29% | 32% | 7% |
| 2. PET #1 | -31% | -13% | 26% | -100% | n/a |
| 3. HDPE #2 | -21% | -46% | -4% | 40% | 10% |
| 4. Bi-metal | 21% | 46% | -29% | 22% | 1% |
| 5. PVC #3 | 54% | -54% | 10% | 18% | 9% |
| 6. LDPE #4 | -55% | 27% | -38% | 5% | 1% |
| 7. PP #5 | -55% | 21% | 28% | 21% | -6% |
| 8. PS #6 | -51% | -72% | -25% | 21% | -2% |
| 9. Other #7 | 65% | -46% | 5% | 16% | 2% |

**Table 3-7**
**Comparison of Processing Fees (per Container)**
**(2004, 2006, 2008, 2010, and 2012)**

| Material | Processing Fee per Container | | | | | |
|---|---|---|---|---|---|---|
| | 2004 | 2006 | 2008 | 2010[b] | 2012 | 2014 |
| 1. Glass | $0.00181 | $0.00229 | $0.00240 | $0.01373 | $0.00237 | $0.00182 |
| 2. PET #1 | 0.00167 | 0.00159 | 0.00072 | 0.00569 | 0.00000 | 0.00016 |
| 3. HDPE #2 | 0.01042 | 0.00503 | 0.00216 | 0.01821 | 0.00213 | 0.00215 |
| 4. Bi-metal | 0.02194 | 0.02557 | 0.04825 | 0.04526 | 0.04470 | 0.03671 |
| 5. PVC #3 | 0.03578 | 0.05501 | 0.02525 | 0.02768 | 0.01194 | 0.03895 |
| 6. LDPE #4 | 0.03153 | 0.01181 | 0.01691 | 0.00982 | 0.01082 | 0.01017 |
| 7. PP #5 | 0.07468 | 0.0248 | 0.09013 | 0.10857 | 0.04727 | 0.04505 |
| 8. PS #6 | 0.0293 | 0.01437 | 0.00507 | 0.00176 | 0.00227 | 0.00223 |

[b] Includes an increased manufacturer's percentage share as a result of the proportional reduction required due to insufficient funds.

**Table 3-8**
**Comparison of the Percent Change in**
**Processing Fees (per Container)**
**(2004, 2006, 2008, 2010, and 2012)**

| Material | Percent Change | | | | |
|---|---|---|---|---|---|
| | 2004 to 2006 | 2006 to 2008 | 2008 to 2010 | 2010 to 2012 | 2012 to 2014 |
| 1. Glass | 27% | 5% | 472% | -83% | -23% |
| 2. PET #1 | -5% | -55% | 690% | -100% | n/a |
| 3. HDPE #2 | -52% | -57% | 743% | -88% | 1% |
| 4. Bi-metal | 17% | 89% | -6% | -1% | -18% |
| 5. PVC #3 | 54% | -54% | 10% | -57% | 226% |
| 6. LDPE #4 | -63% | 43% | -42% | 10% | -6% |
| 7. PP #5 | -67% | 263% | 20% | -56% | -5% |
| 8. PS #6 | -51% | -65% | -65% | 29% | -2% |
| 9. Other #7 | 70% | 15% | 19% | 47% | 18% |

**Figure 3-1**
**Comparison of Glass Processing Payments and Processing Fees**
**(2004, 2006, 2008, 2010, 2012, and 2014)**

