CalRecycle

2025 Handling Fee Final Report

May 19, 2026

Produced Under Contract By: Crowe

State of California
Gavin Newsom
Governor

California Environmental Protection Agency
Yana Garcia
Secretary

Department of Resources Recycling and Recovery
Zoe Heller
Director

Public Affairs Office
1001 I Street (MS 22-B)
P.O. Box 4025
Sacramento, CA 95812-4025
www.calrecycle.ca.gov/Publications/
1-800-RECYCLE (California only) or (916) 341-6300

Prepared as part of contract number DRR24051.

CalRecycle does not discriminate on the basis of disability in access to its programs. CalRecycle publications are available in accessible formats. Persons with hearing impairments can reach CalRecycle through the California Relay Service, 1-800-735-2929.

Disclaimer: This report was produced under contract by Crowe LLP. The statements and conclusions contained in this report are those of the contractor and not necessarily those of CalRecycle, its employees, or the State of California and should not be cited or quoted as official department policy or direction.

The state makes no warranty, expressed or implied, and assumes no liability for the information contained in the succeeding text. Any mention of commercial products or processes shall not be construed as an endorsement of such products or processes.

Table of Contents

Acknowledgments

The CalRecycle Cost Survey requires a high degree of communication and collaboration by all involved. Crowe LLP thanks CalRecycle management and staff for their support throughout the entire project. In addition, Crowe acknowledges and appreciates the cooperation and time commitment of the many recycling centers that were selected to participate in the handling fee cost survey.

Executive Summary

Processing fee and handling fee cost surveys were performed under contract by Crowe LLP (Crowe) for the California Department of Resources Recycling and Recovery (CalRecycle). This Handling Fee Final Report:

- Provides an estimate of the statewide, weighted-average certified recycler cost per container to recycle for handling fee recyclers (HF recyclers) and processing fee recyclers (PF recyclers).[1] The difference between the cost per container for handling fee and processing fee recyclers results in the calculated handling fee payment for July 2026.[2]
- Summarizes tasks that Crowe and their subcontractors conducted to obtain the final, statewide, weighted-average handling fee and processing fee recycler costs per container.
- Provides analysis of the results of this handling fee cost survey.

AB 3056 (Committee on Natural Resources, 2006) mandates that CalRecycle conduct this survey biennially alongside the processing fee cost survey. The handling fee is determined by deducting the average recycling cost per container of certified recycling centers not receiving handling fees (PF Recyclers) from the average cost per container of certified recycling centers that do receive handling fees (HF Recyclers).

The Beverage Container Recycling Program (program) encourages recycling and litter reduction. As part of this, AB 2020 (Margolin, 1986) established specific goals for convenient recycling through a system of Convenience Zones, defined as the area within a half-mile radius of a supermarket with annual sales $2 million or more.[3] To help cover the generally higher costs of operating within a Convenience Zone, the program established a system of payments to support convenient recycling.

Since the passage of AB 3056 (Hancock, 2006), CalRecycle has conducted a handling fee cost survey in conjunction with the processing fee cost survey to determine the amount of the handling fee payment.

---

[1] A handling fee recycler is a certified recycling center that receives the handling fee payment in addition to the processing fee payment. A processing fee recycler is a certified recycling center that only receives a processing fee payment.

[2] Through the passage of SB 156 (Committee on Budget and Fiscal Review, 2024), CalRecycle revised the handling fee structure for certified recyclers. The legislation enabled a rate increase effective FY 2024–25 and directed the development of a new calculation methodology.

[3] Effective January 1, 2023, through SB 1013 (Atkins, 2022), the Convince Zone expanded from a half-mile radius to a one-mile radius of a supermarket, and from a three-mile radius to a five-mile radius in a rural region.

A. Handling Fee Cost Survey Results

The statewide, weighted-average costs per container for handling fee recyclers and processing fee recyclers are presented in **Exhibit 1.** The statewide, weighted-average cost to recycle for handling fee recyclers in 2024 was 2.193 cents per container, 34% higher than the statewide, weighted-average cost to recycle for processing fee recyclers in 2024, which was 1.638 cents per container. The handling fee payment, as calculated based on the difference between the cost per container for handling fee recyclers and processing fee recyclers, is 0.555 cents ($0.00555).

Exhibit 1
Statewide Recycler Costs per Container (2024)

Recycler Type	2024 Statewide, Weighted Average, Cost per Container	Percentage Change (PF to HF Cost per Container)	Error Rate at 90% Confidence Interval
1. Handling Fee Recycler	2.193 Cents	+34%	5.81%
2. Processing Fee Recycler	1.638 Cents	n/a	6.55%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	0.555 Cents	n/a	n/a

Exhibit 2 compares calculated 2024 handling fee payments to the seven prior cost surveys in which CalRecycle measured recycler costs (even years 2010 through 2024). Note that costs per container in Exhibit 2 are not adjusted for inflation or cost of living (COLA). Compared to 2022, the HF cost survey calculated the 2024 handling fee payment decreased by 3% to $0.00555.

Exhibit 2
Handling Fee Cost Survey Calculated Handling Fee Payments (without COLA) (2010 to 2024)

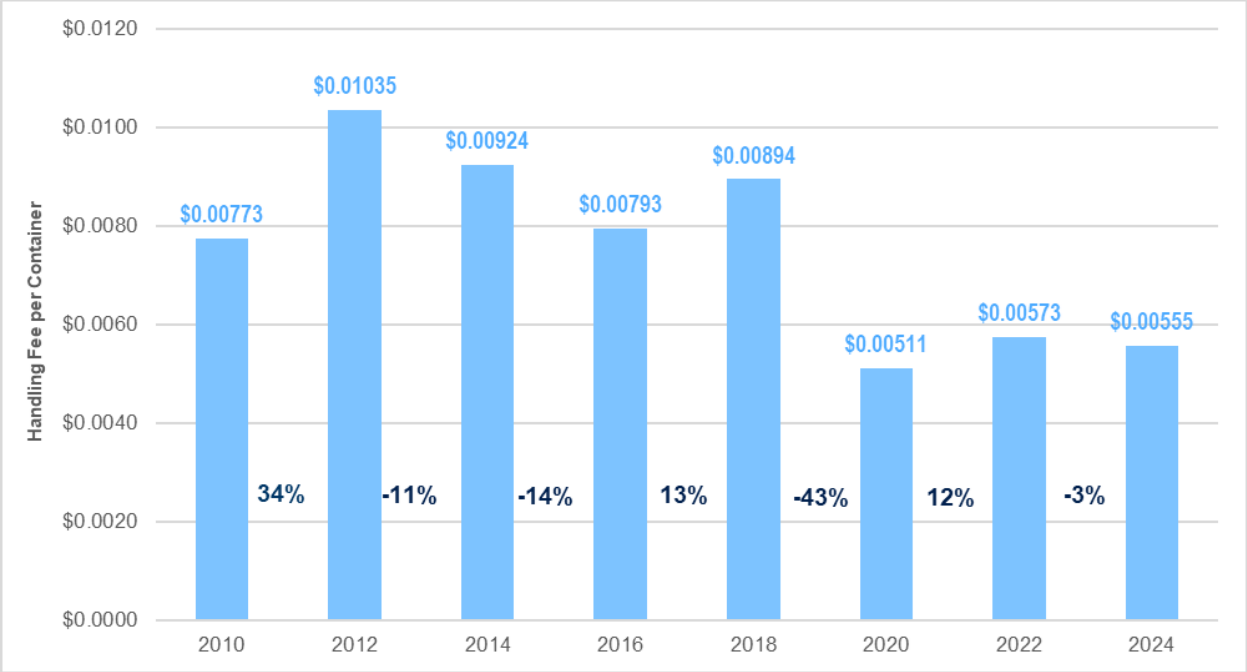
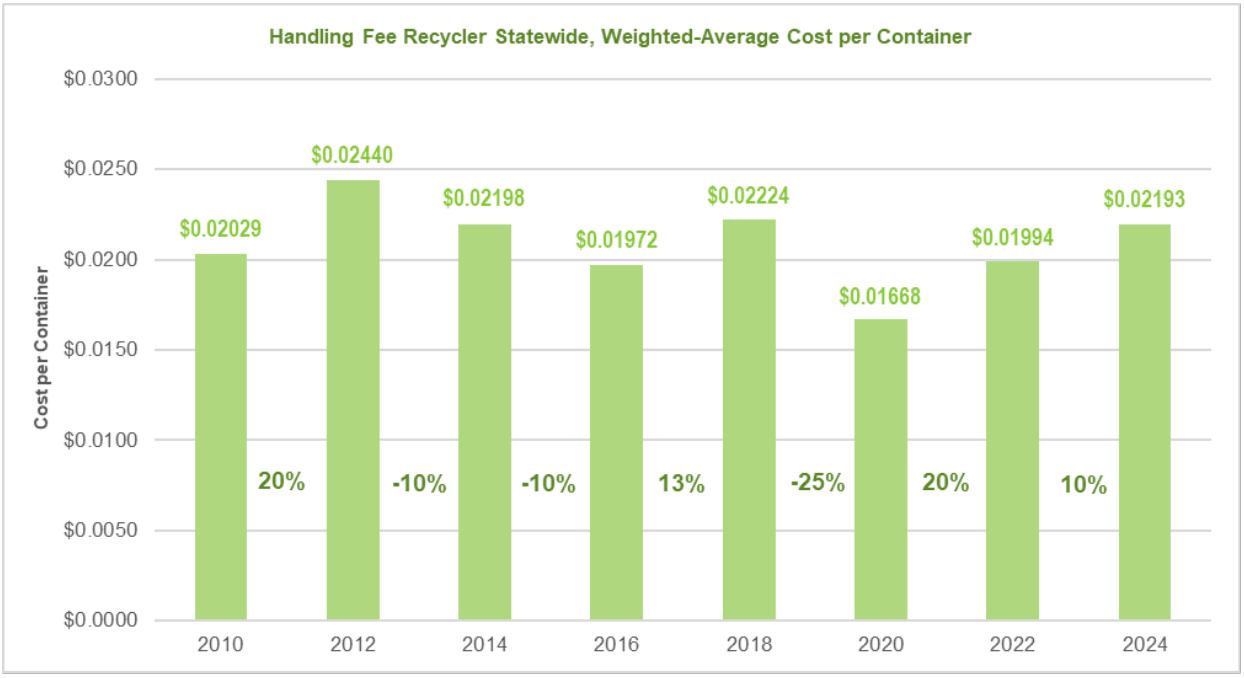
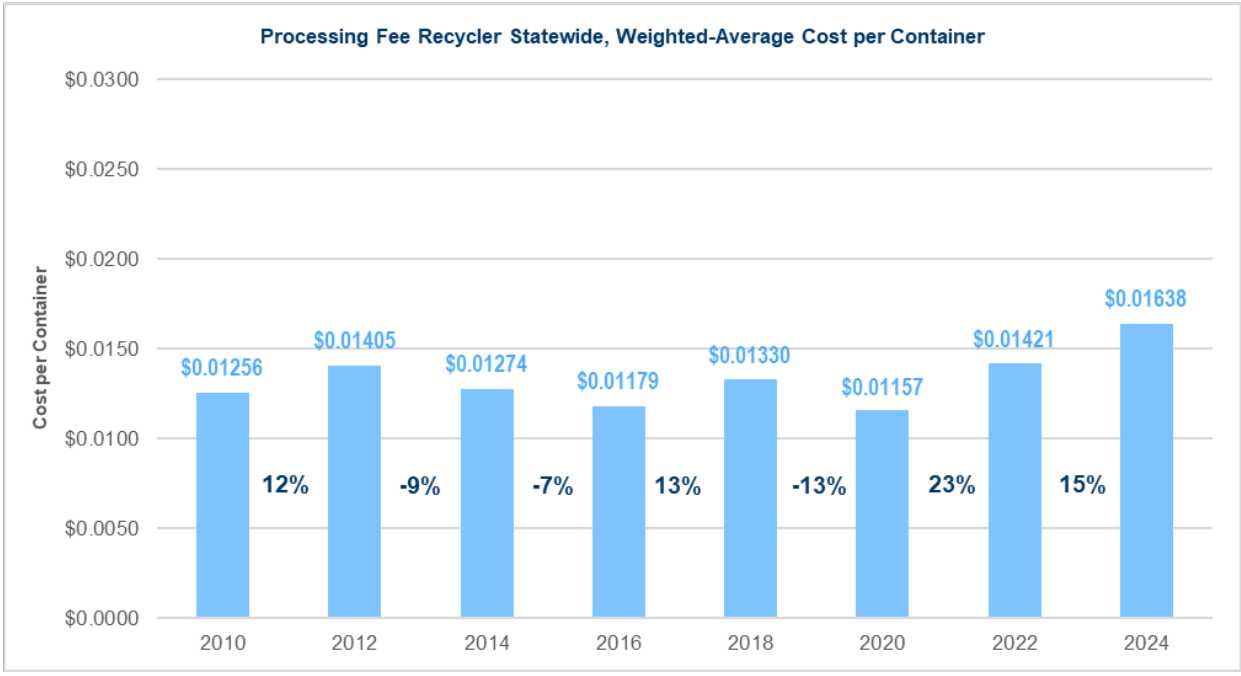


Exhibit 3 compares 2024 handling fee recycler and processing fee recycler cost per container to the seven prior cost surveys. Compared to 2022, the 2024 cost per container for processing fee recyclers increased by 15%, while the cost per container for handling fee recyclers increased by 10%.

Exhibit 3
Statewide Handling Fee and Processing Fee
Recycler Cost per Container[a] (2010 to 2024)





[a] Statewide, weighted-average cost per container recycled.

B. Summary of Results

Overall, cost per container increased between 2022 and 2024. Our analyses identify a combination of factors that may be impacting recycling costs. Between 2022 and 2024 there was an increase in the overall survey population of HF recycling centers and a decrease of PF recycling centers. The increase in HF recycler cost per container between 2022 and 2024 is due to overall increases in operational costs rather than recycler dynamics. In fact, despite increased volumes per recycler, cost per container increased. This indicates that cost-of-living increases were significant enough to overcome increases in recycler productivity. The following provides factors that lead to increased costs:

- **Higher labor costs** – Driven by the 7% increase in minimum wage, average wages per hour increased by 8% for both HF and PF recyclers. Direct labor and indirect labor account for about 55% of recycler costs, therefore an increase of 8% would result in a 4.4% increase to overall costs, all else equal. These higher labor costs contribute to higher overall costs.
- **Labor hours per 1,000 CRV containers** – Increased by 9% for both HF and PF recyclers. This indicates a decline in productivity and higher labor input per unit, which contributed to increased costs.
- **High inflation and cost of living** – Overall cost of living increased between 2022 and 2024, largely driven by a 7.5% increase in consumer price index (CPI).[4] This is almost twice the average CPI increase of 4.5% over a two-year period. All else equal, the 7.5% increase in CPI would generally result in a 7.5% increase to recycler costs.
    - Almost all cost categories among HF and PF recyclers increased, with direct labor, rent, depreciation, maintenance, and transportation accounting for roughly 90% of the increase in costs per recycler.

The handling fee cost survey is a complex, primary data gathering exercise. Crowe drew from 224 diverse recycling centers (128 HF, 96 PF) across the state to determine a single cost-per-container result. The cost-per-container results must make sense in the historical context of prior cost surveys, as well as within the context of current recycling operations and market dynamics. The HF and PF recycler cost-per-container results presented in this Handling Fee Report are both reasonable in a historical context.

[4] Cumulative California inflation of about 7–8% between 2022 and 2024 based on California Department of Finance, Consumer Price Index data, accessed: https://dof.ca.gov/forecasting/economics/economic-indicators/inflation.

1. Handling Fee Cost Survey Methodology

This section describes the cost survey methodology, from establishing the survey sample frame, to quality control procedures, and all the supporting tasks in between. This section summarizes major tasks accomplished over an 11-month period to complete this handling fee cost survey, as well as additional detail for five key areas:

A. Overview of Cost Survey Methodology

B. Survey Design and Sample Selection

C. Conducting Site Visit Surveys

D. *Q*uality Control and Confidentiality Procedures

E. Cost Survey Validation Methodology

A. Overview of Cost Survey Methodology

1. **Developed and documented a sample survey design framework and selected recycling centers for the cost survey.** Crowe determined the number of recycling centers to be selected for the stratified random samples used to measure costs per container for handling fee and processing fee sites used for the handling fee cost survey. Following the sample design, Crowe randomly selected certified recycling centers to participate in the cost surveys.

2. **Updated and calibrated the Labor Allocation Cost Survey Model, a 19-worksheet, Excel-based computer model that was used to allocate recycling center costs to beverage container material types based on labor allocations.** Crowe updated the cost survey model to reflect 2024 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 2025 cost survey information. These sub-models, incorporated into the Labor Allocation Cost Survey Model, help ensure appropriate 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 used to help determine aluminum, PET #1, and HDPE #2 cost per ton. The cost model also incorporates cost allocations for the recent program addition of Wine and Distilled Spirits in Bag-in-Box, Pouches, or Paperboard Cartons (WDS-BBP). These changes are part of Crowe's ongoing commitment to maintain and improve the model, confirming it becomes an increasingly valuable and effective tool for surveyors over time.

3. **Revised and updated the Cost Survey Training Manual and training materials.** We continued to update the evolving training manual. The Manual consists of 10 chapters, each emphasizing actions for survey team members to take in the field and when completing site files. The training manual focuses on key areas of learning necessary to successfully conduct cost surveys. In addition, Crowe updated PowerPoint presentations covering topics in the Training Manual and developed other training content.

4. **Revised and conducted cost survey training consisting of six half-days of interactive training sessions, training site visits, and a follow-up session, as well as two in-person days.** Activities during the first four days included conducting cost survey interview role playing activities, mentoring from experienced survey team members, and completing a site visit cost model and associated documentation. As part of training, each new survey team member conducted a cost survey site visit with an experienced team member to provide "real-world" experience. The experienced survey team member guided the new team member, with increasing levels of responsibility for the on-site and post-site visit procedures over the course of the visit. Following the field visits, new survey members spent one to two days working together to complete the site files. The entire survey team reconvened after the training site visits to present and discuss the site visits and review the remainder of the training materials. For this 2025 Cost Survey, Crowe also conducted a one-hour training for quality control reviewers.

5. **Scheduled, conducted, and completed 224 recycling center on-site visits (128 HF and 96 PF) during 31 weeks between May 5, 2025, and December 1, 2025, using the statistical sample frame developed by Crowe.** Throughout the scheduling and site visits, the Crowe team built upon the working relationships established with the program's recyclers in prior years. These on-site working relationships were important to the success of this cost survey and should carry over into future cost surveys. All the cost surveys were conducted by a team of one or two surveyors, including accountants and/or recycling experts. It typically took between one and three hours to complete an on-site survey. In addition to the on-site time, usually over eight hours of additional time was required after each site visit to analyze data and follow-up with each recycler to obtain complete financial and labor information.

6. **Created a secure SharePoint site for the project team and developed a secure on-line file review system for team members to upload and review survey files.** The survey files maintain the functional components of former hard copy documentation (e.g., site procedure checklist, site memorandum, site equipment sheet, Excel cost model, signed affidavit, and supporting site labor and financial information), but eliminate the paper-intensive file development and review process of prior cost surveys.

7. **Developed and implemented an intensive quality control procedure that included over eight hours and five different levels of review (site team review, independent first level review, manager review, CPA partner review, and project director review) for each site file.** This review took place before the site files were approved for data processing and data analysis. These quality assurance steps helped ensure that each site file was complete and accurate, and results from the labor allocation model and the indirect cost allocation sub-models were accurate. In total, over 28 hours generally were spent for each completed recycler site, including the site team and quality control hours.
8. **Determined the final cost per container for processing fee and handling fee recyclers.** Using an automated process, Crowe extracted results from each of the completed labor hour allocation cost models. Crowe developed an Excel workbook to calculate costs per container for handling fee sites and processing fee sites. Calculations used a weighted average by container strata. Using defined and documented statistical procedures, Crowe calculated error rates at a 90% confidence interval.

B. Survey Design and Sample Selection

Crowe followed processing fee and handling fee cost survey procedures consistent with the eight prior cost surveys. The population of handling fee, or HF, recycling centers eligible for the cost survey was defined as all recycling centers:

- Receiving at least one handling fee payment for any of the months between January 2024 and December 2024,
- Certified and operational on or before March 1, 2024,
- Reporting redemption volume between January 2024 and December 2024,
- Not subsidized by the Department of Rehabilitation, and
- Not subject to CalRecycle investigation for major infractions.

There were 20 handling fee sites removed from the population due to investigations, leaving 570 handling fee recycling centers in this total traditional recycling center population.

The population of processing fee, or PF, recycling centers eligible for the cost survey was defined as all recycling centers:

- Not receiving handling fees between January 2024 and December 2024,
- Certified and operational on or before March 1, 2024,
- Reporting redemption volume between January 2024 and December 2024,
- Not subsidized by the Department of Rehabilitation, and
- Not subject to CalRecycle investigation for major infractions.

There were 39 sites removed from the population due to investigations, leaving 467 recycling centers in this total traditional recycling center population.

