Study of Deposit Beverage Container Handling Fees – Final Report

May 13, 2019

ASO LOG NO. 18-167, Task Order #6

Submitted to:
Darren J. Park, Ph.D.
Hawaii Department of Health
2827 Waimano Home Road
Pearl City, HI 96782

Submitted by:
Lisa Voeller, Principal
Crowe LLP
400 Capitol Mall, Suite 1400
Sacramento, California 95814-4434
Direct 916.492.5133
Tel 916.441.1000
Fax 916.441.1110
Lisa.Voeller@crowe.com

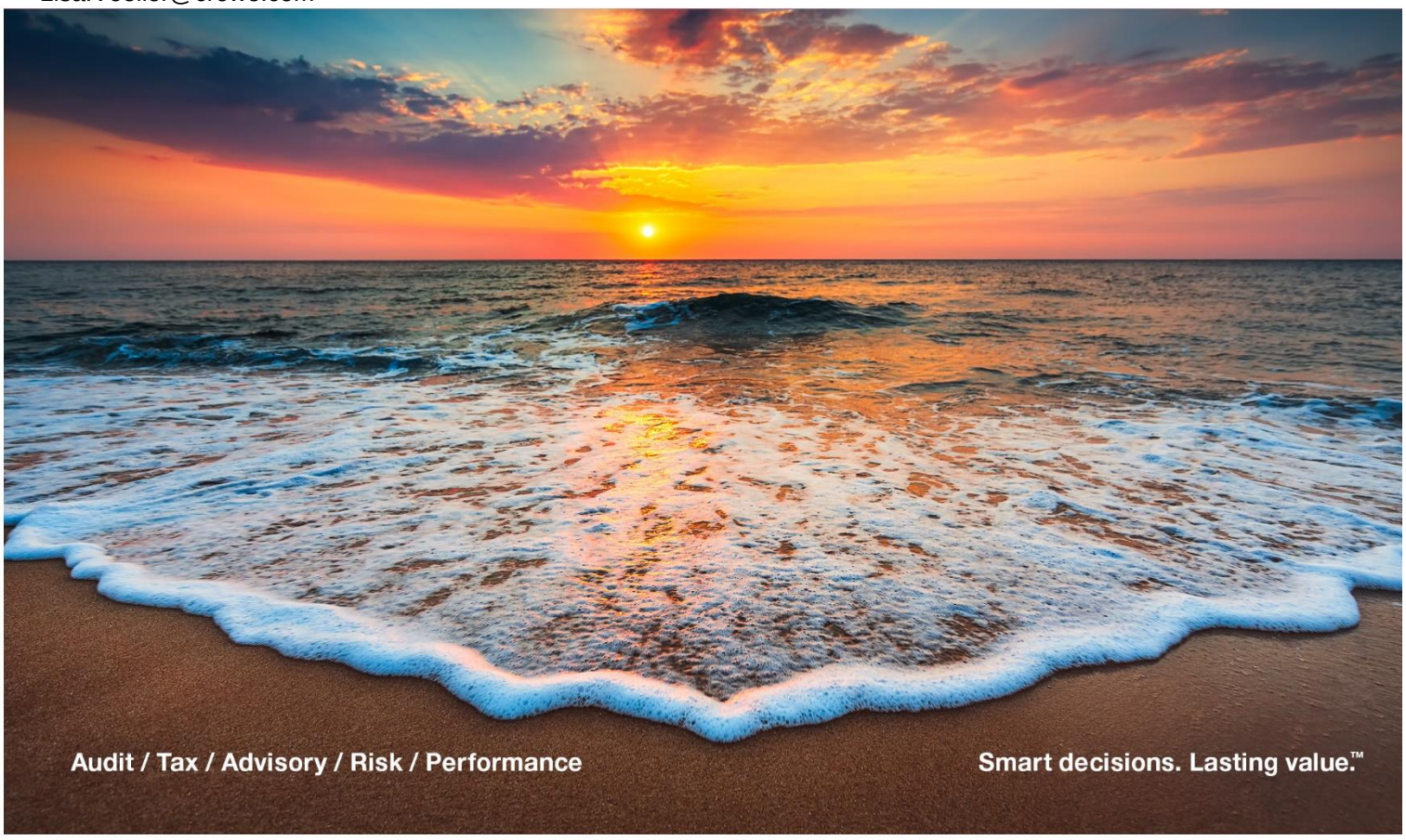


Table of Contents

[This page intentionally left blank.]