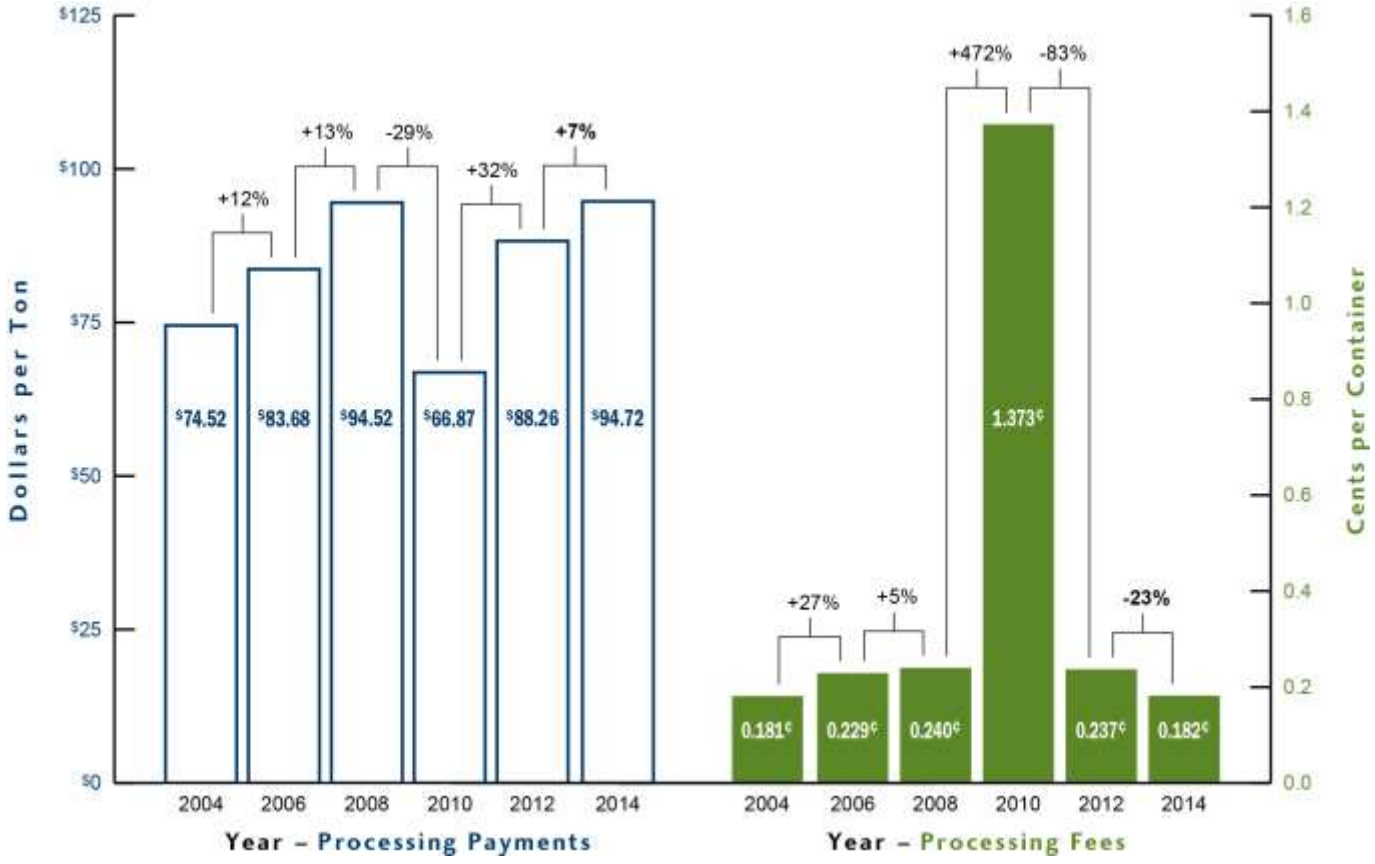

**Figure 3-2**
**Comparison of PET #1 Processing Payments and Processing Fees**
**(2004, 2006, 2008, 2010, 2012, and 2014)**

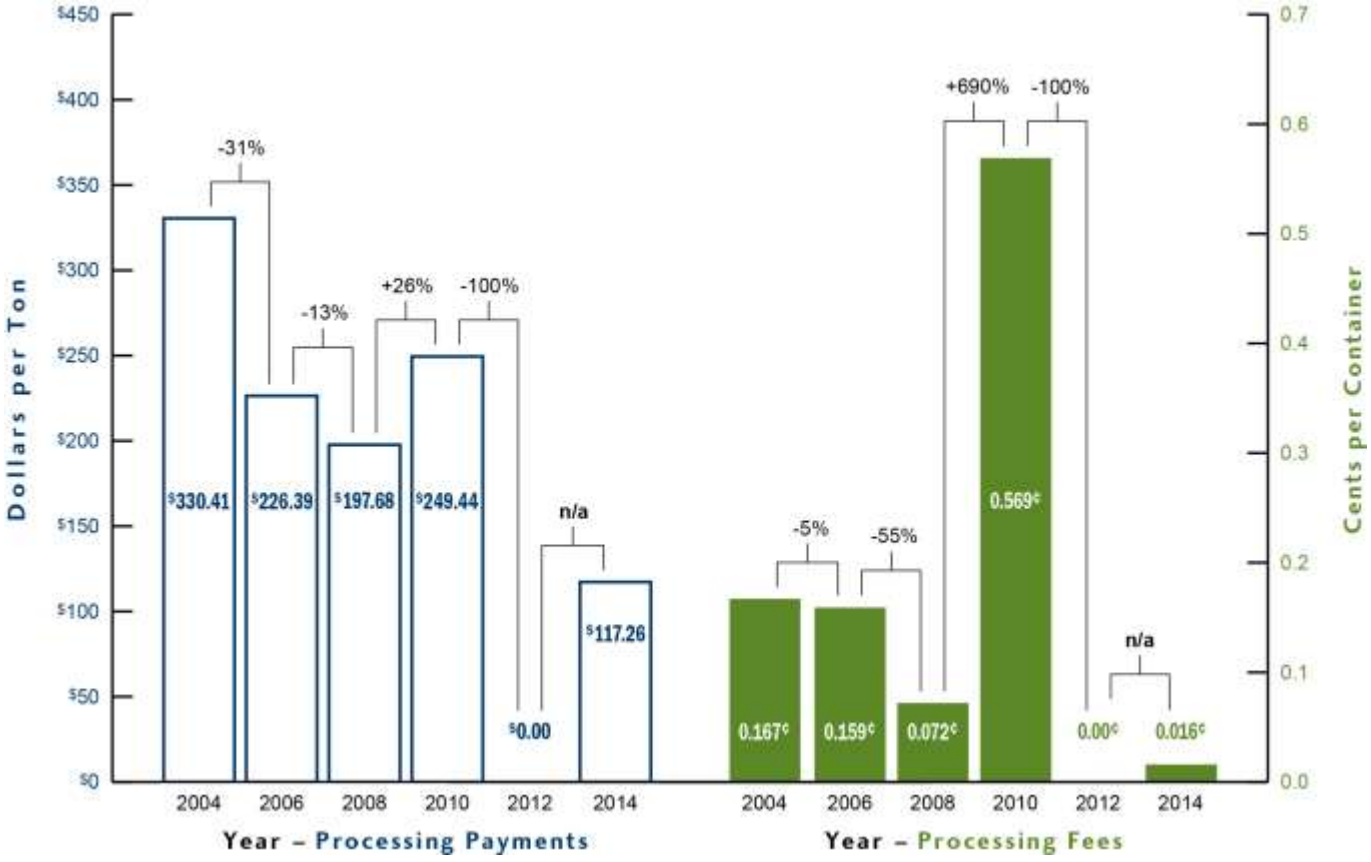

**Figure 3-3**
**Comparison of HDPE #2 Processing Payments and Processing Fees**
**(2004, 2006, 2008, 2010, 2012, and 2014)**