The Crowe team completed 96 PF and 128 HF recycler cost surveys during eight months of field work between May 2025 through December 2025 to obtain results for this cost survey. The 96 processing fee recycling centers within the Handling Fee Cost Survey are also referred to as PF for HF in this report. The 128 handling fee recycling centers within the Handling Fee Cost Survey are also referred to as HF for HF in this report. This handling fee cost survey was consistent with prior cost surveys in terms of quantitative information obtained for each recycling site.

To measure calendar year 2024 costs, the survey design consisted of two stratified random samples:

- A statistically defensible, stratified random sample of 128 sites (for HF for HF), drawn from the 570 qualifying handling fee recycling centers. Three strata were defined based on the total annual containers handled by a site. This stratified random sample was used to measure the costs of recycling California Redemption Value (CRV) containers for handling fee recycling centers. Handling fee recycler strata definitions are provided in **Exhibit 4.**
- A statistically defensible, stratified random sample of 96 sites, drawn from the 467 qualifying processing fee recycling centers. Three strata were defined based on the total annual containers handled by a site. This stratified random sample was used to measure the costs of recycling CRV containers for processing fee recycling centers. Processing fee recycler strata definitions are provided in **Exhibit 5.**

Crowe treated the two survey components equivalently in terms of scheduling, site visits, and quality control. It was only in the final calculations that Crowe made a distinction between the three groups. Because of the parallel strata definitions for handling fee and processing fee recyclers, Crowe was able to directly compare cost per container results for the two populations. Furthermore, because of this survey design, the cost surveys conducted for 2024 costs per container treated the two recycler populations with equal statistical rigor.

To increase precision and confidence in random sample results for all recycling centers, while minimizing overall sample size, the traditional recycling center survey population was divided into three strata, based on number of containers recycled, as shown in Exhibit 4 for handling fee recyclers and Exhibit 5 for processing fee recyclers.

Exhibit 4
Handling Fee Recycler Container Stratum Definitions (2024)

Strata	2024 Number of Containers Recycled
1	Greater than, or equal to, 20.8 million containers
2	Greater than, or equal to, 11.4 million containers, up to less than 20.8 million containers
3	Less than 11.4 million containers

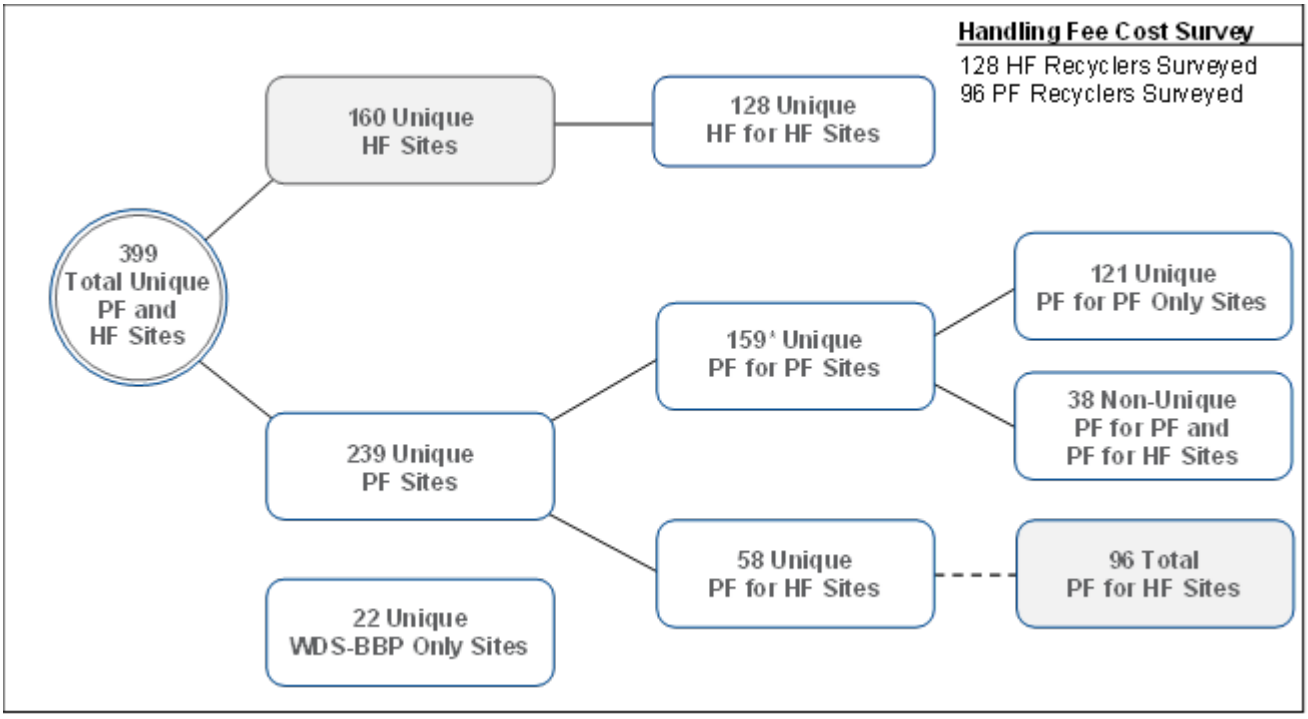
Exhibit 5
Processing Fee Recycler Container Stratum Definitions (2024)

Strata	2024 Number of Containers Recycled
1	Greater than, or equal to, 34.0 million containers
2	Greater than, or equal to, 16.6 million containers, up to less than 34.0 million containers
3	Less than 16.6 million containers

Sample Selection

This handling fee cost survey was part of a broader combined processing fee and handling fee cost survey that included 239 processing fee recyclers and 160 handling fee recyclers. The final 239 processing fee recyclers included 159 unique sites for the processing fee cost survey. **Exhibit 6** illustrates the total number of handling fee and processing fee recyclers surveyed, 399 unique sites, and the number of recyclers in the handling fee cost survey.

Exhibit 6
Handling Fee and Processing Fee Cost Survey Sample (2024)



Note: 38 PF sites within the 159 also were within the HF cost survey, for a total 96 (38 + 58) PF sites used for the cost-per-container calculation.

C. Conducting Site Visit Surveys

A significant component of the cost survey involved scheduling site visits and communicating with recyclers chosen from the sample frame. 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 actual costs of beverage container recycling would be exceptionally difficult, and the results would be hard to support. The 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.

Starting in late April 2025, introduction letters on CalRecycle letterhead were sent to all selected recyclers to:

- Inform them that they were selected to participate in a processing fee and handling fee cost survey,
- Outline what was expected of the recycler, and
- Introduce Crowe as CalRecycle's cost survey contractor.

In the second stage of communication, a Crowe scheduling coordinator established contact with the recyclers to schedule site visits. In addition to a telephone call, the scheduler typically sent a confirmation email to recyclers, and the survey team contacted recyclers the week prior to each site visit.

There were three phases of an individual cost survey, illustrated in **Exhibit 7**:

- **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

Exhibit 7
Three Phases of the Cost Survey (2024)

Phases	1. Pre-Site Visit	2. Site Visit	3. Post-Site Visit
Activities	• Scheduling team sends notification letter • Survey team confirms site visit • Survey team reviews information on the site, including prior site files and current cost model • Scheduling team sends follow-up notification letter, as necessary	• Survey team conducts site visit	• Survey team completes site files and uploads files to SharePoint site • Reviewers begin reviewing site files • Survey team responds to comments • Review process ends in final approval
Participants	• Scheduling Team • Survey Team	• Survey Team	• Survey Team • Reviewers

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 2024 into the cost model Excel file for each site. The survey team evaluated the number of beverage containers recycled 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 one to three 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. Survey teams 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, direct and indirect costs, and beverage container indirect (BCI) and all materials indirect (AMI) costs. Team members classified costs into one of the following categories:

- Direct labor
- Other labor
- General business overhead
- Transportation
- Rent
- Depreciation
- Property taxes
- Utilities
- Supplies
- Fuel
- Insurance
- Interest
- Maintenance/repairs
- Non-allowable

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 over 8 hours further compiling the site data, entering information into the cost model, completing the Site Memorandum and site files, and reviewing the site files. In many cases, site managers did not have all the necessary information available at the site visit, and the survey team had to contact 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 and overall costs per beverage container recycled. Finally, the survey team compiled and checked all workpapers and conducted a reasonableness check of survey results before uploading the files to the secure SharePoint site for the review team to conduct the first of several independent office review steps.

D. Quality Control and Confidentiality Procedures

Data quality control was a primary focus of the cost survey project. Quality control procedures included five separate levels of review and totaled up to 11.5 hours per site on average. These data quality control procedures were essential to ensure the cost survey results were fair, equitable, accurate, reasonable, justifiable, and defensible.

This extensive quality control process, with six different individuals or staff teams, determined that each site file was complete and accurate before it was released for data processing and data analysis. 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- container calculations described in Section 2 after this extensive series of quality control reviews was complete.

Confidentiality was important for the cost survey. The data collected from each recycling site was not to be disclosed, as the release of the data could potentially be compromising to a recycling business. As a result, Crowe developed formal policies regarding confidentiality. 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 LLP (Prime Contractor); Geiss Consulting (Subcontractor); Encina Advisors, LLC (Subcontractor); Boisson Consulting (Subcontractor); DVBABA LLC (Disabled Veteran Business Enterprise Subcontractor); and Vet Business Services, LLC (Disabled Veteran Business Enterprise Subcontractor) also signed company confidentiality agreements.

All electronic files related to site visits were stored on the secure SharePoint site within Crowe's domain, accessible by password only, to authorized survey team members. Financial printouts and worksheet drafts with site-specific information were securely shredded. The final site electronic site files will be delivered to CalRecycle for its secure record retention. Crowe laptop computers were protected against unauthorized access by security encryption software that requires a password/multi-factor authentication to use the laptops.

E. Cost Survey Validation Methodology

Crowe conducted additional analysis to test the validity of the survey results. This subsection discusses distribution of cost-per-container results. Based on the analyses described in the following and throughout this section, we conclude that our methodology is consistent with prior years. We are confident that the cost-per-container results consistently reflect recycler operations and costs.

Exhibit 8 and **Exhibit 9** provide frequency histograms of the cost-per-container results for sampled HF and PF recyclers. The vertical axis is the number of recyclers, and the horizontal axis is the cost per container. The horizontal axis is in one-quarter cent increments. Both histograms are right-skewed normal distributions, as were the PF for PF histograms from the processing fee cost survey.

The histograms demonstrate consistent distributions with the prior cost-survey frequency histograms, which were similarly right-skewed. The distributions are right-skewed with a tail to the right as the cost-per-container increases.

The two histograms also show a slight bump to the right-hand side, with slightly more recycling centers having higher cost-per-container values than might be expected on a pure right-skewed normal distribution curve. In prior years, Crowe evaluated whether this could be a bimodal distribution. Crowe determined that rather than a clear pattern of two sub-populations that would explain a typical bimodal distribution, each with a distinct and somewhat equal mode (height of each curve), the slight bump reflects minor inconsistencies in recycler costs and operations, which generally do not follow a straight linear relationship between costs and number of containers recycled.

Exhibit 8
2024 Sampled Handling Fee Recyclers, Distribution of Cost per Container

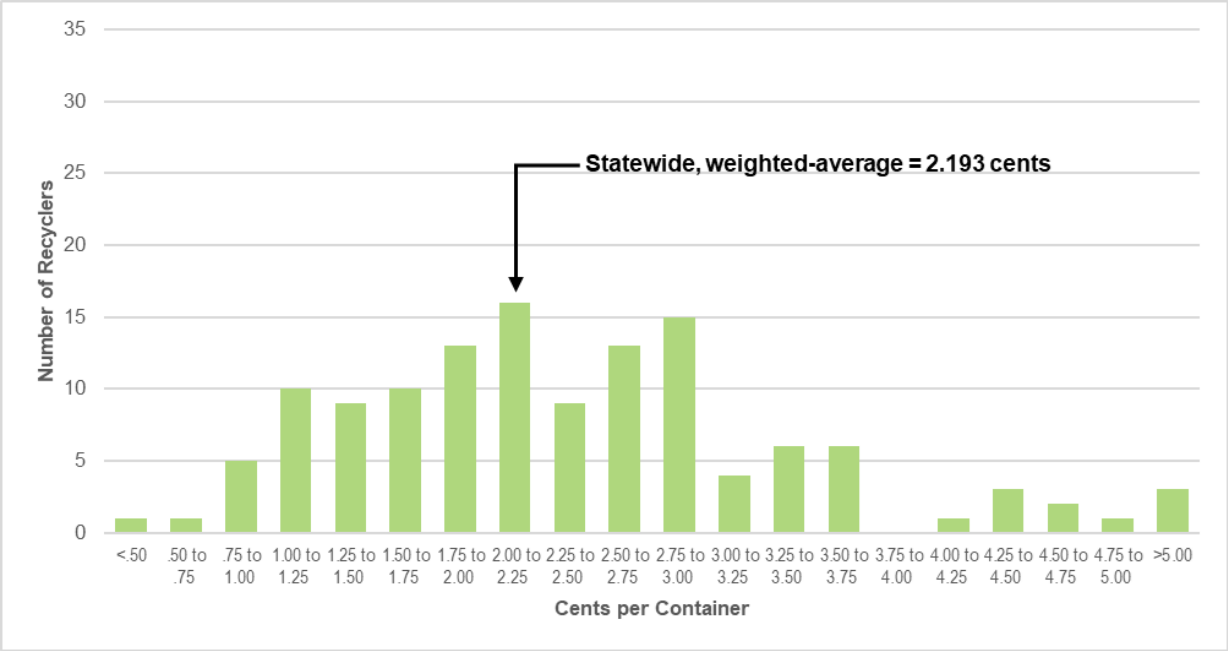
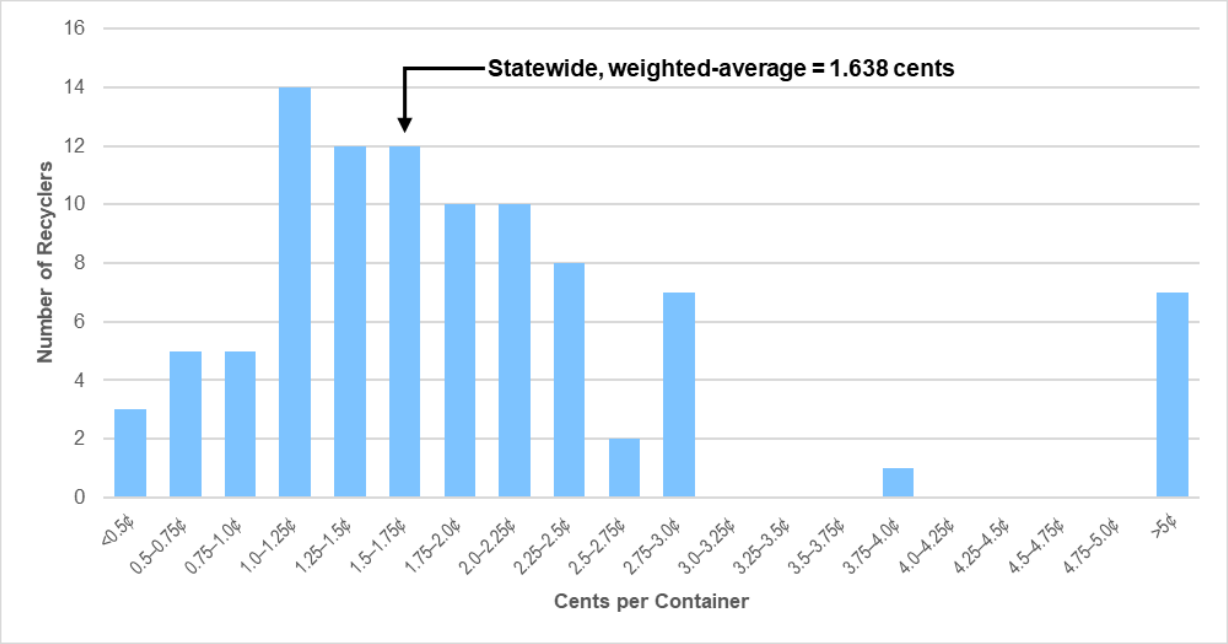


Exhibit 9
2024 Sampled Processing Fee Recyclers, Distribution of Cost per Container



2. Handling Fee Cost Calculations and Results

This section describes the calculations used and the final results for the statewide, weighted-average cost per container to recycle for processing fee recyclers and handling fee recyclers. This section is organized as follows:

A. Cost Calculations

B. Cost Results

C. Comparison Cost per Container, 2010 to 2024

D. Handling Fee Recycler Cost per Container Increase.

A. Cost Calculations

This handling fee cost survey was the ninth time that CalRecycle calculated cost per container at the statewide level. This section discusses the calculation methodology.

The statewide statistical methodology (stratified weighted-average cost, simple weighted-average cost, or population weighted-average cost) used for either cost-per-ton calculations or cost-per-container calculations, was incorporated into the sample design.[5] Crowe utilized two stratified random samples for the handling fee cost survey.

For the stratified random samples, Crowe used a weighted-average by strata calculation to determine cost per container. This weighted-average by strata calculation is similar to the approach for aluminum, glass, PET #1, and HDPE #2 cost per ton for the processing fee cost survey. **Exhibit 10** illustrates the weighted-average by strata calculation approach for calculating cost per container.

[5] The Beverage Container Recycling Act specifies that cost per ton and cost per container 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). SB 156 (Committee on Budget and Fiscal Review, 2024) did not modify this weighted-average methodology for calculating handling fee results but instead directed CalRecycle to establish a revised handling fee rate framework, including a baseline rate and annual cost-of-living adjustments.

Exhibit 10
Cost per Container Calculation (2024)

$$\left(\frac{\text{Container Stratum 1 Sample Costs}}{\text{Container Stratum 1 Sample Containers}} \times \text{Container Stratum 1 Population Containers} = \text{Container Stratum 1 Total Population Costs}\right) +$$

$$\left(\frac{\text{Container Stratum 2 Sample Costs}}{\text{Container Stratum 2 Sample Containers}} \times \text{Container Stratum 2 Population Containers} = \text{Container Stratum 2 Total Population Costs}\right) +$$

$$\left(\frac{\text{Container Stratum 3 Sample Costs}}{\text{Container Stratum 3 Sample Containers}} \times \text{Container Stratum 3 Population Containers} = \text{Container Stratum 3 Total Population Costs}\right)$$

$$\frac{\text{Container Stratum 1 Total Population Costs} + \text{Container Stratum 2 Total Population Costs} + \text{Container Stratum 3 Total Population Costs}}{\frac{\text{Total Population Costs}}{\text{Total Population Containers}}} = \text{Statewide Stratified Weighted-Average Cost Per Container}$$

The handling fee cost survey consisted of two stratified random samples: one for handling fee recyclers and one for processing fee recyclers. Within each population, recyclers were grouped into one of three strata based on the annual number of containers recycled. While the specific definitions for handling fee container strata and processing fee container strata were different, the overall structures of the two sets of strata were similar. That is, both the handling fee and processing fee container strata were constructed so that the recyclers within each stratum handled approximately one-third of the total number of population containers recycled. This was important because it allowed us to directly compare results of the two cost-per-container calculations.

The first step in calculating cost per container was to aggregate the individual material cost results from the completed labor allocation cost model for each site. For each recycling site, Crowe calculated total CRV costs by summing CRV costs for each of the 10 material types, as determined by the labor allocation cost model and sub-models.

Next, Crowe converted tons of each CRV material to number of containers. The number of CRV containers for a given material type was equal to: tons redeemed in 2024 × 2,000 × CPP, where CPP was the 2024 statewide average containers per pound for each material type, as determined by CalRecycle. Crowe determined the total CRV containers by calculating the number of CRV containers for each material type and summing across all 10 material types. For example, for a recycler with 100 tons of aluminum redeemed, the number of aluminum containers was equal to:

(100 tons) × (2,000 pounds/ton) × (30.35 containers/pound) = 6,070,000 containers.

Once Crowe determined individual site CRV costs and CRV containers, we were able to determine statewide weighted-average costs per container. For the weighted-average by stratum calculation for cost per container, we first determined an average sample cost per container for each stratum by dividing total sample CRV costs for the stratum by total sample CRV containers in the stratum. Crowe then multiplied that stratum average cost per container by total containers in the stratum population. They then summed total CRV costs for the three strata and divided by total containers in the population. This calculation is illustrated in **Exhibit 11.** This exhibit provides the weighted-average by strata sample calculation for handling fee recycler cost per container.

Exhibit 11
Weighted-Average by Strata Calculation Example
Handling Fee Recycler Cost per Container (2024)

Strata	Sample CRV Costs	Sample CRV Containers	Sample Cost per Container[6]
1	$16,264,757.33	979,835,721	$0.01660
2	10,028,372.03	477,607,155	0.02100
3	12,571,982.62	445,581,234	0.02821

Strata	Population CRV Costs[7]	Population CRV Containers	Population Cost per Container
1	$36,777,261.13	2,215,567,896	–
2	45,471,936.60	2,165,627,902	–
3	62,046,140.07	2,199,064,101	–
Total	$144,295,337.80	6,580,259,899	**$0.02193[8]**

[6] Simple weighted-average cost per container for each sample stratum.