Crowe

Executive Summary

Executive Summary

This handling fee study was performed under contract by Crowe LLP (Crowe), for the Hawaii Department of Health (DOH), Environmental Management Division, Solid Waste Branch administered Deposit Beverage Container (DBC) program. This Study of DBC Handling Fees Final Report provides estimates of the cost per container to recycle aluminum, glass, and plastic beverage containers. This report also provides the scrap revenue results, handling fee (HF) calculations and adjustments, and HF implementation. This report also summarizes tasks that Crowe conducted, and methodology used, in order to obtain these results.

This executive summary is organized as follows:

A. Handling Fee Study Background
B. Handling Fee Study Methodology
C. Handling Fee Study Cost Analysis
D. Handling Fee Study Scrap Revenue Results
E. Handling Fee Calculations and Adjustments
F. Handling Fee Payment Implementation.

A. Handling Fee Study Background

In 2002, the State of Hawaii Legislature passed Act 176 (Bottle Bill), establishing the DBC Program under Chapter 342G, Part VIII, Hawai'i Revised Statutes. The DOH's Environmental Management Division, Solid Waste Branch administers the DBC Program to: 1) promote recycling, 2) reduce litter, and 3) reduce the amount of waste sent to landfills. In 2005, Chapter 11-282 of the Hawaii Administrative Rules implemented the DBC program and established minimum standards for the collection of empty beverage containers. The program requires that all eligible aluminum, bi-metal, glass, and plastic (PET & HDPE) containers sold, donated, or otherwise distributed to consumers in the State have a deposit payment of $0.05 for each container.[1]

The State also requires a non-refundable "container fee" in addition to the $0.05 deposit. This fee helps to provide Program operational support, Program administration, and redemption center operator eligible handling fees. The container fee, originally at $0.01 per container, increased to $0.015 in September 2012, returning to $0.01 in September 2015, as the redemption rate exceeded, then fell under, the 70 percent threshold.

Beverage container manufacturers and distributors are required to pay deposits and fees for DBC Program containers into the DBC Fund. Manufacturers and distributors must report the number of DBCs sold and/or distributed into the State, paying deposits and container fees to the DBC Program on a monthly basis (or semi-annually for small companies). The manufacturers and distributors may pass the deposits and fees to their customers (e.g., retailers), who then may pass on the costs to consumers. Consumers may take their DBC program containers to a Certified Redemption Center (CRC) for redemption.

The DBC Program requires CRCs to submit the 5¢ Deposit Refund Request Form (DR-1) and Handling Fee Request Form (HR-1), at minimum, twice per month. CRC reports include number and/or weight of DBCs of each material type accepted, amount of refunds paid out, and number and/or weight of DBCs transported to out-of-state transport or to recycling facilities. In addition to populating the forms, recyclers must submit supporting documentation such as copies of out-of-state transport and weight receipts or recycling facility acceptance receipts. State law provides the program 30 days to reimburse CRCs.