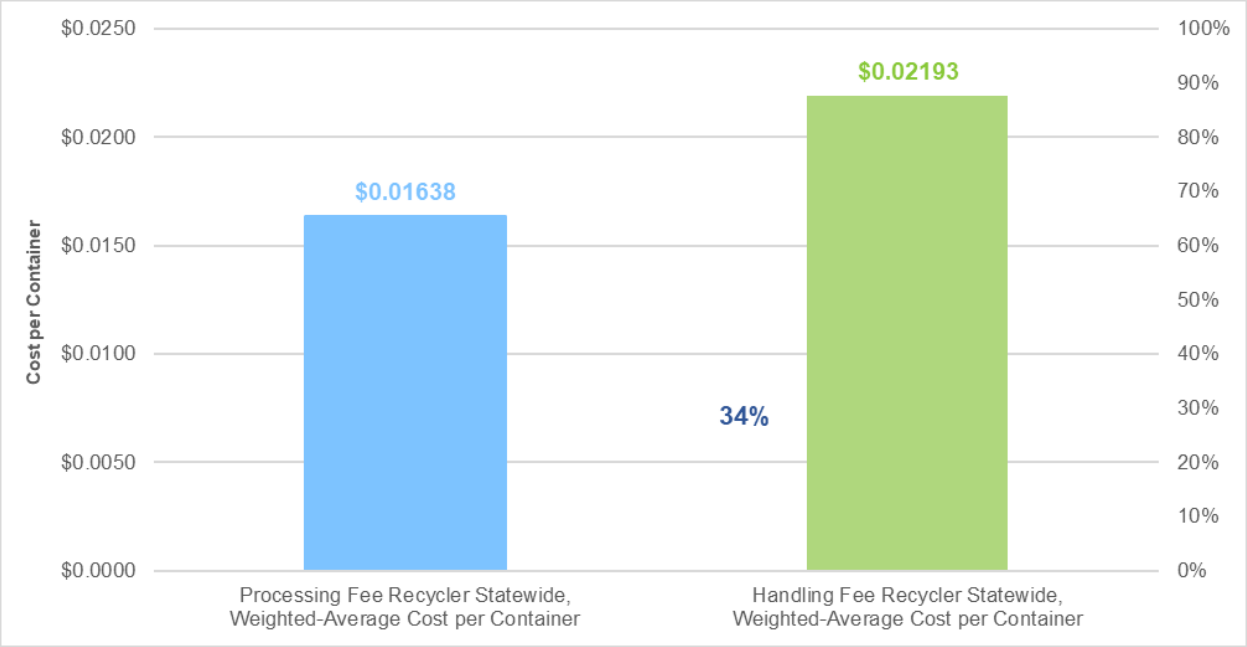
[7] Total costs for each population stratum, calculated by multiplying cost per container, by total CRV containers, summed for entire population.

[8] A statewide, weighted-average result of $0.01994 calculated by dividing total population CRV costs by total population CRV containers.

B. Cost Results

The statewide, weighted-average, recycler cost per container for processing fee recyclers and handling fee recyclers are presented in **Exhibit 12.** The 2024 cost to recycle for handling fee recyclers was 2.193 cents per container, 34% higher than the cost to recycle for processing fee recyclers in 2024, at 1.638 cents per container.

Exhibit 12
Processing Fee and Handling Fee
Recycler Cost per Container[a] (2024)



[a] *Statewide, weighted-average cost per container recycled.*

Exhibit 13 includes the new handling fee payment calculation, 0.555 cents per recycled container, equal to the difference between the handling fee recycler cost per container to recycle, and the processing fee recycler statewide cost per container to recycle, as specified in Section 14585 (f)(3). Under existing law, the Department is scheduled to implement this new handling fee payment starting July 1, 2026.

Exhibit 13
Statewide Recycler Costs per Container (2024)

Recycler Type	2024 Statewide, Weighted Average, Cost per Container	Percentage Change (PF to HF Cost per Container)	Error Rate at 90% Confidence Interval
1. Handling Fee Recycler	2.193 Cents	+34%	5.81%
2. Processing Fee Recycler	1.638 Cents	n/a	6.55%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	0.555 Cents	n/a	n/a

The sample sizes used to determine the costs per container were estimated to achieve a 90% confidence interval. This standard was higher than the statistical requirements in regulations for handling fee cost survey cost per container calculations, which specify an 85% confidence interval. The 2024 cost per container results for both handling fee recyclers and processing fee recyclers exceeded this target, with low error rates at the 90% confidence level of 5.81%, and 6.55%, respectively.

Exhibit 14 compares total number of containers recycled, sample population size, and sample size for handling fee and processing fee recyclers. **Exhibit 15** illustrates the cost-per-container calculations for the two populations of recyclers.

Consistent with the 2020 and 2022 surveys, this 2024 handling fee cost survey would result in a relatively low handling fee payment, just over one half-cent. While low from a historical perspective, the 2024 cost year result, at 0.555 cents, is around the same level as both the 2020 cost survey ($0.511 cents) and 2022 cost survey ($0.573 cents). Between 2006 and 2018 cost years, the calculated handling fee payments fluctuated between 0.77 cents and 1.04 cents per container.

Exhibit 14
Handling Fee and Processing Fee Recyclers
Number of Containers Recycled, Population Sizes, and Sample Sizes (2024)

Recycler Type	Total Number of Containers Recycled	Sample Population Size (sites)	Sample Size (sites)
1. Handling Fee Recyclers	6.6 billion	570	128
2. Processing Fee Recyclers	7.8 billion	467	96

Exhibit 15
Strata and Population Costs and Volumes (2024)

Handling Fee Recyclers

Container Stratum	Sample CRV Costs	Sample CRV Containers	Cost per Container	Population CRV Costs	Population CRV Containers
1	$16,264,757.33	979,835,721	$0.01660	$36,777,261.13	2,215,567,896
2	10,028,372.03	477,607,155	0.02100	45,471,936.60	2,165,627,902
3	12,571,982.62	445,581,234	0.02821	62,046,140.07	2,199,064,101
Total	n/a	n/a	n/a	$144,295,337.80	6,580,259,899

Handling Fee Recycler Statewide, Weighted Average Cost per Container: **$0.02193**

Processing Fee Recyclers

Container Stratum	Sample CRV Costs	Sample CRV Containers	Cost per Container	Population CRV Costs	Population CRV Containers
1	$14,759,425.59	1,009,414,461	$0.01462	$38,720,019.54	2,648,107,639
2	10,867,511.36	683,397,331	0.01590	41,548,786.59	2,612,772,043
3	7,662,576.24	410,750,459	0.01866	48,233,203.13	2,585,528,641
Total	n/a	n/a	n/a	$128,502,009.26	7,846,408,323

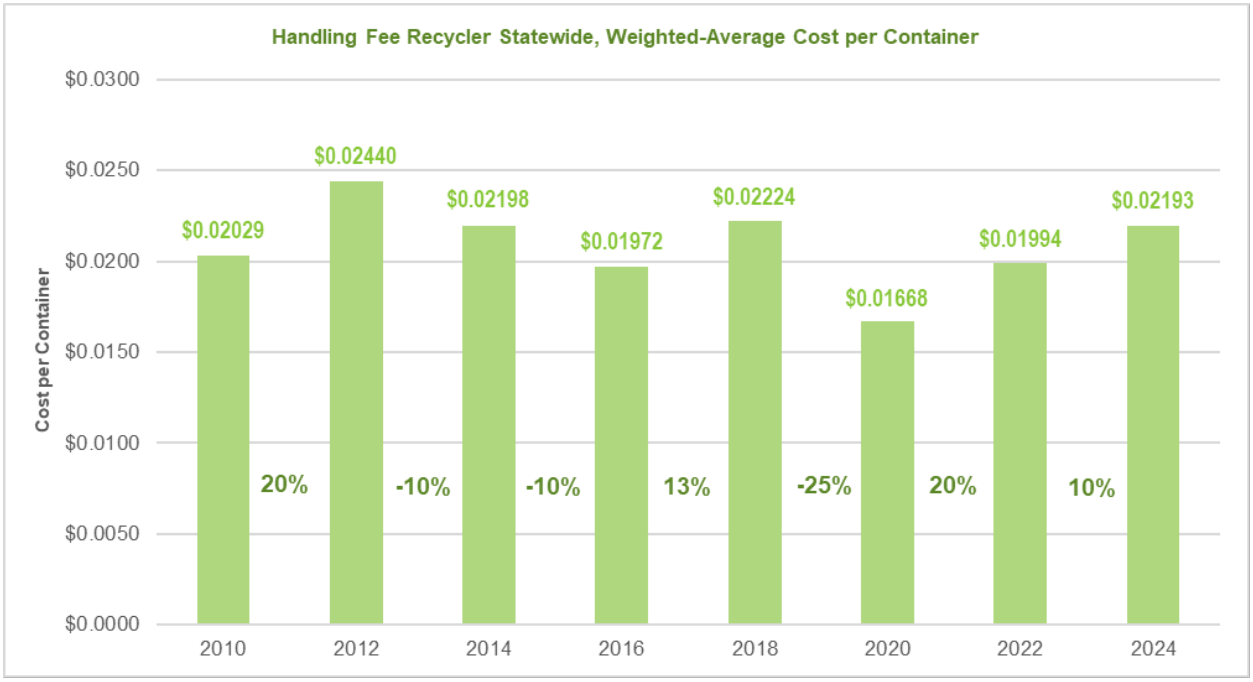
Processing Fee Recycler Statewide, Weighted Average Cost per Container: **$0.01638**

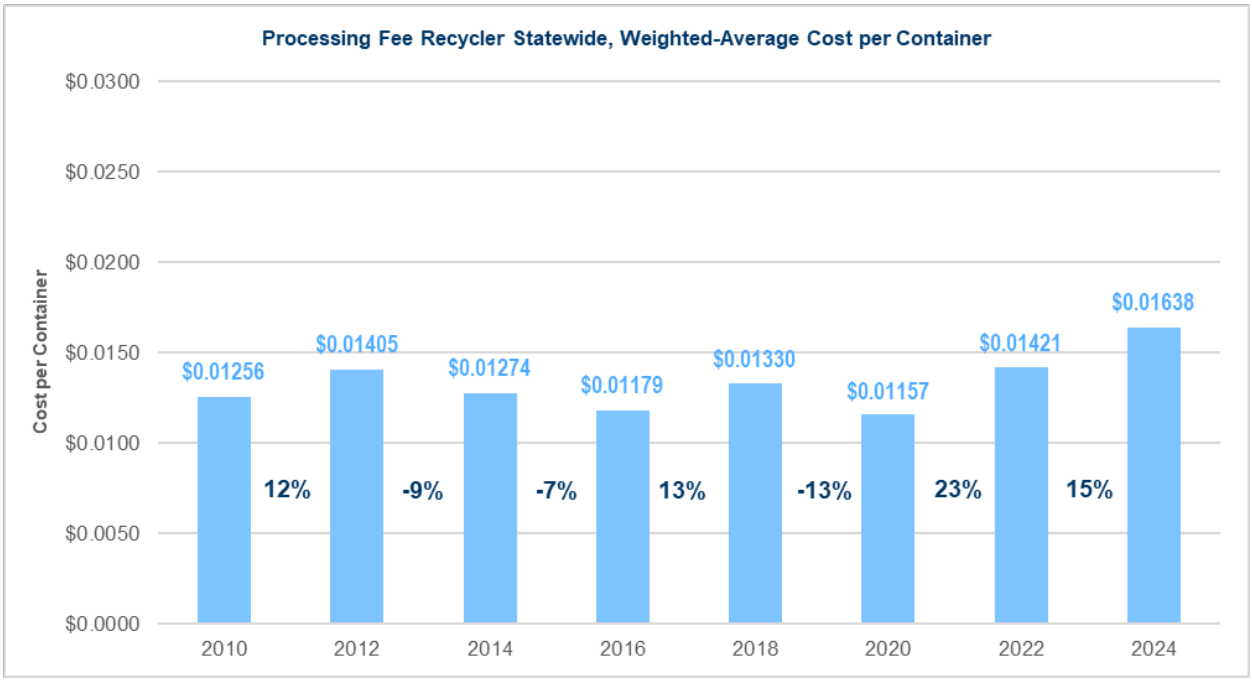
C. Comparison Cost per Container, 2010 to 2024

Exhibit 16 compares the statewide, weighted-average cost per container for processing fee and handling fee recyclers from the most recent eight handling fee cost surveys (from 2010 to 2024). Costs per container increased by 15% in 2024 for processing fee recyclers and 10% for handling fee recyclers. The processing fee recycler increase is consistent with the PF cost survey results in which cost per ton increased for aluminum, glass, and PET.

Between 2010 and 2018, the HF and PF recycler cost per container has fluctuated around $0.023 for HF recyclers and $0.013 for PF recyclers. In 2020, costs per container decreased for both PF and HF recyclers, more notably for HF recyclers at a 25% decrease. Since 2020, the cost per container has been increasing for both PF and HF recyclers.

Exhibit 16
Handling Fee and Processing Fee
Recycler Cost per Container[a] (2010 to 2024)





[a] *Statewide, weighted-average cost per container recycled.*

The increases in HF recycler cost per container between 2022 and 2024 is due to overall increases in operating costs rather than recycler dynamics. In fact, despite increased volumes per recycler, cost per container increased. This indicates that cost-of-living increases were significant enough to overcome the increases in recycler productivity.

To test the credibility of the full cost survey results, Crowe examined several selected factors that may have caused the increase in cost per container for handling fee recyclers and processing fee recyclers. As a result of the analyses, Crowe is confident that the cost-per-container results are a valid reflection of both handling fee and processing fee recyclers' CRV recycling operations during 2024.

Several factors, such as population size, recycling volumes, labor costs, and fuel costs influence recycling center costs, containers, and cost per container, both upward and downward. Consistent with the processing fee cost survey, costs per container increased for both PF and HF recyclers.

Exhibit 17 and **Exhibit 18** provide comparisons of the results for the last eight handling fee cost surveys from 2010 to 2024. The calculated handling fee payment, as of July 1, 2026, will result in a decrease of 3% in the calculated per container handling fee payments from the prior handling fee cost survey.[9] The error rates for the 2024 handling fee cost survey were consistent with prior years. Both error rates, calculated at the 90% confidence level, were below 10%.

[9] CalRecycle opted to issue a revised handling fee rate for FY 2022/2023 based on a cost-of-living adjustment to prior handling fees. Based on the current applied handling fee rate, the result would be a decreased rate if using this current Handling Fee Cost Survey calculated per container handling fee payment.

Exhibit 17
Statewide Handling Fee and Processing Fee Recycler
Costs per Container and Calculated Handling Fee (2010 to 2024)

Statewide, Weighted Average, Cost per Container

Recycler Type	2024	2022	2020	2018	2016	2014	2012	2010
1. Handling Fee Recycler	2.193 Cents	1.994 Cents	1.157 Cents	2.224 Cents	1.972 Cents	2.198 Cents	2.440 Cents	2.029 Cents
2. Processing Fee Recycler	1.638 Cents	1.421 Cents	1.668 Cents	1.330 Cents	1.179 Cents	1.274 Cents	1.405 Cents	1.256 Cents
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	0.555 Cents	0.573 Cents	0.511 Cents	0.894 Cents	0.793 Cents	0.924 Cents	1.035 Cents	0.773 Cents

Percentage Change

Recycler Type	2022 to 2024	2020 to 2022	2018 to 2020	2016 to 2018	2014 to 2016	2012 to 2014	2010 to 2012
1. Handling Fee Recycler	10%	20%	-13%	13%	-10%	-10%	20%
2. Processing Fee Recycler	15%	23%	-25%	13%	-7%	-9%	12%
3. Handling Fee Recycler Cost per Container minus Processing Fee Recycler Cost per Container	-3%	12%	-43%	13%	-14%	-11%	34%

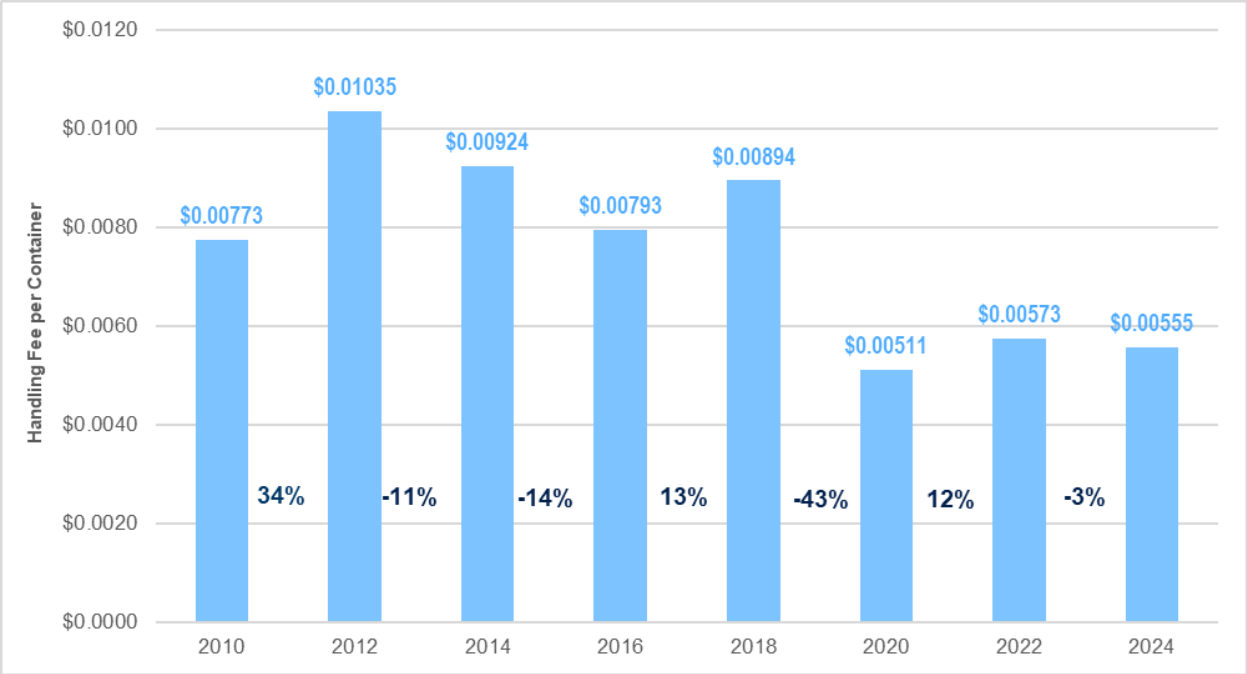
Exhibit 18
Statewide Handling Fee and Processing Fee Recycler Cost Survey Error Rates (2010 to 2024)

Recycler Type	2024	2022	2020	2018	2016	2014	2012	2010
1. Handling Fee Recycler	5.81%	6.12%	6.07%	4.94%	5.07%	4.09%	4.37%	5.62%
2. Processing Fee Recycler	6.55%	4.55%	5.63%	6.70%	6.98%	7.03%	6.30%	5.79%

Exhibit 19 illustrates the most recent eight per container handling fees, as measured by the associated cost surveys. The changes from survey to survey can be significant, depending on the varied factors impacting PF and HF recycler costs and the relative changes between PF and HF recyclers. The measured handling fee for a given year becomes effective on July 1, two years after the survey cost year. For example, the costs calculated for 2024 determine the handling fee effective on July 1, 2026.

Between the 2022 survey year and the 2024 survey year, the calculated handling fee decreased by 3%. Since 2010, the calculated handling fee payments remained close to $0.008 and dropped significantly between 2018 and 2020. CalRecycle made an administrative decision[10] to maintain the $0.010 cent per container handling fee (the calculated rate plus a cost-of-living increase from 2019) for July 2022. Note that CalRecycle applies a cost-of-living adjustment (COLA) to handling fees, so actual per container payments are slightly higher than the calculated results.

Exhibit 19
Handling Fee Cost Survey Calculated Handling Fee Payments (without COLA) (2010 to 2024)



[10] Through AB 203, CalRecycle is able to issue a handling fee rate that is based on a cost-of-living adjustment to the prior handling fee rate.

D. Handling Fee Recycler Cost per Container Increase

The handling fee cost per container increased 10% between 2022 and 2024. This section discusses several factors that likely contributed to the higher HF cost per container and resulting higher handling fee payment. To test the credibility of the full cost survey results, Crowe examined several selected factors that may have caused the increase in cost per container for both handling fee recyclers and processing fee recyclers. The higher costs-per-container results from this handling fee cost survey are consistent with the higher costs-per-ton results for the three main materials (aluminum, glass, and PET) of the processing fee cost survey.

Importance of Number of Containers Recycled

Cost per container is highly dependent on the number of containers recycled. **Exhibit 20** provides a comparison of the HF recycler cost per container and the number of containers recycled by the HF recycler population for the eight handling fee cost surveys. The exhibit shows that in most years leading up to 2020, cost per container decreased between survey years when the number of containers recycled increased, and cost per container increased when containers recycled decreased. However, in both 2022 and 2024, cost per container increased, even with a significant increase in the number of containers recycled. This indicates that non-volume factors contributed to the cost increase.

Exhibit 20
Cost per Container Results and Containers Recycled by the Survey Population
Handling Fee Recyclers (2008 to 2024)

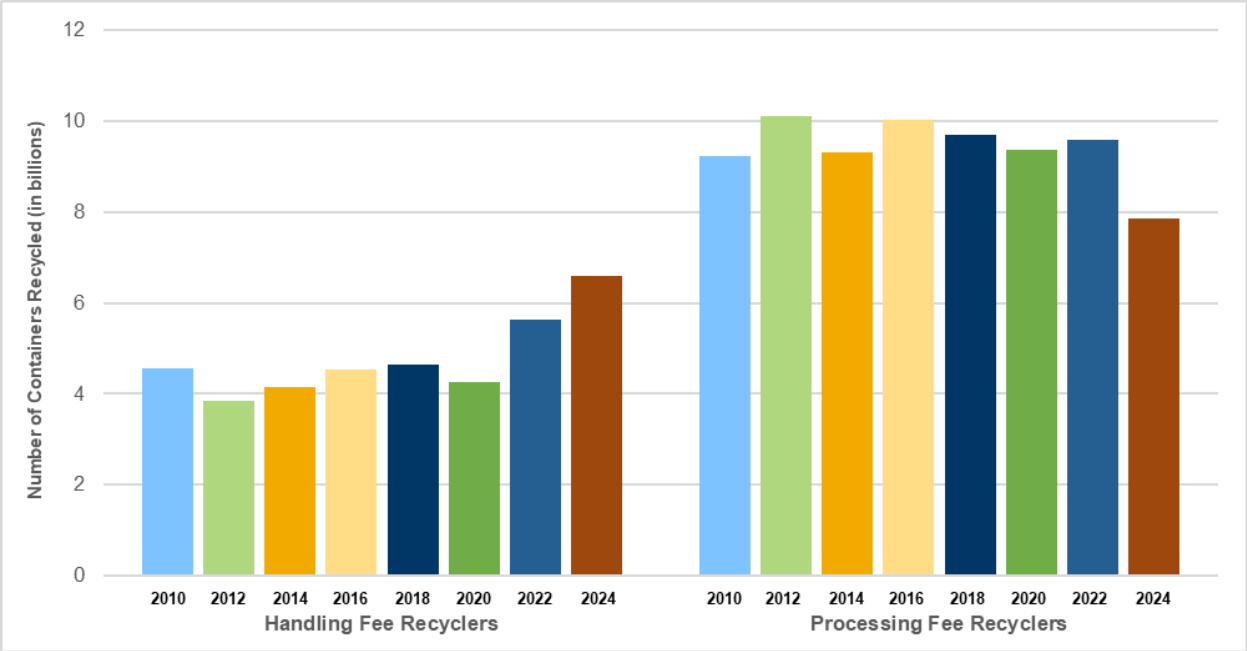
Survey Year	Cost per Container (cents)	Percent Change in Cost per Container	Population Containers Recycled	Percent Change in Containers Recycled
2008	2.196	-9%	3,992,318,572	+28%
2010	2.029	-8%	4,562,408,591	+14%
2012	2.440	+20%	3,837,216,107*	-16%
2014	2.198	-10%	4,157,132,629	+8%
2016	1.972	-10%	4,520,190,932	+9%
2018	2.224	+13%	4,640,870,876	+3%
2020	1.668	-25%	4,259,919,837	-8%
2022	1.994	+20%	5,619,353,246	+32%
2024	2.193	**+10%**	6,580,259,899	**+17%**

The importance of number of containers recycled applies to the overall results but starts at the individual recycling center level. In determining CRV costs at an individual recycling center, there is sometimes an opportunity to allocate costs between CRV and non-CRV (including other business) categories. However, the majority of handling fee recyclers only handle CRV material. For example, of the 128 HF for HF recyclers surveyed for 2024, only 4% of total labor hours were associated with non-CRV recycling. Thus, the cost-per-HF container is primarily based on all of the recycling center's (RC) costs, divided by all of the RC's containers. To the extent that many RC costs are essentially fixed, the number of containers tends to have a significant influence on cost per container. For PF recyclers, costs (and labor) are more often distributed across CRV and non-CRV categories, so cost per container is less dependent on number of containers recycled.

Once the survey team has identified CRV costs at the individual RC, the number of containers recycled is the only variable in the cost-per-container calculation: CRV costs ÷ CRV containers. By comparison, the material-specific cost-per-ton calculations of the processing fee cost survey have an additional variable: the percent of labor spent on aluminum/bi-metal, glass, and plastic recycling. For any given RC, and for employees at the RC, the percent of labor spent on each of the three categories varies. Thus, cost-per-ton values are dependent on allocations for both labor and tons of material, which reduces dependency on recycled material quantity.

Once the survey team has identified CRV costs at the individual recycling center, the number of containers recycled is the only variable in the cost-per-container calculation: CRV costs ÷ CRV containers. **Exhibit 21** provides a comparison of containers recycled by the HF and PF cost survey populations over the most recent eight handling fee cost surveys. Comparing the equivalent full population data, PF containers recycled have been steady from 2010 to 2022. In 2024, PF containers recycled decreased by 18%. Conversely, HF containers recycled have been increasing since 2022 and increased by 17% from 2022 to 2024.

Exhibit 21
Number of Containers Recycled by Handling Fee Recyclers and Processing Fee Recyclers (2010 to 2024 Populations)



Cost Differential between Handling Fee Recyclers and Processing Fee Recyclers

The increase in HF recycler cost per container clearly has implications on the handling fee payment, as does the increase in PF recycler cost per container. The calculated handling fee payment is the difference between the cost to recycle for recyclers that receive handling fees (HF recyclers) and the cost to recycle for recyclers that do not receive handling fees (PF recyclers):

Calculated Handling Fee = HF Cost/Container – PF Cost/Container

To determine the calculated handling fee, we compare costs between similar samples of HF and PF recyclers. Both populations are stratified, with approximately one-third of containers recycled within each of the three strata. Because we utilize parallel sample designs, we can be assured that we are making an appropriate comparison, to the extent possible.

PF recycler cost per container to recycle increased 15% between 2022 and 2024, from 1.421 cents per container to 1.638 cents per container. The 15% increase in PF recycler cost per container is consistent with the increases seen in the PF recycler cost per ton results, although the cost per container increase is more significant. The calculated $0.00555 handling fee payment from this cost survey represents a 3% decrease from the $0.00573 handling fee payment calculated in the 2022 HF cost survey.

The impact of the differential can move in both directions. For example, in the 2022 cost survey, the HF recycler cost per container increased 20% compared to 2020, and the PF recycler cost per container also increased over the same period. The calculated 2022 handling fee payment increased compared to 2020. This survey represents a similar trend between HF and PF results, where HF and PF cost per container results change in the same direction and to similar levels. The fact that PF cost per container increased more than HF cost per container led to a decrease in the calculated HF.

3. Handling Fee Cost Survey Analyses

This section provides analyses of the cost per container results for the handling fee cost survey. The section is organized as follows:

A. Changes in Number of Recyclers, Costs, and Recycled Containers

B. Changes in Recycling Center Productivity and Costs

C. Total Annual Handling Fee Payments

D. Comparison of Population Size, Containers Recycled, and Costs by Strata

E. Comparison of Population Characteristics of Processing Fee and Handling Fee Recyclers

F. Summary of Handling Fee Cost Survey Analyses.

A. Changes in Number of Recyclers, Costs, and Recycled Containers

Introduction

The statewide, weighted-average cost per container for the HF for HF RCs, and for the PF for HF RCs, is the quotient determined by dividing the estimated statewide weighted cost of recycling the CRV material as calculated from the handling fee cost survey (numerator), by the number of containers recycled as determined from CalRecycle reporting systems (denominator). Changes in the HF for HF and PF for HF costs per container from survey to survey result from changes in CRV costs and CRV containers recycled. There is generally an inverse linear relationship between costs of recycling and containers recycled (costs decrease as the number of containers increase). However, the relative increase, or decrease, in costs and containers between any two given cost surveys is not necessarily the same.

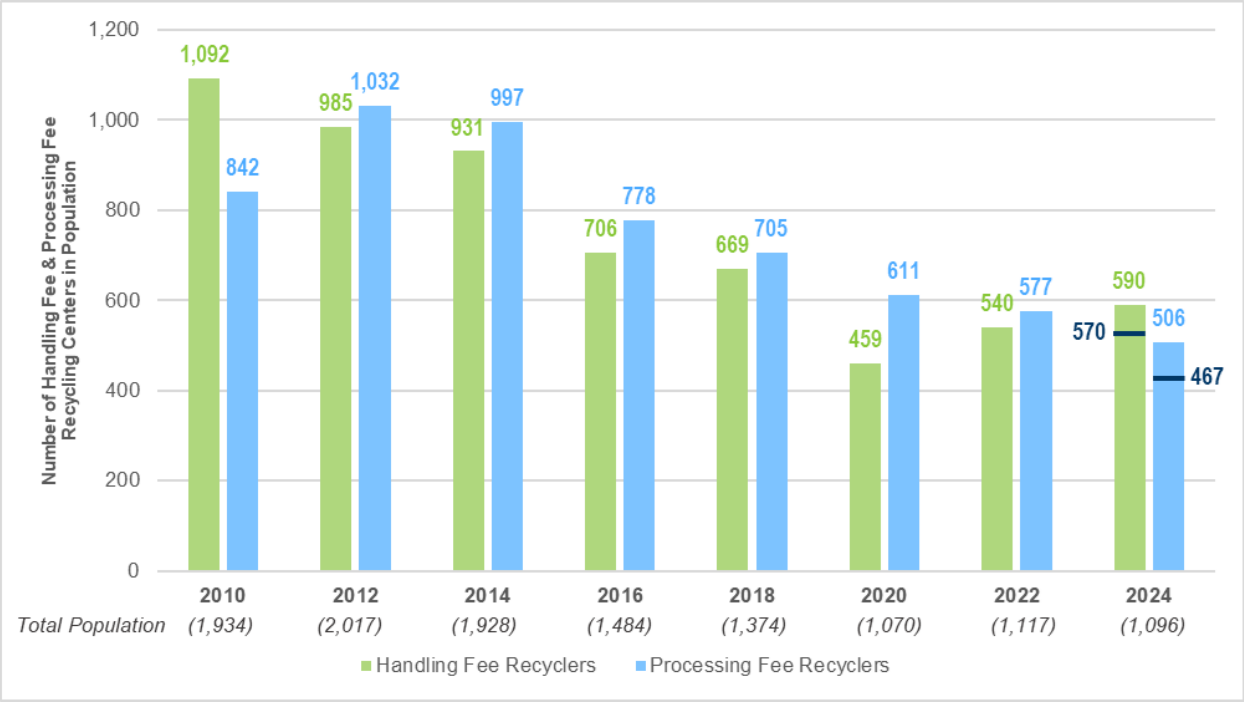
In the following section, Crowe presents a series of graphs that explore the relationship between population CRV costs and containers recycled over time, and how changes in these two variables impact changes in the cost per container over time. In the subsection that follows, Crowe examines the impact of these changes on cost-per-container results.

Historical Trends in Population Number of Recyclers

The population costs and recycled containers are related, to some extent, to the number of RCs in the population. In any given survey year, each recycler in the population may recycle more, or less, CRV materials. Generally, recyclers handling more containers have a lower cost per container than recyclers handling fewer containers.

Exhibit 22 provides the number of HF and PF recyclers during each of the most recent handling fee cost survey years. The exhibit displays the downward trend in HF recyclers, since 2010, with an increase since 2020. Since 2020, the number of HF recyclers has increased 29%. The increase in HF recycler population between 2020 and 2022 is the largest increase in RCs in the most recent eight surveys. Though too early to tell, this increase may signal a reverse in the trend of declining HF recycler population. This may also signal a stabilization or re-adjustment since the closure of one large recycler in 2019. Further, with SB 1013 (Atkins, 2022), the convenience zone radius was expanded from 0.5 miles to 1 mile, which also may have increased the number of recycling centers eligible for the handling fee. The volume of containers recycled by HF recyclers has also increased during the same period (between 2020 and 2024).

Exhibit 22
2010 to 2024 Populations, Number of Handling Fee Recycling Centers and Processing Fee Recycling Centers



Note: The 2024 bar includes 20 HF Recyclers and 39 PF Recyclers being investigated. These were removed from the survey population (590 HF recyclers reduced to 570 and 506 PF recyclers reduced to 467).

The volume of containers recycled by HF recyclers also increased from 2022 to 2024, by about 17%. When the number of HF recyclers increases by a lower percentage than the number of containers recycled, the amount of recycled material available to each HF recycler, on average, increases.

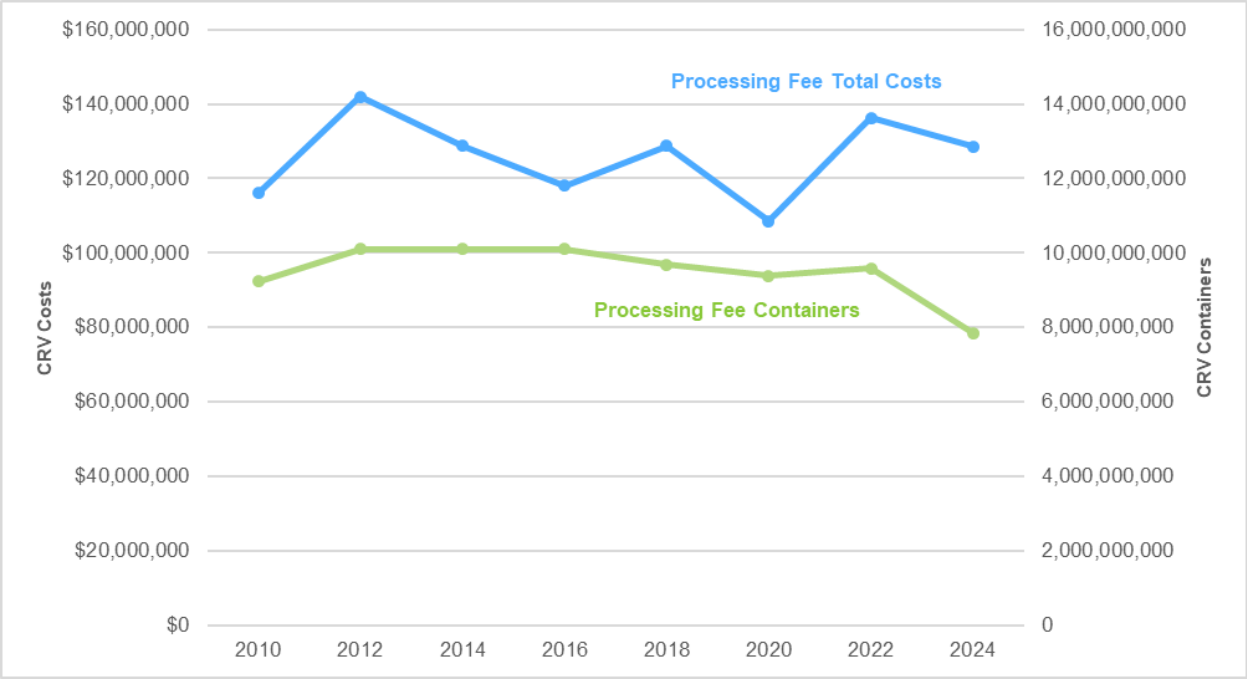
The number of PF recyclers peaked in 2012 at 1,032. Since 2012, the total number of PF recyclers has trended downward, with a 12% decrease between 2022 and 2024. Again, this could relate to the portion of PF recyclers that became eligible for the handling fee under SB 1013. There was also an 18% decrease in PF population container volumes, reducing the average number of containers recycled per site.

Commonly, higher container volumes translate to lower costs per container. In this case, the smaller recycler population and increased volumes per recycler have had little impact to the resulting PF recycler population cost per container increases. As costs increased similarly between HF and PF recyclers, other factors are impacting the increase in cost, rather than the overall container volume increases.

Containers recycled by handling fee RCs has been increasing since 2014 and increased about 9% from 2022 to 2024. **Exhibit 23** and **Exhibit 24** provide historical trends in total population costs and total population containers, from the 2010 handling fee cost survey to 2024 handling fee cost survey. Population cost data are estimated from the handling fee cost survey. Population container data are based on CalRecycle reports.

Exhibit 23
Population CRV Costs and Containers of Handling Fee Recyclers (2010 to 2024)

Exhibit 24
Population CRV Costs and Containers of Processing Fee Recyclers (2010 to 2024)



B. Changes in Recycling Center Productivity and Costs

Introduction

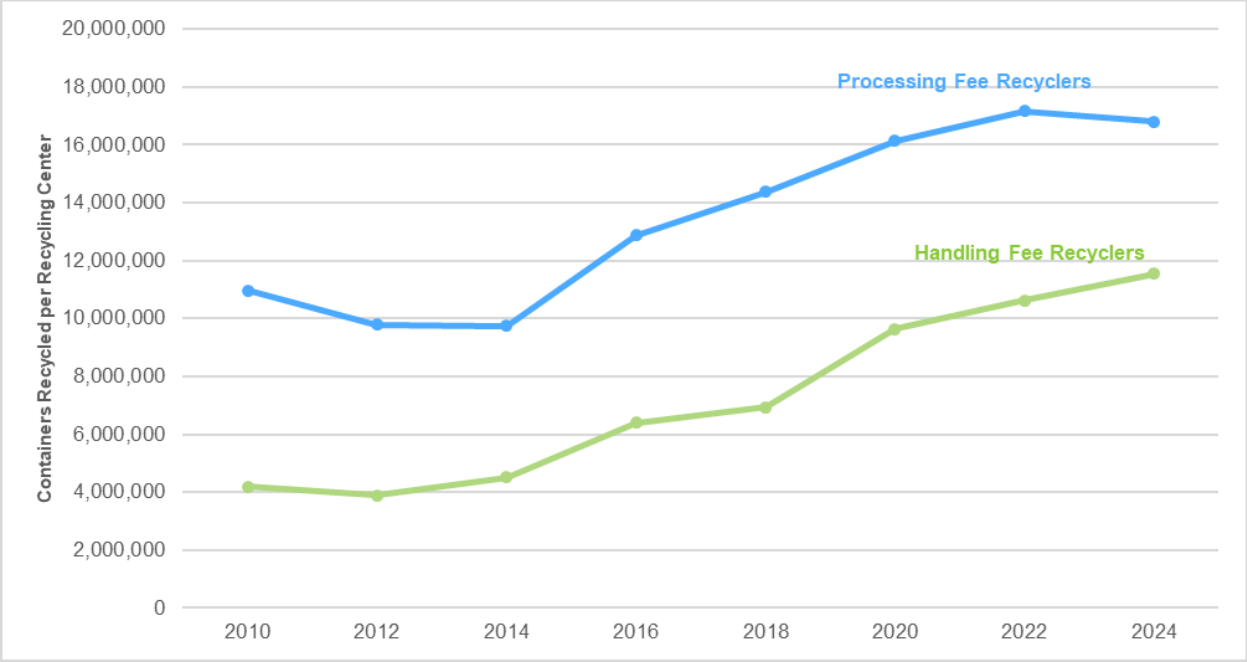
The increase in cost per container for 2024 is due to the interrelationship between several factors: recycling center productivity, labor hours, and costs. From 2022 to 2024, productivity levels, measured as containers recycled per RC, increased for HF and decreased for PF recyclers. The minor changes in productivity did not significantly contribute to a change in costs.

Average Containers Recycled per Recycling Center

The productivity of handling fee recyclers (i.e., the average number of containers recycled per RC) has generally been increasing, with a dramatic increase starting in 2014. There has been a similar steep increase in average containers per RC (productivity) for PF recyclers, with the exception of 2022 to 2024.

Exhibit 25 provides the average number of containers recycled per RC, for the cost survey years 2010 through 2024. Each cost survey year's data point is the quotient determined by dividing population containers recycled by the number of RCs in the population. HF recycler productivity increased by 9%, while PF recycler productivity decreased slightly by 2%. The decrease in PF recycler productivity is due to the greater decrease in total containers recycled as compared to the decrease in the number of PF recyclers.