In addition to reimbursing CRCs the $0.05 deposit refund paid out to consumers (through DR-1s), the program pays a "handling fee" for each container verified as being recycled (through HR-1s). Handling fees are paid for containers that are: 1) transported out-of-state; 2) received by an approved in-state company for an approved end use for recycling; or 3) received by a department-permitted facility; provided

[1] Beverages covered through the DBC Program include all nonalcoholic drinks, except milk or dairy products, and limited alcoholic drinks (i.e., beer, malt beverages, mixed spirits, mixed wine)

that the container is physically received by the redemption center. Hawai'i Revised Statutes, Chapter 342G-177 states that the department shall evaluate the handling fee at least once a year; however, the handling fee has not been adjusted since 2008. Any changes to the handling fee require a public notice at least 30 days in advance. Handling fees shall be not less than the prevailing deposit beverage container fee (currently one cent).

CRC Challenges

The recycling landscape in Hawaii has changed since the inception of the DBC Program in 2008. CRCs face macroeconomic conditions that are beyond the control of the recycling program, such as:

- Minimum wage in Hawaii has increased 50 percent since 2006, and 19 percent during the 2015 to 2017 handling fee study period; CRCs typically pay their entry-level employees at or slightly above the minimum wage rate to retain their employees
- Unemployment in Hawaii is currently about 2.8 percent, and was as low as 2.2 percent in 2018; low unemployment rates make hiring dedicated employees more challenging for CRCs
- The 2011 Hawaii Prepaid Health Care Act (Hawaii Revised Statutes 393-1 et seq.) requires employers to pay at least 50 percent of comprehensive health insurance, including vision and dental for employees that work more than 20 hours per week
- CRC processors ship materials off island and have little control over freight costs due to a monopolized shipping industry in Hawaii and the Jones Act, which requires ships to be built in the United States, owned by U.S. citizens, carry a United States flag, and 75 percent of the crew must be U.S. citizens and permanent residents
- Scrap pricing for aluminum, plastic, and bi-metal are based on global secondary material markets; scrap prices traditionally fluctuate over time, demonstrating the traditional variability seen in commodity pricing
- Scrap prices for both aluminum and plastic have dropped, and the impact on plastic has been more severe; plastic scrap prices have been at levels that provide little, if any, profit margin.

To address these challenges, the DOH issued a request for offer (RFO) to secure a contractor to conduct a detailed study of recycler costs and scrap values to recommend revised handling fees.

B. Handling Fee Study Methodology

The DOH selected Crowe to perform the tasks involved with this study of Hawaii DBC Handling Fees. Crowe brought unique qualities for this study, including over 25 years of beverage container recycling, integrated waste management, and cost survey experience. **Exhibit ES-1** provides an overview of the tasks completed by Crowe.

<u>Cost Survey Methodology</u>

In coordination with the DOH, Crowe developed a cost survey to obtain CRC costs to recycle DBC containers and scrap values paid to recyclers. Given the relatively small number of CRCs in the State of Hawaii, the survey consisted of a census of all CRCs. Crowe's team visited all recently closed and operating CRC headquarters and site locations during May and June 2018 to obtain the necessary financial, labor, and scrap value information. In total, Crowe surveyed 19 CRC companies and performed surveys at over 70 CRC locations.

Exhibit ES-1
Crowe Project Work Plan Tasks

DBC Handling Fee Study – Contractor Tasks
1. **Conduct an "Environmental Scan"** – Conduct interviews and research to help establish a methodological approach to detailed fiscal analyses and to identify factors in the changing environment that are likely to impact the cost of recycling Hawaii's DBCs.
2. **Conduct Detailed Fiscal Analysis (Recycler Costs)** – Conduct a detailed study, by surveying all CRCs, to determine the actual cost of recycling Hawaii's DBCs by material type, statewide, county, and processor/non-processor for Fiscal Year (FY) 16 and FY17.
3. **Conduct Detailed Fiscal Analysis (Recycler Scrap Values)** – Conduct a detailed study, by surveying all CRCs, to determine the actual scrap values paid for Hawaii's DBCs by material type, statewide, county, and processor/non-processor for FY16 and FY17.
4. **Recommend DBC Handling Fees** – Analyze the results of Task 2 and Task 3 to recommend revised handling fees for DBCs by material type, county, and processor/non-processor.
5. **Conduct Detailed Fiscal Analysis (Impacts on DBC Special Fund)** – Conduct a detailed fiscal analysis to evaluate redemption rates and the impact of the recommended handling fees on the DBC Special Fund.
6. **Describe a Process the Department may use to Regularly Evaluate the Handling Fee** – Develop a defensible process and procedures to regularly evaluate, and if necessary adjust, DBC handling fees.
7. **Presentation of Study Methodology and Findings/Recommendations** – Prepare and present study methodology and results to the Office of Solid Waste Management (OSWM), Administrative Staff from the Department of Health, and public hearings.