Exhibit 25
Average Containers Recycled per Handling Fee Recycler and Processing Fee Recycler (2010 to 2024)



Change in Containers per RC, Costs per RC, and Cost per Container

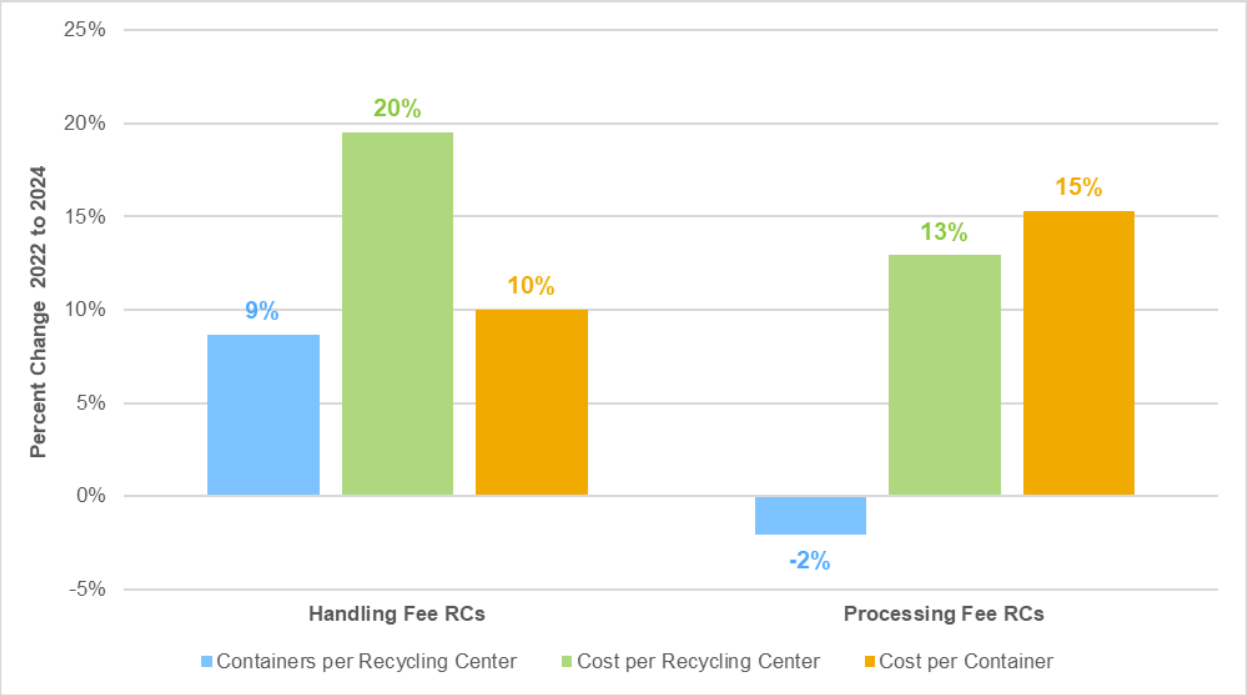
Exhibit 26 summarizes the typical impacts of key recycler metrics (containers per recycler, costs per recycler) and their impact to cost per container. This shows that higher containers per recycler contribute to lower cost per container (inverse relationship), and higher costs per recycler contribute to higher costs per container (positive relationship).

Exhibit 26
Impact of Key Recycler Metrics to Cost per Container

Key Metric	Relative Value	Cost per Container
Containers per Recycler	Higher	Lower
Costs per Recycler	Higher	Higher

Exhibit 27 summarizes the relationship between RC productivity, costs, number of containers, and cost per container. The figure shows the percent change of these key metrics between 2022 and 2024. For handling fee recyclers, productivity, measured as containers recycled per RC, increased at a significantly lower rate than costs per RC, resulting in an increase in cost per container. Processing fee recyclers experienced a similar trend to a slightly greater extent. The spread between the change in containers and costs per recycler for HF recyclers is 11 percentage points (20% increased recycler costs vs 9% increased containers), while the spread was 15 percentage points (13% vs -2%) for processing fee recyclers. The slightly higher spread for processing fee recyclers resulted in a slightly higher percent increase in cost per container compared to handling fee recyclers.

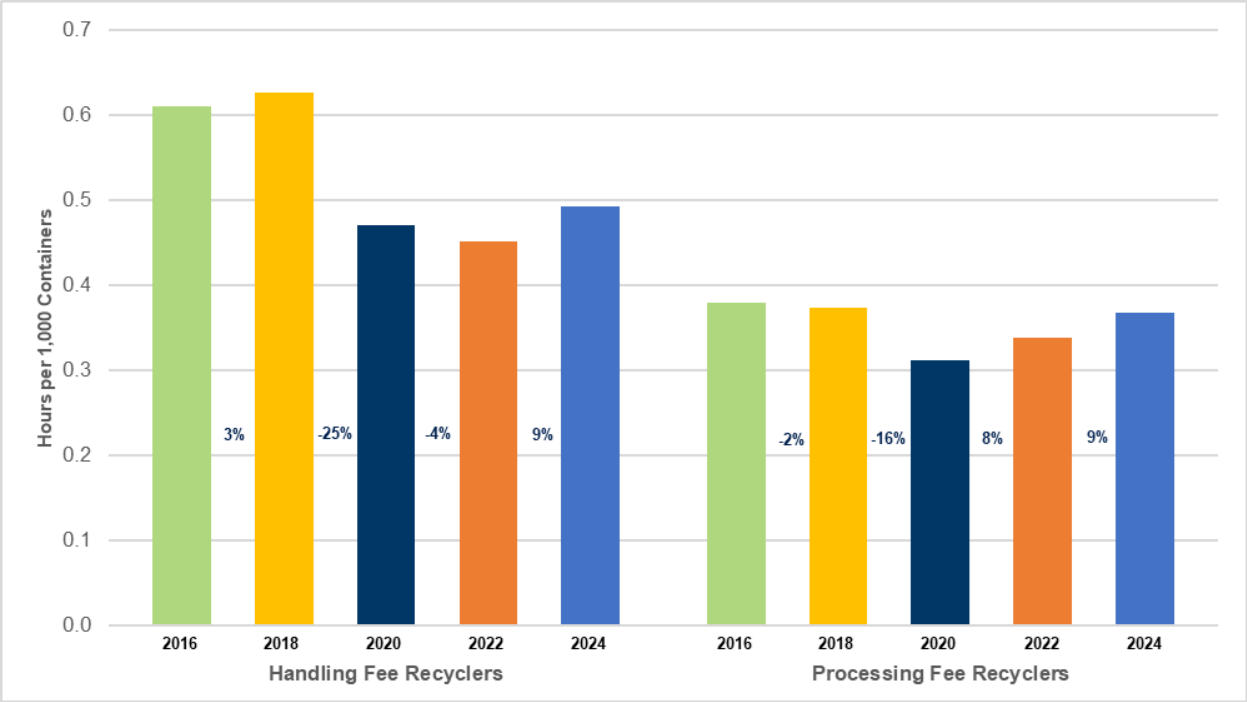
Exhibit 27
2022 and 2024 Sampled Handling Fee and Processing Fee Recyclers
Percent Change in Key Recycler Metrics



Labor Hours per 1,000 Containers Recycled

The labor hours required to handle 1,000 CRV beverage containers is another measure of RC productivity and is a factor that has a direct impact on cost per container. Crowe calculated and compared the average handling fee and processing fee recycler labor hours allocated per 1,000 containers recycled between the 2016 and 2024 surveys. **Exhibit 28** shows the labor hours allocated per 1,000 CRV containers recycled. Labor hours per 1,000 containers declined substantially for both recycler types in 2020. Since then, labor hours for HF recyclers have generally hovered around 2020 levels, indicating relatively stable productivity in recent years. In contrast, PF recyclers have experienced a gradual increase in labor hours per 1,000 containers, suggesting a modest decline in productivity since 2020.

Exhibit 28
2016 to 2024 Sampled Handling Fee Recyclers and Processing Fee Recyclers
Average Labor Hours per 1,000 Containers Recycled



Because labor represents more than half of total recycler operating costs, even modest increases in labor hours per 1,000 containers can materially affect overall cost per container. While earlier productivity gains helped offset rising wages and other cost pressures, the recent decrease in labor productivity (particularly for PF recyclers) may contribute to higher overall system costs if sustained.

Cost Category Comparison

In conducting the cost surveys, Crowe assigns each recycler cost line item to one of 13 categories. To help evaluate potential reasons for the cost-per-ton increases between 2022 and 2024, we compared the average CRV category costs among HF for HF and PF for HF recyclers for the two survey years. This data reflects the total costs in a particular category divided by the number of sampled RCs. It does not consider costs by strata or recycling tons per site; it simply reflects an average category cost per RC for the 128 HF recyclers and 96 PF recyclers surveyed as part of the 2024 Handling Fee cost survey.

Exhibit 29 provides a comparison of the 2022 and 2024 average category costs and percentage of costs per sampled HF recycler. This comparison illustrates several key points:

- Average CRV costs per RC increased by 22%.
- The distribution of CRV costs by major category remained largely consistent between the two years. Direct labor accounted for 52.6% of total CRV costs in both years, transportation comprised approximately 11% to 12%, and general business overhead represented roughly 7.5% in each year.
- All cost categories increased besides indirect labor, supplies, and insurance.
- The cost categories with the greatest dollar increase between 2022 and 2024, accounting for almost 90% of the increase, were (ordered from greatest to least):
    - Direct Labor
    - Rent
    - Depreciation
    - Transportation
- Direct labor was the largest single factor, accounting for 53% of the increase.
- Rent and depreciation had the next greatest dollar increase, accounting for 19% and 10% of the increase, respectively.

Exhibit 29
Comparison of Average Handling Fee Recycler Category Costs (2022 and 2024)

Cost Category	2022 (n=115)	% of CRV Costs	2024 (n=128)	% of CRV Costs	% Change 2022 to 2024
Direct Labor	$132,967	52.5%	$162,977	52.6%	23%
Indirect Labor	15,349	6.1%	12,670	4.1%	-17%
General Business Overhead	19,912	7.9%	23,006	7.4%	16%
Transportation	29,830	11.8%	34,501	11.1%	16%
Rent	20,757	8.2%	31,334	10.1%	51%
Depreciation	3,587	1.4%	9,192	3.0%	156%
Property Tax	86	0.0%	379	0.1%	339%
Utilities	6,504	2.6%	9,003	2.9%	38%
Supplies	12,261	4.8%	11,944	3.9%	-3%
Fuel	366	0.1%	538	0.2%	47%
Insurance	5,796	2.3%	4,957	1.6%	-14%
Interest	574	0.2%	1,516	0.5%	164%
Maintenance	5,191	2.1%	7,754	2.5%	49%
Total CRV Costs per Site	**$253,180**	**100.0%**	**$309,771**	**100.0%**	**22%**

Exhibit 30 provides a similar comparison for sampled PF recyclers, which illustrates several key points:

- Average CRV costs per RC increased by 18%.
- Similar to HF recyclers, for PF recyclers the percent of CRV costs by category, were very similar between the two years. For example, direct labor represented 52.6% of CRV costs in 2022 and 51.5% in 2024.
- The cost categories that make up the largest share of RC costs besides labor are:
    - Rent (13%)
    - Transportation (7%)
- All cost categories increased besides transportation and depreciation.
- The cost categories with the greatest increase between 2022 and 2024, accounting for almost 90% of the increase, were (ordered from greatest to least):
    - Direct labor
    - Rent
    - Maintenance
    - Utilities
- The increase in labor was the largest single factor, accounting for 45% of the increase.
- Rent and maintenance had the next greatest dollar increase, each accounting for 26% and 10%, respectively.

Overall, changes by cost category among HF and PF recyclers were similar, with both increasing by about 20%. Category by category, larger percent changes were related to minority cost categories.

Exhibit 30
Comparison of Average Processing Fee Recycler Category Costs (2022 to 2024)

Cost Category	2022 (n=134)	% of CRV Costs	2024 (n=96)	% of CRV Costs	% Change 2022 to 2024
Direct Labor	$157,737	52.6%	$182,136	51.5%	15%
Indirect Labor	22,812	7.6%	23,985	6.8%	5%
General Business Overhead	17,462	5.8%	19,997	5.7%	15%
Transportation	27,433	9.1%	24,273	6.9%	-12%
Rent	31,904	10.6%	46,091	13.0%	44%
Depreciation	6,873	2.3%	6,556	1.9%	-5%
Property Tax	1,503	0.5%	1,744	0.5%	16%
Utilities	9,191	3.1%	13,225	3.7%	44%
Supplies	9,974	3.3%	10,855	3.1%	9%
Fuel	1,454	0.5%	3,565	1.0%	145%
Insurance	5,046	1.7%	6,783	1.9%	34%
Interest	1,005	0.3%	1,860	0.5%	85%
Maintenance	7,573	2.5%	12,775	3.6%	69%
Total CRV Costs per Site	**$299,967**	**100.0%**	**$353,845**	**100.0%**	**18%**

Labor and Non-Labor Costs

The average HF and PF recyclers' wages per hour continued to increase through 2024. **Exhibit 31** illustrates average wages per hour from 2016 through 2024. For HF recyclers, average wages increased from $20.68 in 2022 to $22.25 in 2024, an increase of $1.57 per hour, or approximately 8%. For PF recyclers, average wages increased from $21.25 in 2022 to $22.86 in 2024, an increase of $1.61 per hour, also approximately 8%.

Although the percentage increases from 2022 to 2024 were smaller than the sharp increases observed between 2020 and 2022, they represent continued wage escalation. Since labor accounts for more than half of total recycler costs, even single-digit percentage increases materially affect total cost per container.

Importantly, during this same period (2022 to 2024), labor hours per 1,000 containers increased for both HF and PF recyclers. This indicates a decline in productivity at the same time wages were increasing. The combination of higher hourly wages and increased labor hours per 1,000 containers adds upward pressure on labor cost per container.

Exhibit 31
2016 to 2024 Sampled Handling Fee and Processing Fee Recyclers
Average Wages per Hour

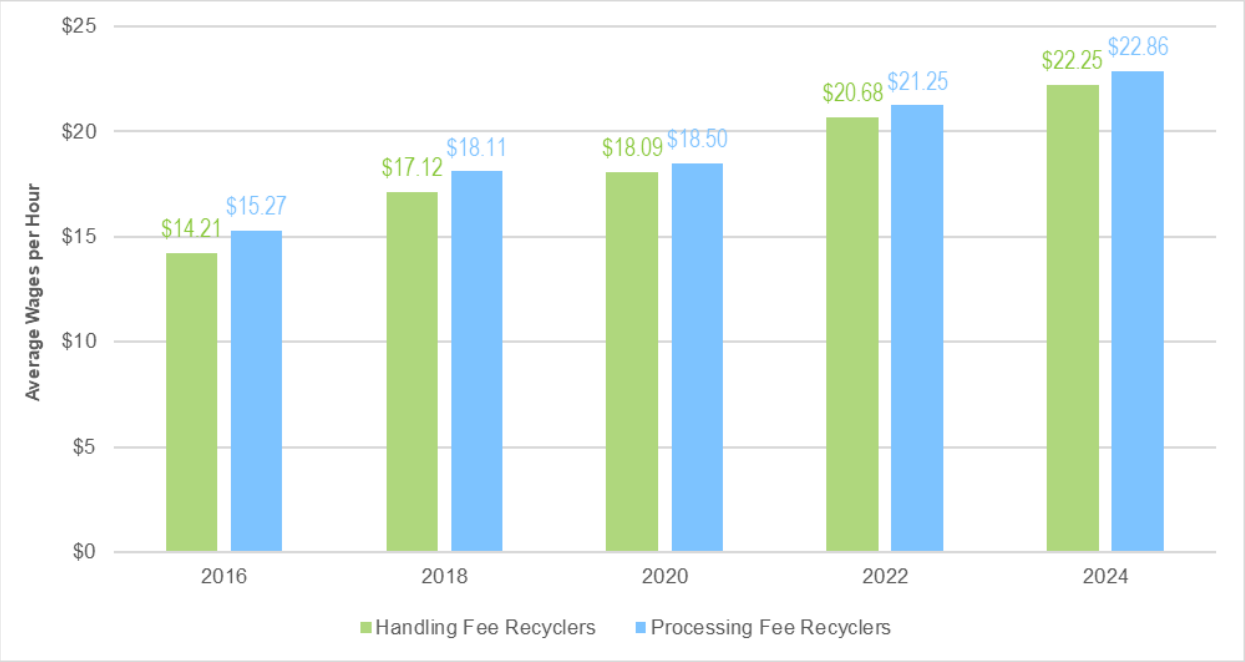
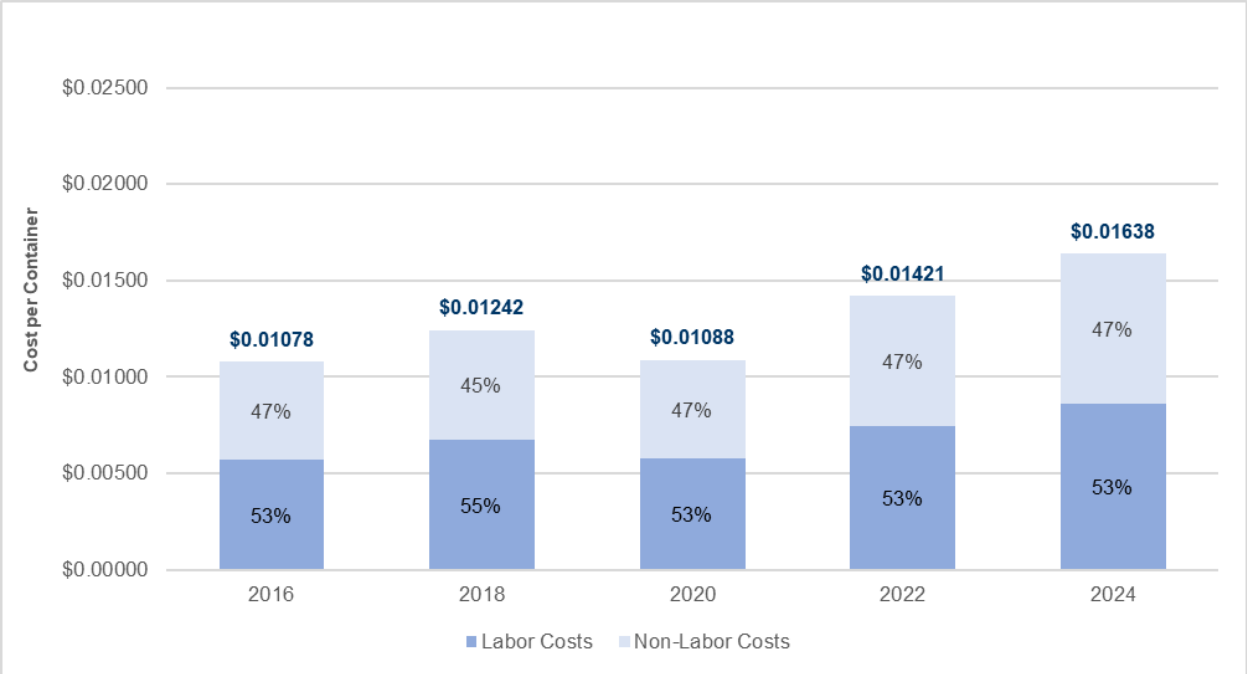


Exhibit 32 and **Exhibit 33** illustrate the split of costs between labor and non-labor expenditures.

Exhibit 32
2016 to 2024 Sampled Handling Fee Recyclers
Labor and Non-Labor Costs per Container

Exhibit 33
2016 to 2024 Sampled Processing Fee Recyclers
Labor and Non-Labor Costs per Container



Changes in Labor Costs

Crowe analyzed CRV labor costs and labor hours to better understand how labor influenced the increase in cost per container between 2022 and 2024. In following the analyses, 2024 labor costs are not adjusted by CPI, rather, they are a straight dollar comparison across the two survey years. A CPI adjustment would increase 2024 costs by 7.5%.[11]

To evaluate the potential influence and impact of labor costs on costs per container, as well as the potential influence of high-wage sites or labor allocations, Crowe conducted evaluations of several potential factors related to labor hours, labor allocations, hourly yard wages, hourly administrative wages, and minimum wage. The cost survey labor allocation methodology assigns labor hours for each employee or owner at the site based on whether the time was associated with: 1) the recycler or other business, 2) CRV or non-CRV activities, 3) Direct yard labor (DYL) or all other labor (AOL), and 4) certain material types, i.e., aluminum/bi-metal, glass, and plastic. DYL labor includes yard employees that sort, weigh, handle, bale, or cashier. AOL includes administration, management, and driver time, all of which are typically higher-wage activities.

- Factors that **did** lead to higher labor costs:
    - **Higher CRV hourly wages** – Weighted-average CRV wages increased by 8% for both HF and PF recyclers. Wages rose across nearly all strata (except HF Strata 1), likely reflecting minimum wage increases of 7% statewide and 8% in LA County, as well as broader labor market pressures.
    - **High wage sites** – The share of sites with AOL wages
    - $100/hour increased for both HF and PF recyclers. These sites also exhibited higher average wage rates in 2024, contributing to upward pressure on overall labor costs.
    - **Labor hours per 1,000 CRV containers** – Increased by 9% for both HF recyclers and PF recyclers. This indicates a decline in productivity and higher labor input per unit, which contributed to increased costs.
- Factors that **did not** lead to higher labor costs:
    - **Low wage sites** – The proportion of low wage sites decreased slightly for HF recyclers (17% in 2022 and 14% in 2024), and PF recyclers (14% to 11%). At the same time, the average hourly wage for this proportion of low wage recyclers increased in 2024 compared to 2022. Given their relatively small and shrinking share, along with offsetting wage increases, low-wage sites did not materially impact overall labor cost changes.

[11] Cumulative California inflation of about 7–8% between 2022 and 2024 based on California Department of Finance, Consumer Price Index data, accessed: https://dof.ca.gov/forecasting/economics/economic-indicators/inflation.

CRV Hourly Wages

Crowe calculated CRV hourly wages by summing CRV labor costs across all RCs in each survey sample and dividing by the sum of CRV labor hours. **Exhibit 34** and **Exhibit 35** provide a summary of sampled HF and sampled PF CRV hourly wages, respectively. Thus, this calculation reflects a weighted average hourly wage across the survey samples. It does not consider number of CRV containers. As seen in the cost category analysis, labor reflects approximately 50% of the cost of CRV recycling.