Crowe utilized a detailed survey methodology to capture and categorize costs of recycling and scrap payments by DBC material type. The cost component of the survey captures financial information by category, assigning direct costs to specific material types when applicable. The survey methodology utilizes structured labor allocation interviews to apportion costs between DBC material types and non-DBC activities. There are three phases of an individual cost survey, which include:

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

The financial and scrap value survey estimated costs per container and scrap payments per container during two fiscal years: FY16 (July 1, 2015 to June 30, 2016) and FY17 (July 1, 2016 to June 30, 2017). Crowe determined costs per container and scrap payments per container, based on the weighted-average costs over the two fiscal years, for aluminum, glass, combined plastics, and an overall cost per container.

Cost per Container Results

Crowe utilizes a weighted-average approach for determining costs per container. **Exhibit ES-2** provides an illustration of the cost per container calculation for aluminum. We utilized the same method for each material type and for combined containers. We also utilized the same weighted approach to determine costs per container by company, county, processor-status, and statewide calculations.

Scrap Value Results

Crowe utilized the same weighted-average approach for scrap value calculations. **Exhibit ES-3** provides an equivalent calculation of the aluminum scrap value per container. Again, we utilized the same weighted approach for all material types, company, county, processor-status, and statewide calculations.

Exhibit ES-2
Cost per Container Calculation for Handling Fee Survey

Weighted Average:

$$\frac{\Sigma \text{ Aluminum Costs}}{\Sigma \text{ Aluminum Pounds}} = \text{Aluminum Cost per Pound}$$

$$\frac{\text{Aluminum Cost per Pound}}{\text{Aluminum Containers per Pound}} = \text{Aluminum Cost per Container}$$

Exhibit ES-3
Scrap Value per Container Calculation for Handling Fee Survey

Weighted Average:

$$\frac{\Sigma \text{ Aluminum Scrap Payments}}{\Sigma \text{ Aluminum Pounds}} = \text{Aluminum Scrap Payment per Pound}$$

$$\frac{\text{Aluminum Scrap Payment per Pound}}{\text{Aluminum Containers per Pound}} = \text{Aluminum Scrap Payment per Container}$$

C. Handling Fee Study Cost Analysis

This section summarizes the results of Task 2 of the Study of Hawaii's DBC Handling Fees, the Detailed Fiscal Analysis (Recycler Costs). The results presented in this section were directly calculated from the survey results, and do not include any adjustment factors. This section provides the cost per container and overall cost category results. We provide additional handling fee study cost analyses in Section 3 of this Report.