CRV hourly wages increased 8% for both sampled HFs and sampled PFs between 2022 and 2024. If we consider that California minimum wage increased 7%, these increases seem reasonable. Across strata for sampled HFs, stratum 1 was the only decrease between 2022 and 2024 for weighted average hourly wages. HF stratum 3 increased the most, with a 28% increase. Across strata for sampled PFs, stratum 1 increased the most with a 12% increase.

To provide context, at 2,080 hours annually, $22.00 per hour is equivalent to $45,760 gross annual income. The following provides additional annual wage comparisons for 2024:

- Median household income in California was $100,600. (Source: St. Louis FRED)
- Per capita income in California was $49,513. (Source: U.S. Census, American Community Survey)
- The California Poverty Measure for a family of four, slightly higher than the federal poverty level, was about $40,545 for homeowners and $40,765 for renters (Source: Population Reference Bureau).

Exhibit 34
Comparison of HF CRV Hourly Wages Overall and by Strata (2022 and 2024)

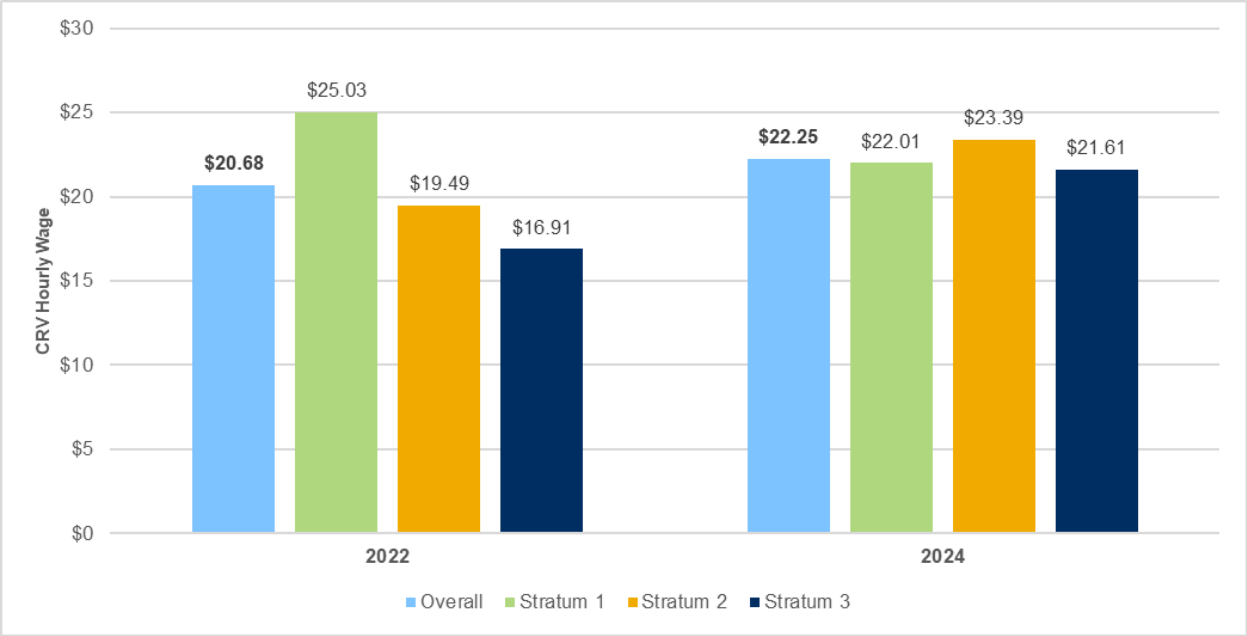
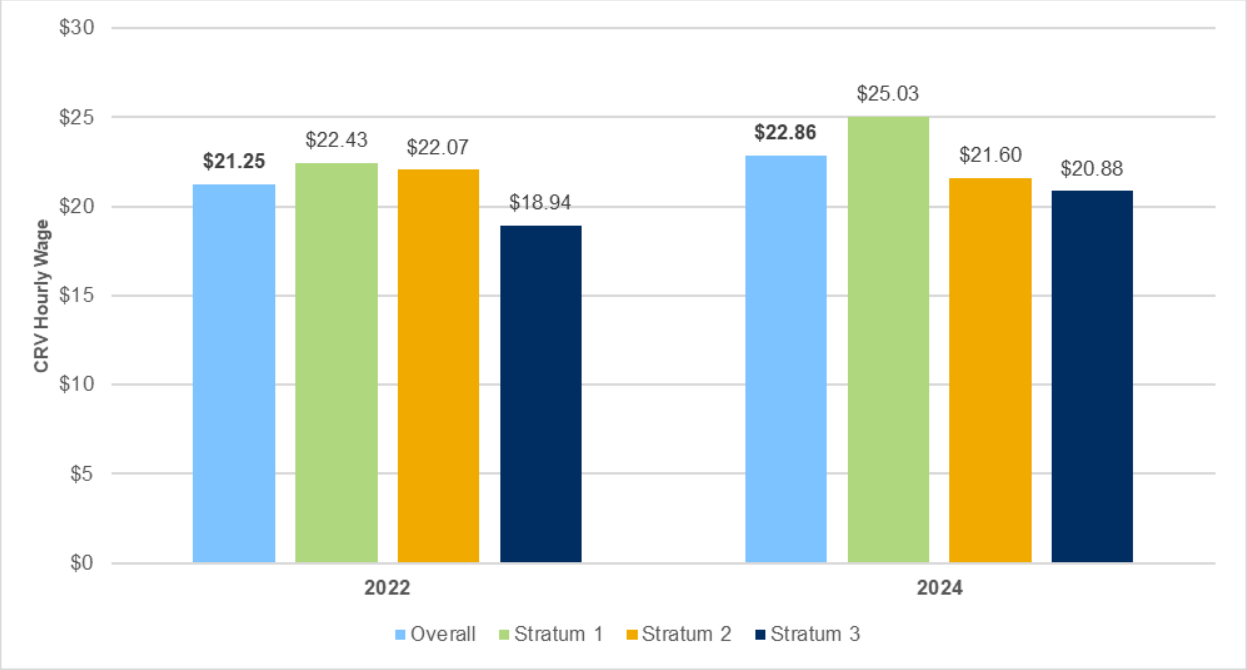


Exhibit 35
Comparison of PF CRV Hourly Wages Overall and by Strata (2022 and 2024)



Increases in DYL, AOL, and Overall Wage per Hour

Consistent with the weighted-average increases (or decreases) in CRV hourly wage, the simple average for DYL, AOL, and overall hourly wages increased (or decreased). Again, for HF recyclers, only stratum 1 had a decrease in hourly wages between 2022 and 2024. This is mostly driven by a 3% decrease in DYL hourly wages. For PF recyclers, hourly wages increased 85% for AOL stratum 1 sites. This explains the overall weighted average increase to stratum 1 PF recyclers seen in Exhibit 37.

It's important to note that these wages cover all types of labor, including other business activities, the recycling center, and both CRV and non-CRV work. Including all labor increases overall wages for HF and PF recyclers. These wages do not reflect the number of hours per site, or volumes of material handled. **Exhibit 36** and **Exhibit 37** provide a comparison of average hourly wages by strata and overall, for sampled HF and PF recyclers, respectively.

Exhibit 36
Comparison of HF DYL, AOL, and Overall Wage per Hour (2022 and 2024)

Average DYL per hour

Strata	2022	2024	% Change
1	$20.32	$19.71	-3%
2	$18.47	$21.09	14%
3	$15.60	$18.96	22%
Average	**$17.50**	**$19.66**	**12%**

Average AOL per hour

Strata	2022	2024	% Change
1	$54.00	$67.67	25%
2	$28.50	$37.76	32%
3	$24.75	$37.72	52%
Average	**$32.02**	**$44.13**	**38%**

Average Overall Wage per Hour

Strata	2022	2024	% Change
1	$24.50	$29.32	20%
2	$19.47	$24.01	23%
3	$16.57	$22.37	35%
Average	**$19.13**	**$24.45**	**28%**

Exhibit 37
Comparison of PF DYL, AOL, and Overall Wage per Hour (2022 and 2024)

Average DYL per hour

Strata	2022	2024	% Change
1	$19.58	$21.84	12%
2	$19.15	$21.19	11%
3	$17.72	$18.73	6%
Average	**$18.52**	**$20.13**	**9%**

Average AOL per hour

Strata	2022	2024	% Change
1	$39.69	$73.34	85%
2	$37.81	$40.43	7%
3	$26.42	$29.70	12%
Average	**$32.43**	**$42.31**	**30%**

Average Overall Wage per Hour

Strata	2022	2024	% Change
1	$23.14	$34.47	49%
2	$23.38	$39.44	69%
3	$19.62	$24.31	24%
Average	**$21.42**	**$30.94**	**44%**

On average, CRV AOL hours make up about 16% of HF and 14% of PF recyclers' total hours. Therefore, even significant changes in AOL wages per hour have a relatively minor impact to overall wage per hour. Further analysis is provided within the following subsection to discuss high AOL wage per hour sites that may have influenced these changes.

From 2022 to 2024, DYL wages per hour increased for both HF (+12%) and PF (+9%) recyclers, consistent with ongoing upward pressure on wages, including increases in minimum wage and competitive labor market conditions. Anecdotal feedback continues to suggest that recycling centers must raise wages not only to comply with minimum wage increases but also to remain competitive and attract workers to physically demanding roles.

In contrast to prior periods, AOL wages per hour increased significantly, rising by 38% for HF and 30% for PF recyclers, with especially large increases in certain strata (e.g., +85% for PF Strata 1). These increases, combined with higher DYL wages, contributed to overall wage per hour increases of 28% for HF and 44% for PF recyclers.

Overall, while DYL wage growth remains a primary driver of overall wage increases, the sharp rise in AOL wages, particularly among PF recyclers, also played a meaningful role in elevating total labor costs in 2024.

Minimum Wage Increases

Changes in DYL are directly impacted by changes in minimum wage. Because DYL accounts for 82% to 84% of CRV labor hours, increases in DYL have a much greater impact on CRV recycling costs than increases in AOL. California minimum wage increased 7%, from $15 per hour in 2020 to $16 per hour in 2024. Los Angeles (LA) County's minimum wage increased 8.2% between 2022 and 2024. Approximately 30% of surveyed handling fee recyclers were located in LA County, while 35% of surveyed processing fee recyclers were located in LA County. The increases in hourly wages in LA County sites have a significant impact on processing fee costs and a slightly lesser impact on handling fee costs.

Exhibit 38 shows that LA County DYL wages increased 11% between 2022 and 2024, while non-LA County DYL increased 14%. AOL wages increased significantly, with a 117% decrease for LA County recyclers and a 14% increase for non-LA County recyclers. Overall, both LA County and non-LA County recyclers increased by approximately 30%. This indicates little difference between LA County and non-LA County.

Exhibit 38
Comparison of HF Los Angeles County and non-Los Angeles County DYL, AOL, and Overall Wage per Hour (2022 and 2024)

Wage Category	LA County 2022 (n=24)	LA County 2024 (n=37)	LA County % Change	Non-LA County 2022 (n=91)	Non-LA County 2024 (n=91)	Non-LA County % Change
Minimum Wage	$15.96	$17.28	8%	$15.00	$16.00	7%
Direct Yard Labor (DYL)	$17.55	$19.48	11%	$17.29	$19.73	14%
All Other Labor (AOL)	$32.37	$70.10	117%	$30.76	$35.17	14%
Overall Wage per Hour	**$19.23**	**$24.77**	**29%**	**$18.76**	**$24.32**	**30%**

Reductions in Low Wage Recycling Centers

One of the challenges inherent in the cost survey methodology is that for sole proprietors, S-corporations, and partnerships where the owner(s) work in the recycling centers, owner's income or profits are generally equivalent to owner wages. These business categories represent a large share of the survey population – 69% for sampled handling fee recyclers and 71% for sampled processing fee recyclers in 2024. Over the past several years, we have seen a growing number of recycling centers where the owner(s) work a significant number of hours, but that have relatively low-to-no profits. This results in hourly wages that are below minimum wage, driving cost per container down.

Crowe evaluated the number and percent of surveyed recyclers with overall hourly wages below California minimum wage in 2022 and in 2024. **Exhibit 39** shows the proportion of surveyed handling fee recycling centers with overall average hourly wages that were less than minimum wage in both 2022 and 2024. The proportion decreased slightly between the two surveyed years. **Exhibit 40** shows the same comparison and overall similar results for processing fee recyclers, again with a slight decrease in proportion of low wage sites in 2024 compared to 2022.

Exhibit 39
Comparison of Low Wage HF Recycling Centers (2022 and 2024)

Category	2022 (n=115)	2024 (n=128)
California Minimum Wage	$15.00	$16.00
Number of Surveyed HF Recyclers < Minimum Wage	19	16
Percent of Surveyed Sites < Minimum Wage	17%	14%
Range of Hourly Wages < Minimum Wage	$2.47 to $14.99	$3.94 to $15.68
Average Hourly Wage of Recyclers < Minimum Wage	$9.76	$12.13

Exhibit 40
Comparison of Low Wage PF Recycling Centers (2022 and 2024)

Category	2022 (n=134)	2024 (n=96)
California Minimum Wage	$15.00	$16.00
Number of Surveyed PF Recyclers < Minimum Wage	16	13
Percent of Surveyed Sites < Minimum Wage	14%	11%
Range of Hourly Wages < Minimum Wage	$0.00 to $14.99	$0.00 to $15.15
Average Hourly Wage of Recyclers < Minimum Wage	$9.95	$10.24

Transportation Costs

Crowe analyzed CRV transportation costs to gain a better understanding of how transportation impacted the changes in cost per container. Transportation costs were one of the larger contributors to overall CRV costs and increased 10% for HF recyclers between 2022 and 2024. To evaluate the impact of transportation on recycler costs, Crowe evaluated transportation and fuel costs for each material type by hauling method. To evaluate the impact of transportation on recycler costs, Crowe combined transportation and fuel costs. These costs include non-labor costs that should generally reflect the cost to recyclers of hauling material to processors.[12] To analyze how transportation influenced cost per container between the two years, Crowe analyzed the changes in transportation costs. Transportation (and fuel) costs represent 11% of total CRV costs for HF recyclers and 7% for PF recyclers.

Exhibit 41 compares transportation and fuel costs per container for sampled HF and PF recyclers in 2022 and 2024, along with the average 2024 California retail diesel price per gallon.[13] Between 2022 and 2024, the average retail diesel price declined from $6.03 per gallon to $4.93 per gallon, a decrease of approximately 18%. For HF recyclers, transportation and fuel costs per container increased 10%. In contrast, PF recyclers experienced a decrease in transportation and fuel costs per container by 2%.

Exhibit 42 and **Exhibit 43** provides the breakdown of transportation cost per container for each stratum of HF and PF recyclers for 2022 and 2024. In general, the results show that the larger the recycler (i.e., stratum 1), the lower the transportation cost per container. There were not any consistent trends in transportation cost per container across the strata.

[12] These costs also include general transportation costs and fuel for forklifts, so they are not exclusive to transporting specific materials, however, these non-hauling costs are minimal compared to hauling costs.

[13] Source: U.S. Energy Information Administration, Annual Average Retail Gasoline and Diesel Prices: https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_sca_a.htm.

Exhibit 41
Transportation and Fuel Costs Per Container (2022 and 2024)

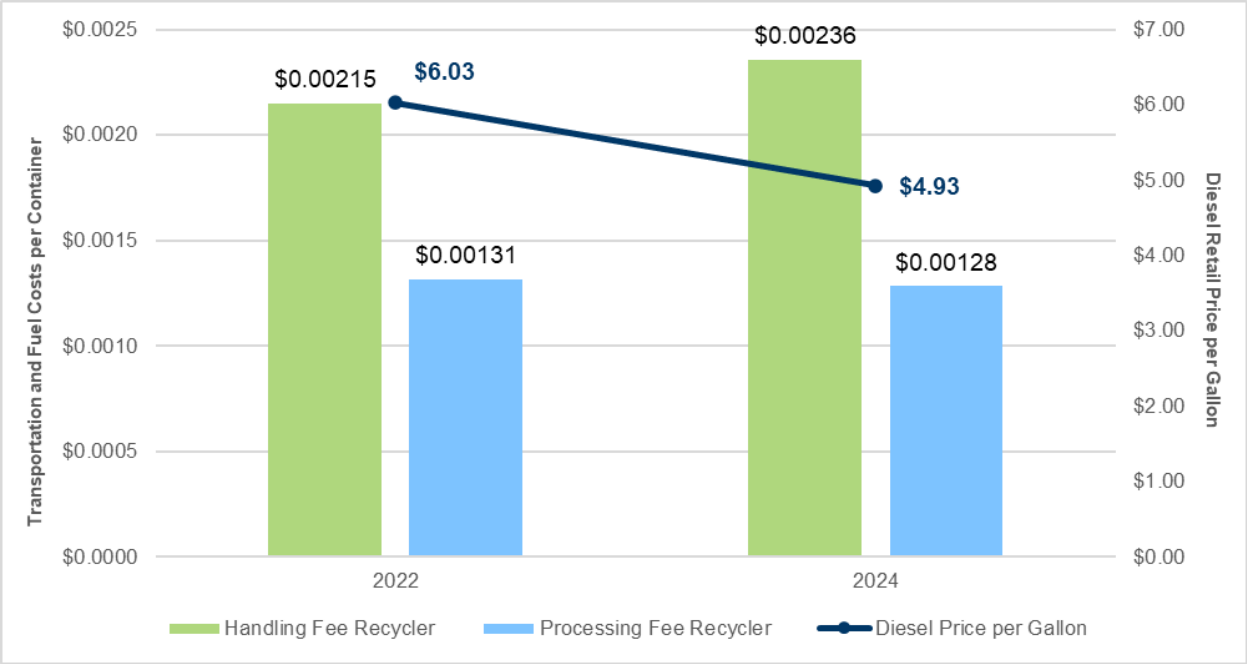


Exhibit 42
Handling Fee Recycler Transportation Cost Per Container by Strata (2022 and 2024)

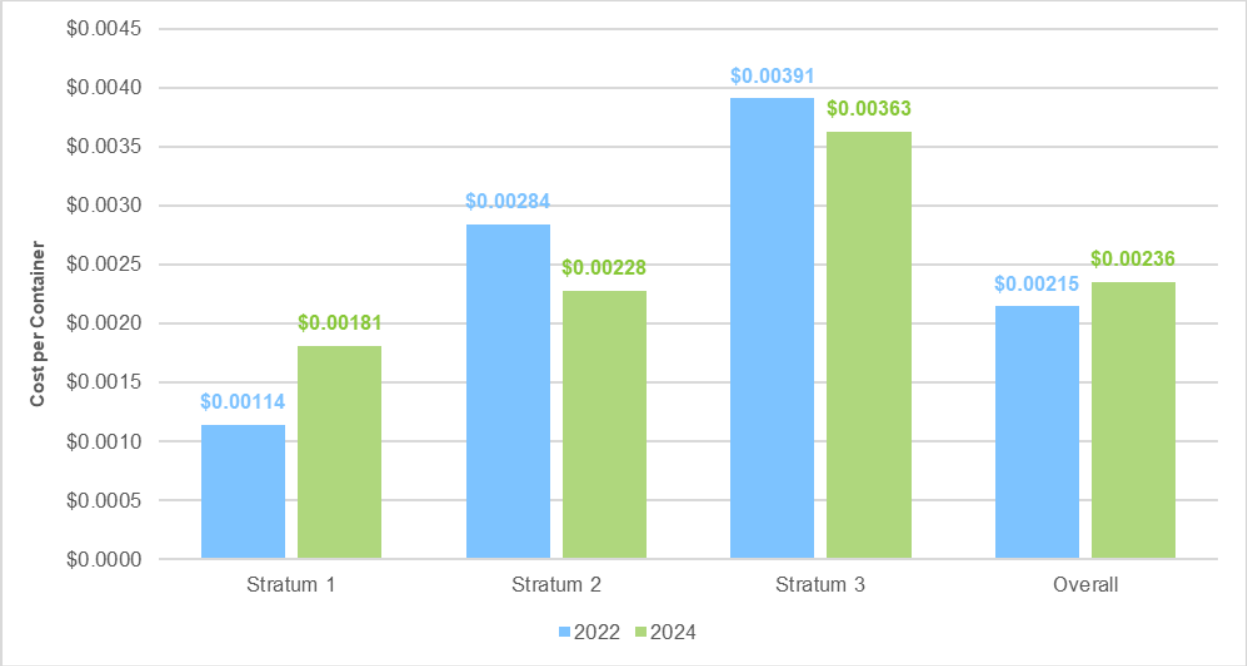
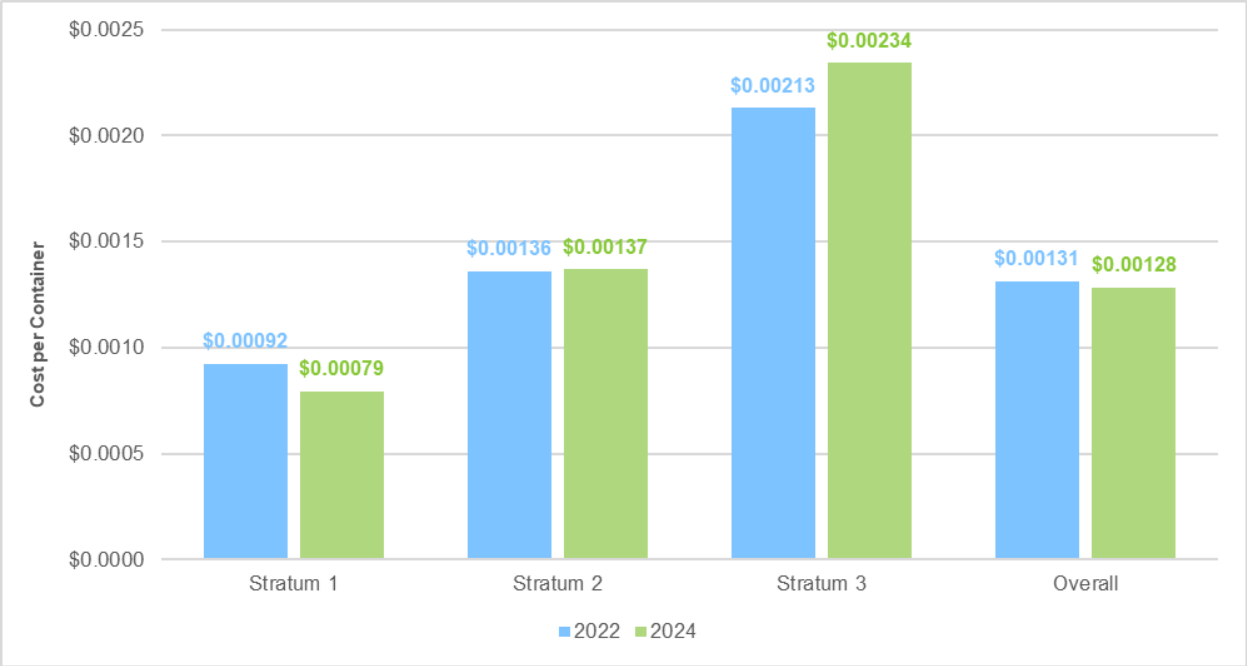


Exhibit 43
Processing Fee Recycler Transportation Cost Per Container by Strata (2022 and 2024)



C. Total Annual Handling Fee Payments

CalRecycle, beverage container program stakeholders, and the Legislature have been discussing, analyzing, and debating alternatives to the current handling fee payment approach since the 2010 handling fee cost survey results were completed in early 2012. At that time, many handling fee recyclers felt that the cost per container result of $0.00773 cents per container was low. Assembly Bill (AB) 1933 (Gordon, Statutes of 2012, Chapter 540) stated that CalRecycle "may update the methodology and scrap values[14] used for calculating the handling fee from the most recent cost survey if it finds that the handling fee resulting from the most recent cost survey does not accurately represent the actual cost incurred for the redemption of empty beverage containers by those certified recycling centers."

There is consensus among program stakeholders that the current handling fee approach has problems. The fact that handling fees are paid on all containers recycled by eligible HF recyclers results in very high monthly payments to large recyclers, and very low monthly payments to small recyclers. Additionally, the closure of one large recycler in 2019 significantly disrupted the recycling center network, altering both the number of certified centers and cost dynamics statewide. There have been ongoing discussions and a number of different legislative fixes proposed in the past several years, with one assembly bill enacted in 2022 and another senate bill enacted in 2024.

Through the passage of AB 203 (Committee on Budget, 2022), CalRecycle was able to issue a revised handling fee rate. Based on a cost-of-living adjustment to prior handling fees, this rate has been used for fiscal year (FY) 2022/2023 and FY 2023/2024. More recently in 2024, SB 156 (Committee on Budget and Fiscal Review) increased the handling fee beginning in FY 2024/2025 and established a new calculation methodology. Starting in FY 2025/2026, handling fees are based on a minimum rate with annual inflation adjustments or a cost-based calculation, whichever is higher.

Exhibit 44 provides total annual handling fee payments between FYs 2000/2001 and 2024/2025. Between FY 2000/01 and FY 2007/08, total payments generally ranged between $22 million and $33 million. Payments increased sharply in FY 2008/09 and were generally in the $40-$50 million range with the exception of 2009/10. Following the 2019 market disruption, annual payments stabilized in the mid-$40 million range from FY 2018/19 through FY 2021/22. Payments significantly increased to $65-$75 million in FY2022/23 through FY 2024/25.

[14] AB 1933 mistakenly connected the handling fee cost survey and scrap values.

Exhibit 44
Total Annual Handling Fee Payments (FY 2000/2001 to FY 2023/2024)

Source: CalRecycle Quarterly Status of Recycling Fund

If CalRecycle were to apply the 2024 handling fee cost survey calculated rate of $0.00555 per container instead of currently applied COLA-adjusted rate of $0.01092, total calculated handling fee payments would decline by approximately 49%. Even accounting for additional containers entering the program under SB 1013 (Atkins, 2022) and SB 353 (Dodd, 2023), total annual handling fee payments would significantly drop. If applying a COLA adjustment to the current handling fee rate per AB 203, total handling fees paid would be expected to increase.

D. Comparison of Population Size, Containers Recycled, and Costs by Strata

Exhibit 45 compares the average cost per container for each of the three handling fee recycler container strata, and the statewide, weighted-average cost per container of 2.193 cents. For handling fee recyclers, the average cost per container increases as the size (i.e., volume handled) of the recycling center decreases.

While the handling fee is not intended to cover the full cost of recycling for handling fee recyclers, the per container handling fee payment will provide less coverage for stratum 3 recyclers than for strata 1 or 2 recyclers. The 0.555 cent handling fee covers 33% of the average cost of recycling for stratum 1 recyclers, 26% of the average cost of recycling for stratum 2 recyclers, and only 20% of the average cost of recycling for stratum 3 recyclers.

Exhibit 45
Handling Fee Recycler Costs per Container and Population Size, by Strata (2024)

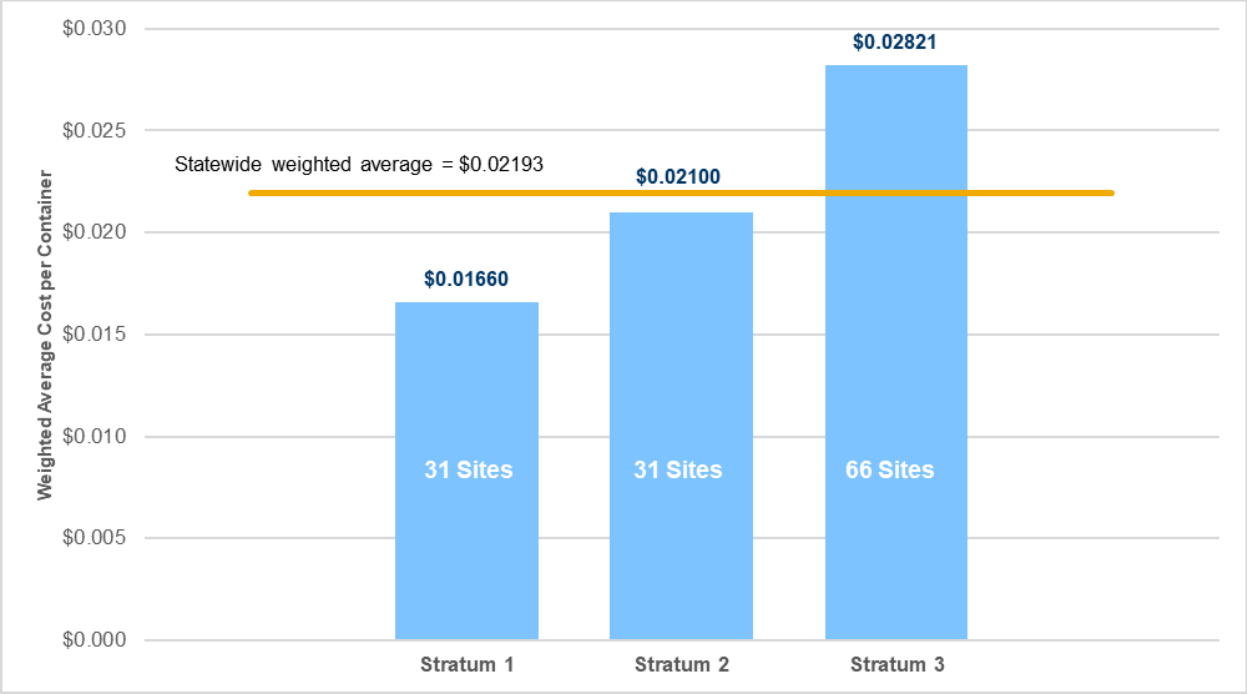


Exhibit 46 compares the average cost per container for each of the three processing fee recycler container strata, and the statewide, weighted-average cost per container of 1.638 cents. Similar to handling fee recyclers, stratum 1 recyclers had the lowest average cost per container to recycle and stratum 3 recyclers had the highest average cost per container to recycle.

Exhibit 46
Processing Fee Recycler Costs per Container and Population Size, by Strata (2024)

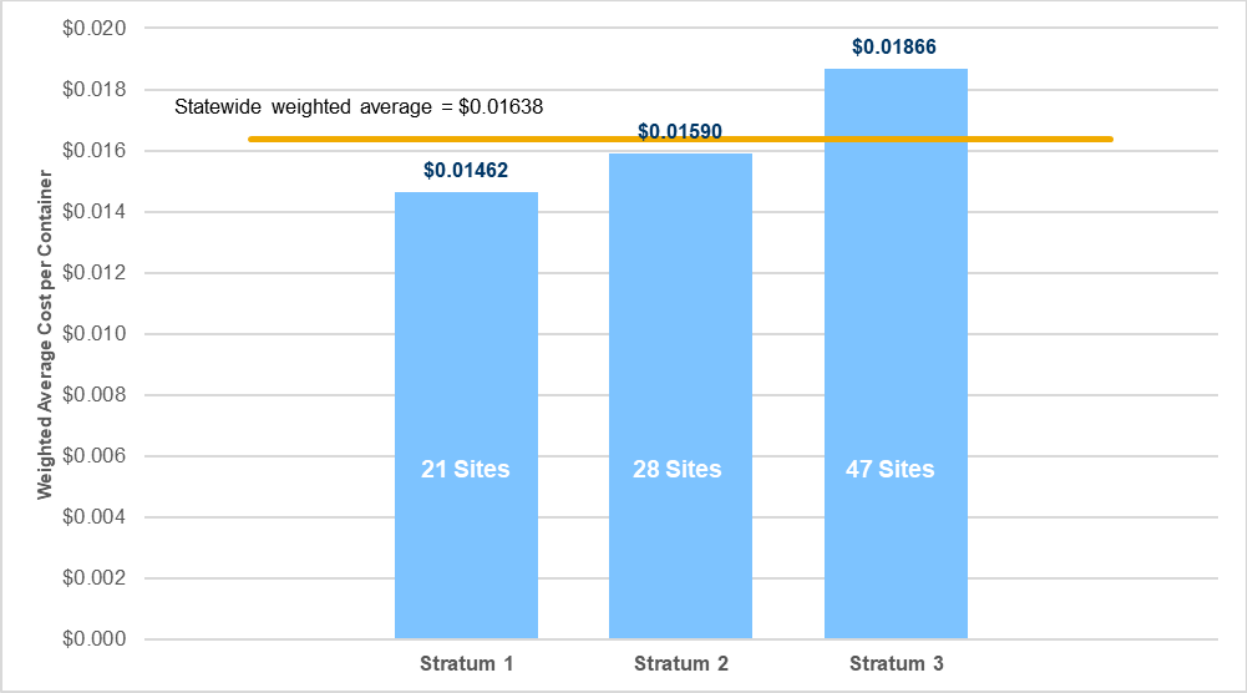


Exhibit 47 provides a comparison of population and total containers recycled by strata for handling fee recyclers over the eight handling fee cost surveys. The most significant drop of handling fee recyclers was between 2018 and 2020 with 34% decline, due to the loss of one large recycler in 2019. After years of continued decline, in 2022 and 2024, the population of handling fee recyclers rebounded and increased by 20% and 8%. This increase indicates a trend reversal and a potential stabilization of the number of handling fee recyclers. There's a likelihood that the implementation of SB 1013 also increased the number of HF recyclers.

Exhibit 47
Population and Container Detail, by Strata, for Handling Fee Recyclers (2010 to 2024)

Population

Year	Stratum 1	Stratum 2	Stratum 3	Total Population
2010	125	298	669	1,092
2012	115	254	616	985
2014	121	243	567	931
2016	97	193	416	706
2018	92	177	400	669
2020	55	117	270	442
2022	61	140	328	529
2024	**66**	**144**	**360**	**570**

Containers Recycled

Year	Stratum 1	Stratum 2	Stratum 3	Total Containers
2010	1,518,736,173	1,513,367,002	1,530,305,416	4,562,408,591
2012	1,274,311,289	1,277,893,538	1,285,011,280	3,837,216,107
2014	1,443,740,805	1,420,326,860	1,389,821,107	4,253,888,772
2016	1,505,533,487	1,500,543,415	1,514,114,030	4,520,190,932
2018	1,532,633,780	1,566,572,421	1,541,664,675	4,640,870,876
2020	1,405,118,838	1,424,364,796	1,430,436,203	4,259,919,837
2022	1,864,495,942	1,876,077,663	1,878,779,641	5,619,353,246
2024	**2,215,567,896**	**2,165,627,902**	**2,199,064,101**	**6,580,259,899**

The number of containers recycled by handling fee recyclers statewide has been relatively stable between 2010 and 2020. In 2022 and 2024, there was a significant increase in the number of containers — 32% in 2022 and 17% in 2024 — the largest increases among past surveys.

Exhibit 48 provides a similar comparison of the full population and total containers recycled by strata for processing fee recyclers over the eight handling fee cost surveys. The number of recyclers has been steadily decreasing since its peak in 2012. 2024 represents the lowest number of processing fee recycler population over the past eight handling fee cost surveys.

While the number of containers recycled by handling fees has been increasing, the proportion of containers recycled by processing fee sites has been decreasing, reaching its lowest in 2024 at just over 7 billion containers. If this trend continues, the economics among HF and PF recyclers will gradually diminish.

Exhibit 48
Population and Container Detail, by Strata, for Processing Fee Recyclers (2010 to 2024)

Population

Year	Stratum 1	Stratum 2	Stratum 3	Total Population
2010	69	162	611	842
2012	88	214	730	1,032
2014	103	218	676	997
2016	77	179	522	778
2018	73	154	447	674
2020	61	131	389	581
2022	60	132	367	559
2024	**51**	**113**	**303**	**467**

Containers Recycled

Year	Stratum 1	Stratum 2	Stratum 3	Total Containers
2010	3,044,270,529	3,048,789,601	3,144,984,680	9,238,044,810
2012	3,357,130,353	3,387,872,789	3,335,801,537	10,100,804,679
2014	3,628,846,790	3,267,773,758	3,210,941,420	10,107,561,968
2016	3,349,130,123	3,336,484,969	3,326,746,142	10,012,361,234
2018	3,254,846,789	3,208,744,521	3,219,995,245	9,683,586,555
2020	3,117,964,406	3,143,110,677	3,115,144,687	9,376,219,770
2022	3,145,094,654	3,214,577,785	3,229,877,077	9,589,549,516
2024	**2,648,107,639**	**2,612,772,043**	**2,585,528,641**	**7,846,408,323**

E. Comparison of Population Characteristics of Processing Fee and Handling Fee Recyclers

HF recyclers and PF recyclers represent two unique populations of CRV recycling centers. In general, PF recyclers are: (1) larger, (2) more likely to accept scrap metal, paper, and other non-CRV materials, and (3) not necessarily located near supermarkets.

In contrast, HF recyclers tend to: (1) be smaller, (2) accept only CRV containers, and (3) be located at or near supermarkets.[15]

The HF and PF recycler populations serve different purposes. The primary objective of HF recyclers is to provide convenient redemption opportunities as an alternative to in-store take-back of containers. The primary objective of PF recyclers is to provide profitable recycling services for CRV and non-CRV materials. Both types of recyclers are important to the CRV program.

[15] There are some exceptions to these generalizations. For example, some handling fee recyclers located in rural regions are not near supermarkets and accept a variety of materials. At the same time, some supermarket lot recyclers were in the processing fee recycler population because they did not receive handling fees. When more than one recycler operates within a convenience zone, handling fee eligibility is limited to recycler(s) designated as eligible by CalRecycle.

Exhibit 49 compares the percent of containers of CRV material recycled by PF recyclers, HF recyclers, and curbside programs between 2002 and 2024. This graphic illustrates long-term trends in CRV recycling by the three major categories of recyclers: those receiving only processing fees ("traditional recyclers"), those receiving processing fees and handling fees ("supermarket recyclers"), and curbside programs (receiving CRV, processing fees, and curbside supplemental payments). The majority of CRV recycling takes place at PF recycling centers. Between 2008 and 2018, there have been no significant shifts in the proportions. In 2020, curbside programs took a higher share of containers, which shows some of the impact of the pandemic on recyclers during that time. Since 2020, PF recyclers' share of containers continues to decrease, while HF recyclers' share of containers continues to increase, creating a convergence between the two recycler populations. This supports the significant increase in the number of containers recycled by HF recyclers and the significant decrease in number of containers recycled by PF recyclers.

Exhibit 49
Comparison of Percent of CRV Containers Recycled by Major Recycler Type (2002 to 2024)

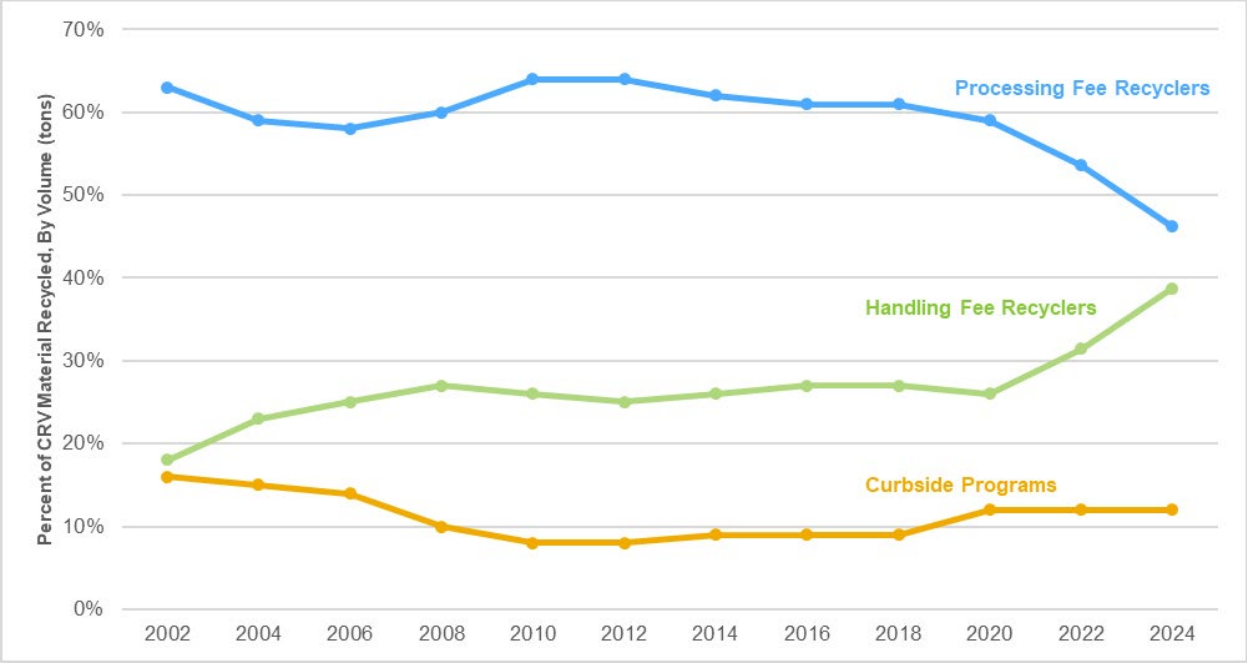


Exhibit 50 illustrates the total number of containers recycled by processing fee and handling fee recyclers from 2010 to 2024, as well as the number of processing fee and handling fee recyclers during the same period. This chart shows that the number of recyclers does not contribute to higher or lower volumes. In fact, as the number of recyclers decreased over time, volume of containers remained stable to increasing over time.