Cost per Container Results

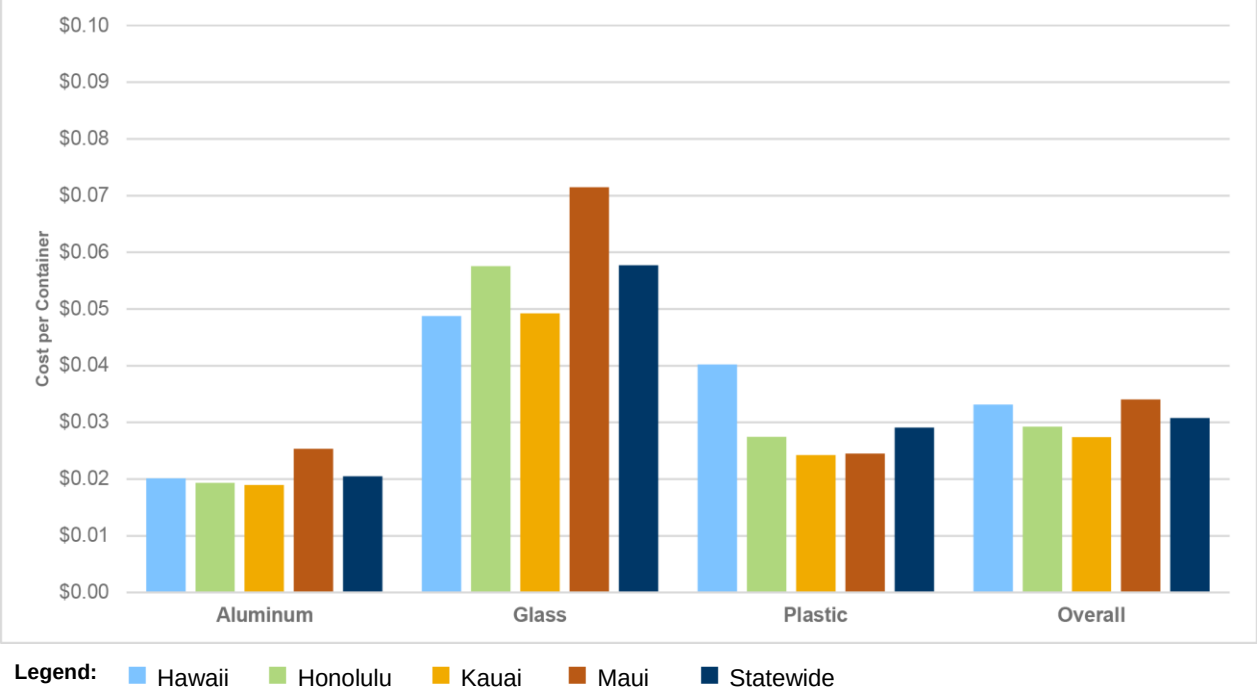
Crowe utilized the cost per container results as a basis to develop our recommended handling fees. With the exception of glass cost per container, Kauai County has the lowest average cost per container across the four counties and statewide. This is likely because in most cases there is no shipping associated with Kauai recycling, in addition to generally lower rent costs and minimal materials processing. For all materials except plastic, Maui County has the highest average cost per container. Maui's high cost per container appears to be driven by relatively high rent and transportation costs. Hawaii County has relatively higher plastic cost per container, primarily because of high on-island transportation costs from remote CRCs to headquarter locations.

Exhibit ES-4 provides the weighted average cost per container results for each material type, county, and processor status. **Exhibit ES-5** illustrates the cost per container for each material type, county, and statewide.

Exhibit ES-4
Costs per Container to Recycle DBC Beverage Containers

Category	Aluminum	Glass	Plastic	Combined
Statewide	$0.0202	$0.0578	$0.0290	$0.0306
Non-Processor	$0.0222	$0.0543	$0.0252	$0.0295
Processor	$0.0198	$0.0584	$0.0297	$0.0308
Hawaii County	$0.0196	$0.0486	$0.0395	$0.0326
Honolulu County	$0.0193	$0.0590	$0.0276	$0.0295
Kauai County	$0.0190	$0.0487	$0.0248	$0.0276
Maui County	$0.0242	$0.0683	$0.0240	$0.0328