Exhibit 50
Total Number of Containers Recycled by Handling Fee and Processing Fee Recyclers (2010 to 2024)

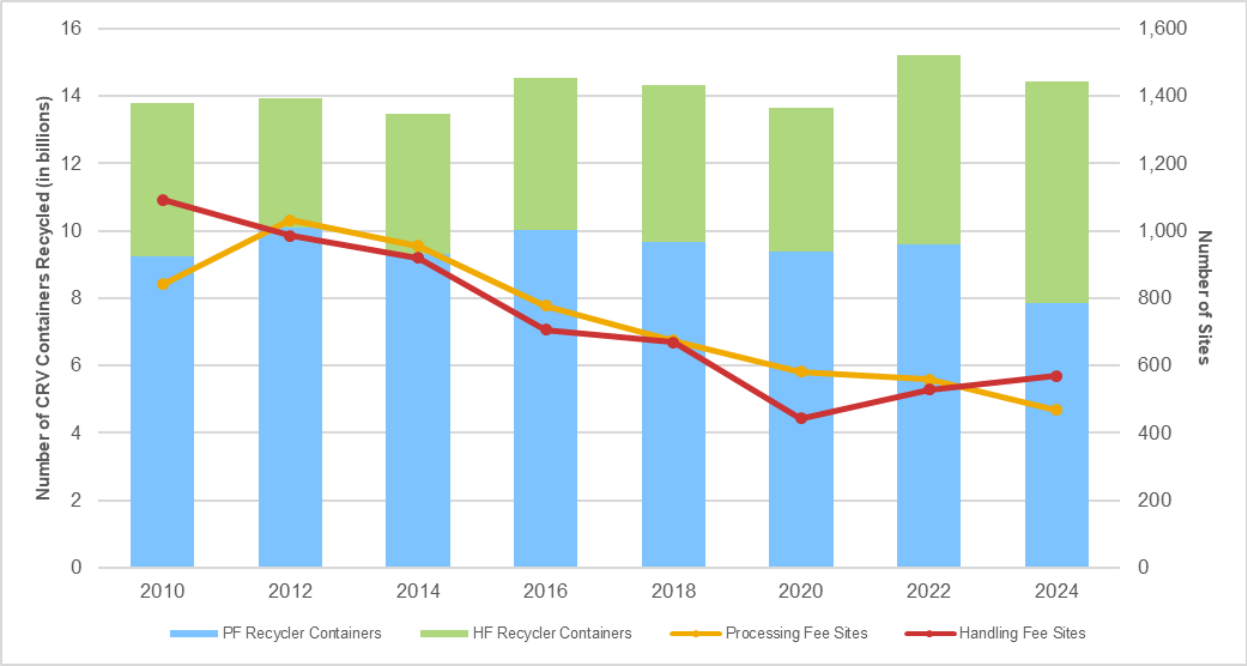
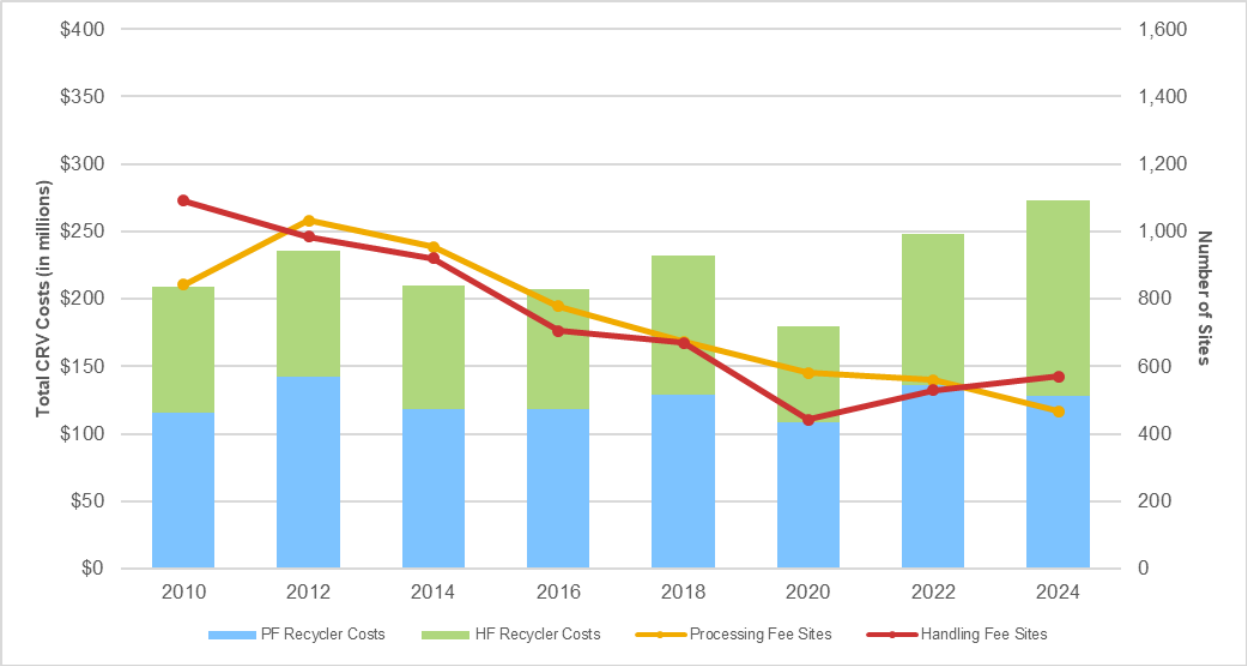


Exhibit 51 illustrates the total CRV recycling cost by processing fee and handling fee recyclers from 2010 to 2024, as well as the number of processing fee and handling fee recyclers during the same period. This chart shows that the number of recyclers does not contribute to higher or lower total CRV costs. In fact, as the number of recyclers decreased over time, total CRV costs either remained stable or increased over time. The exception to this overall trend was 2020, after one large recycler closed in 2019.

Exhibit 51
Total Cost of CRV Recycling for Handling Fee and Processing Fee Recyclers (2010 to 2024)



F. Summary of Handling Fee Cost Survey Analyses.

Overall, cost per container increased between 2022 and 2024. Our analyses identify a combination of factors that may be impacting recycling costs. Between 2022 and 2024 there was an increase in the overall survey population of HF recycling centers and a decrease of PF recycling centers. The increase in HF recycler cost per container between 2022 and 2024 is due to overall increases in operational costs rather than recycler dynamics. In fact, despite increased volumes per recycler, cost per container increased. This indicates that cost-of-living increases were significant enough to overcome increases in recycler productivity. In the following we provide factors that lead to increased costs:

- Higher labor costs - Driven by the 7% increase in minimum wage, average wages per hour increased by 8% for both HF and PF recyclers. Direct labor and indirect labor account for about 55% of recycler costs, therefore an increase of 8% would result in a 4.4% increase to overall costs, all else equal. These higher labor costs contribute to higher overall costs.
- Labor hours per 1,000 CRV containers - Increased by 9% for both HF recyclers and PF recyclers. This indicates a decline in productivity and higher labor input per unit, which contributed to increased costs.
- High inflation and cost of living - Overall cost of living increased between 2022 and 2024, largely driven by a 7.5% increase in consumer price index (CPI).[16] This is almost twice the average CPI increase of 4.5% over a two-year period. All else equal, the 7.5% increase in CPI would generally result in a 7.5% increase to recycler costs.
    - Almost all cost categories among HF and PF recyclers increased, with direct labor, rent, depreciation, maintenance, and transportation accounting for roughly 90% of the increase in costs per recycler.

The HF cost survey is a complex, primary data gathering exercise. Crowe drew from 224 diverse recycling centers (128 HF, 96 PF) across the state to determine a single cost per container result. The cost-per-container results must make sense in the historical context of prior cost surveys, as well as within the context of current recycling operations and market dynamics. The HF and PF recycler cost per container results presented in this Handling Fee Report are both reasonable in a historical context.

[16] Cumulative California inflation of about 7–8% between 2022 and 2024 based on California Department of Finance, Consumer Price Index data, accessed: https://dof.ca.gov/forecasting/economics/economic-indicators/inflation.

Appendix A:
Accessibility Additional Information

This appendix provides additional data and explanations for the various bar graph and line chart exhibits presented in this report.

Exhibit 2
Handling Fee Cost Survey Calculated Handling Fee Payments (without COLA) (2010 to 2024)

Year	Cost per Container	Percent Change
2010	$0.00773	n/a
2012	$0.01035	34%
2014	$0.00924	-11%
2016	$0.00793	-14%
2018	$0.00894	13%
2020	$0.00511	-43%
2022	$0.00573	12%
2024	$0.00555	-3%

Exhibit 3
Statewide Handling Fee and Processing Fee
Recycler Cost per Container[a] (2010 to 2024)

Handling Fee Recycler

Year	Cost per Container	Percent Change
2010	$0.02029	n/a
2012	$0.02440	20%
2014	$0.02198	-10%
2016	$0.01972	-10%
2018	$0.02224	13%
2020	$0.01668	-25%
2022	$0.01994	20%
2024	$0.02193	10%

Processing Fee Recycler

Year	Cost per Container	Percent Change
2010	$0.01256	n/a
2012	$0.01405	12%
2014	$0.01274	-9%
2016	$0.01179	-7%
2018	$0.01330	13%
2020	$0.01157	-13%
2022	$0.01421	23%
2024	$0.01638	15%

[a] *Statewide, weighted-average cost per container recycled.*

Exhibit 8
2024 Sampled Handling Fee Recyclers,
Distribution of Cost per Container

Cents per Container	Frequency
<.50	1
.50 to .75	1
.75 to 1.00	5
1.00 to 1.25	10
1.25 to 1.50	9
1.50 to 1.75	10
1.75 to 2.00	13
2.00 to 2.25	16
2.25 to 2.50	9
2.50 to 2.75	13
2.75 to 3.00	15
3.00 to 3.25	4
3.25 to 3.50	6
3.50 to 3.75	6
3.75 to 4.00	0
4.00 to 4.25	1
4.25 to 4.50	3
4.50 to 4.75	2
4.75 to 5.00	1
>5.00	3

Exhibit 9
2024 Sampled Processing Fee Recyclers,
Distribution of Cost per Container

Cents per Container	Frequency
<.50	3
.50 to .75	5
.75 to 1.00	5
1.00 to 1.25	14
1.25 to 1.50	12
1.50 to 1.75	12
1.75 to 2.00	10
2.00 to 2.25	10
2.25 to 2.50	8
2.50 to 2.75	2
2.75 to 3.00	7
3.00 to 3.25	0
3.25 to 3.50	0
3.50 to 3.75	0
3.75 to 4.00	1
4.00 to 4.25	0
4.25 to 4.50	0
4.50 to 4.75	0
4.75 to 5.00	0
>5.00	7

Exhibit 10
Cost per Container Calculation (2024)

- This diagram illustrates the calculation approach that was used for determining the statewide stratified weighted average recycling cost per beverage container.
- The equation for cost per container is as follows: Part (1) – container stratum 1 sample costs divided by container stratum 1 sample containers multiplied by container stratum 1 population containers equals container stratum 1 total population costs; Part (2) – container stratum 2 sample costs divided by container stratum 2 sample containers multiplied by container stratum 2 population containers equals container stratum 2 total population costs; Part (3) – container stratum 3 sample costs divided by container stratum 3 sample containers multiplied by container stratum 3 population containers equals container stratum 3 total population costs. Then, all three parts are summed to determine the total population costs, then divided by total population containers, which equal statewide stratified weighted average cost per container.

Exhibit 12
Processing Fee and Handling Fee Recycler Cost per Container[a] (2024)

Year	Cost per Container	Percent Change
2024 Processing Fee Recycler Statewide, Weighted Average Cost per Container	$0.01638	n/a
2024 Handling Fee Recycler Statewide, Weighted Average Cost per Container	$0.02193	34%

[a] *Statewide, weighted-average cost per container recycled.*

Exhibit 16
Handling Fee and Processing Fee Recycler Cost per Container[a] (2010 to 2024)

Handling Fee Recycler

Year	Cost per Container	Percent Change
2010	$0.02029	n/a
2012	$0.02440	20%
2014	$0.02198	-10%
2016	$0.01972	-10%
2018	$0.02224	13%
2020	$0.01668	-25%
2022	$0.01994	20%
2024	$0.02193	10%

Processing Fee Recycler

Year	Cost per Container	Percent Change
2010	$0.01256	n/a
2012	$0.01405	12%
2014	$0.01274	-9%
2016	$0.01179	-7%
2018	$0.01330	13%
2020	$0.01157	-13%
2022	$0.01421	23%
2024	$0.01638	15%

[a] *Statewide, weighted-average cost per container recycled.*

Exhibit 19
Handling Fee Cost Survey Calculated Handling Fee Payments (without COLA) (2010 to 2024)

Year	Cost per Container	Percent Change
2010	$0.00773	n/a
2012	$0.01035	34%
2014	$0.00924	-11%
2016	$0.00793	-14%
2018	$0.00894	13%
2020	$0.00511	-43%
2022	$0.00573	12%
2024	$0.00555	-3%

Exhibit 21
Number of Containers Recycled by Handling Fee Recyclers and Processing Fee Recyclers (2010 to 2024 Populations)

Year	Handling Fee Recyclers	Processing Fee Recyclers
2010	4,562,408,591	9,238,044,810
2012	3,837,216,107	10,100,804,679
2014	4,157,132,629	9,307,083,284
2016	4,520,190,932	10,012,361,234
2018	4,640,870,876	9,683,586,555
2020	4,259,919,837	9,376,219,770
2022	5,619,353,246	9,589,549,516
2024	6,580,259,899	7,846,408,323

Exhibit 22
2010 to 2024 Populations, Number of Handling Fee Recycling Centers and Processing Fee Recycling Centers

Year	Handling Fee Recyclers	Processing Fee Recyclers
2010	1,092	842
2012	985	1,032
2014	931	997
2016	706	778
2018	669	705
2020	459	611
2022	540	577
2024	590	506

Exhibit 23
Population CRV Costs and Containers of Handling Fee Recyclers (2010 to 2024)

Year	Handling Fee Total Costs	Handling Fee Containers
2010	$92,571,270	4,562,408,591
2012	$93,628,073	3,837,216,107
2014	$93,500,475	4,253,888,785
2016	$89,000,000	4,500,000,000
2018	$103,000,000	4,640,000,000
2020	$71,056,800	4,260,000,000
2022	$112,051,518	5,619,353,246
2024	$144,295,338	6,580,259,899

Exhibit 24
Population CRV Costs and Containers of Processing Fee Recyclers (2010 to 2024)

Year	Processing Fee Total Costs	Processing Fee Containers
2010	$116,029,843	9,238,044,810
2012	$141,916,306	10,100,804,679
2014	$128,770,339	10,107,561,968
2016	$118,000,000	10,107,561,968
2018	$128,800,000	9,680,000,000
2020	$108,480,320	9,376,000,000
2022	$136,235,460	9,589,549,516
2024	$128,502,009	7,846,408,323

Exhibit 25
Average Containers Recycled per Handling Fee Recycler and Processing Fee Recycler (2010 to 2024)

Year	Processing Fee Recyclers	Handling Fee Recyclers
2010	10,971,550	4,178,030
2012	9,787,601	3,895,651
2014	9,745,637	4,518,622
2016	12,869,359	6,402,537
2018	14,370,000	6,940,000
2020	16,138,072	9,637,828
2022	17,154,829	10,622,596
2024	16,801,731	11,544,316

Exhibit 27
2022 and 2024 Sampled Handling Fee and Processing Fee Recyclers
Percent Change in Key Recycler Metrics

Measure	Handling Fee RCs Percent Change	Processing Fee RCs Percent Change
Containers per Recycling Center	9%	-2%
Cost per Recycling Center	20%	13%
Cost per Container	10%	15%

Exhibit 28
2016 to 2024 Sampled Handling Fee Recyclers and Processing Fee Recyclers
Average Labor Hours per 1,000 Containers Recycled

Year	HF Hours per 1,000 Containers	HF Percent Change	PF Hours per 1,000 Containers	PF Percent Change
2016	0.61	n/a	0.38	n/a
2018	0.63	3%	0.37	-2%
2020	0.47	-25%	0.31	-16%
2022	0.45	-4%	0.34	8%
2024	0.49	9%	0.37	9%

Exhibit 31
2016 to 2024 Sampled Handling Fee and Processing Fee Recyclers
Average Wages per Hour

Year	Handling Fee Recyclers	Processing Fee Recyclers
2016	$14.21	$15.27
2018	$17.12	$18.11
2020	$18.09	$18.50
2022	$20.68	$21.25
2024	$22.25	$22.86

Exhibit 32
2016 to 2024 Sampled Handling Fee Recyclers
Labor and Non-Labor Costs per Container

Year	Labor Costs	Non-Labor Costs
2016	$0.00865	$0.00963
2018	$0.01072	$0.00939
2020	$0.00852	$0.00706
2022	$0.01047	$0.00947
2024	$0.01152	$0.01041

Exhibit 33
2016 to 2024 Sampled Processing Fee Recyclers
Labor and Non-Labor Costs per Container

Year	Labor Costs	Non-Labor Costs
2016	$0.00574	$0.00504
2018	$0.00677	$0.00565
2020	$0.00578	$0.00510
2022	$0.00747	$0.00674
2024	$0.00861	$0.00777

Exhibit 34
Comparison of HF CRV Hourly Wages Overall and by Strata (2022 and 2024)

Stratum	2022	2024
Overall	$20.68	$22.25
Stratum 1	$25.03	$22.01
Stratum 2	$19.49	$23.39
Stratum 3	$16.91	$21.61

Exhibit 35
Comparison of PF CRV Hourly Wages Overall and by Strata (2022 and 2024)

Stratum	2022	2024
Overall	$21.25	$22.86
Stratum 1	$22.43	$25.03
Stratum 2	$22.07	$21.60
Stratum 3	$18.94	$20.88

Exhibit 41
Transportation and Fuel Costs Per Container (2022 and 2024)

Year	Handling Fee Recycler	Processing Fee Recycler	Diesel Price per Gallon
2022	$0.00215	$0.00131	$6.03
2024	$0.00236	$0.00128	$4.93

Exhibit 42
Handling Fee Recycler Transportation Cost Per Container by Strata (2022 and 2024)

Year	Stratum 1	Stratum 2	Stratum 3	Overall
2022	$0.00114	$0.00284	$0.00391	$0.00215
2024	$0.00181	$0.00228	$0.00363	$0.00236

Exhibit 43
Processing Fee Recycler Transportation Cost Per Container by Strata (2022 and 2024)

Year	Stratum 1	Stratum 2	Stratum 3	Overall
2022	$0.00092	$0.00136	$0.00213	$0.00131
2024	$0.00079	$0.00137	$0.00234	$0.00128

Exhibit 44
Total Annual Handling Fee Payments (FY 2000/2001 to FY 2023/2024)

Year	Total Handling Fees Paid
2000-01	$22,000,000
2001-02	$23,000,000
2002-03	$23,000,000
2003-04	$27,000,000
2004-05	$28,000,000
2005-06	$27,000,000
2006-07	$33,000,000
2007-08	$31,000,000
2008-09	$47,000,000
2009-10	$24,000,000
2010-11	$51,000,000
2011-12	$40,500,000
2012-13	$40,140,000
2013-14	$41,900,000
2014-15	$45,600,000
2015-16	$51,300,000
2016-17	$46,600,000
2017-18	$50,500,000
2018-19	$44,000,000
2019-20	$45,000,000
2020-21	$46,705,772
2021-22	$46,906,318
2022-23	$64,096,000
2023-24	$72,045,000
2024-25	$77,352,000

Source: CalRecycle Quarterly Status of Recycling Fund

Exhibit 45
Handling Fee Recycler Costs per Container and Population Size, by Strata (2024)

Stratum	Costs per Container	Benchmark	Sites
Stratum 1	$0.01660	$0.02193	31
Stratum 2	$0.02100	$0.02193	31
Stratum 3	$0.02821	$0.02193	66

Exhibit 46
Processing Fee Recycler Costs per Container and Population Size, by Strata (2024)

Stratum	Costs per Container	Benchmark	Sites
Stratum 1	$0.01462	$0.01638	21
Stratum 2	$0.01590	$0.01638	28
Stratum 3	$0.01866	$0.01638	47

Exhibit 49
Comparison of Percent of CRV Containers Recycled by Major Recycler Type (2002 to 2024)

Year	Processing Fee Recyclers	Handling Fee Recyclers	Curbside Programs
2002	63%	18%	16%
2004	59%	23%	15%
2006	58%	25%	14%
2008	60%	27%	10%
2010	64%	26%	8%
2012	64%	25%	8%
2014	62%	26%	9%
2016	61%	27%	9%
2018	61%	27%	9%
2020	59%	26%	12%
2022	54%	31%	12%
2024	46%	39%	12%

Exhibit 50
Total Number of Containers Recycled by Handling Fee and Processing Fee Recyclers (2010 to 2024)

Year	PF Recycler Containers	HF Recycler Containers	Processing Fee Sites	Handling Fee Sites
2010	9,238,044,810	4,562,408,591	842	1,092
2012	10,100,804,679	3,837,216,107	1,032	985
2014	9,307,083,284	4,157,132,629	955	920
2016	10,012,361,234	4,520,190,932	778	706
2018	9,683,586,555	4,640,870,876	674	669
2020	9,376,219,770	4,259,919,837	581	442
2022	9,589,549,516	5,619,353,246	559	529
2024	7,846,408,323	6,580,259,899	467	570

Exhibit 51
Total Cost of CRV Recycling for Handling Fee and Processing Fee Recyclers (2010 to 2024)

Year	PF Recycler Costs	HF Recycler Costs	Processing Fee Sites	Handling Fee Sites
2010	$116,029,843	$92,571,270	842	1,092
2012	$141,916,306	$93,628,073	1,032	985
2014	$118,572,241	$91,373,775	955	920
2016	$118,026,096	$89,143,563	778	706
2018	$128,769,232	$103,234,372	674	669
2020	$108,517,017	$71,053,936	581	442
2022	$136,235,460	$112,051,518	559	529
2024	$128,502,009	$144,295,338	467	570