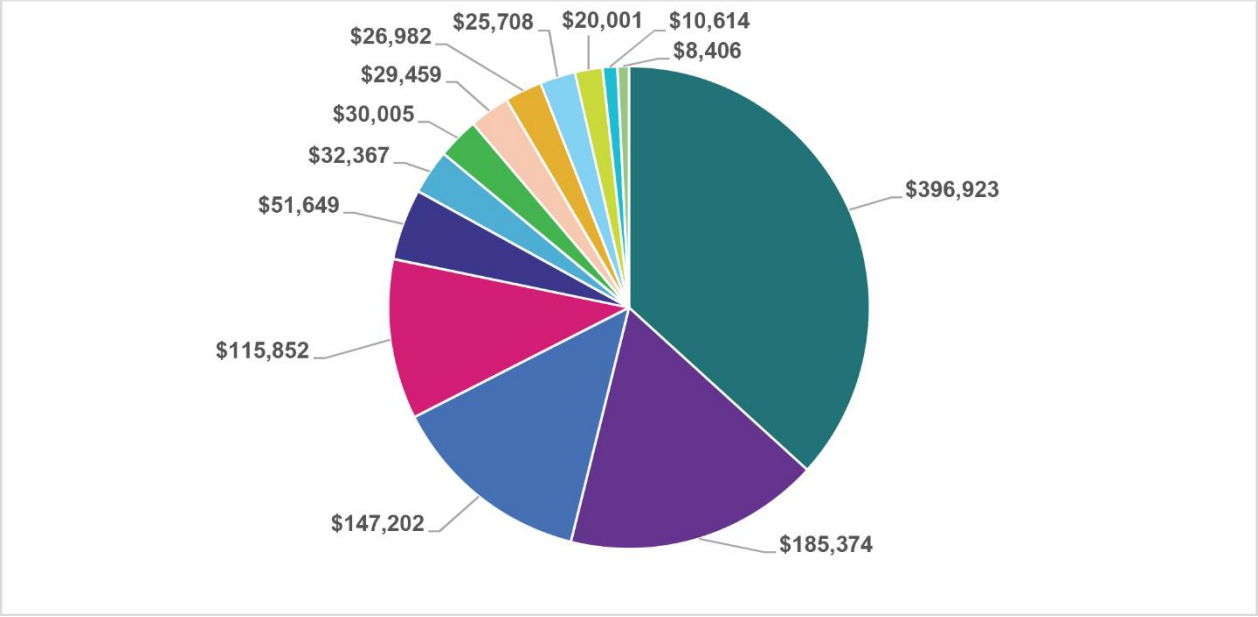
Exhibit ES-5
Cost per Container by Material Type, County, and Statewide (FY16/FY17)



Overall Cost Category Analysis

The top four CRC cost categories were direct labor (37%), transportation (combined) (17%), rent (14%), and indirect labor (11%). Each of the remaining categories accounted for between 0.2 percent and 5 percent of annual average CRC costs. **Exhibit ES-6** provides the annual average HI5 costs, by category, for CRCs for FY16 and FY17. Annual average HI5 CRC expenditures by company were $1,080,543.

Exhibit ES-6
Average Annual HI5 Category Costs per CRC Company, Statewide (FY16/FY17)



D. Handling Fee Study Scrap Revenue Results

This section summarizes the results of Task 3 of the Study of Hawaii's DBC Handling Fees, the Detailed Fiscal Analysis (Recycler Scrap Values). In consultation with the DOH, Crowe did not utilize the scrap revenue data in developing the handling fee recommendations due to the volatility of scrap markets. We provide additional handling fee study scrap revenue analyses in Section 4 of this Report.

Exhibit ES-7 provides a visual summary of the combined FY16/FY17 scrap payments per container by material and county. Aluminum receives the highest scrap payment per container, typically between 1 and 1 ½-cents per container (equivalent to 32 to 48 cents per pound). Glass received a small positive payment in Hawaii and Honolulu counties, offset by a negative payment (i.e. CRCs having to pay the end user to take the material) in Kauai and Maui Counties. Plastic received a positive scrap payment of almost ½ cent per container (equivalent to under 10 cents per pound). Overall, the scrap payment was positive, but less than one-cent per container.

Exhibit ES-7
Average per Container Scrap Price by Material Type and County – FY16/FY17

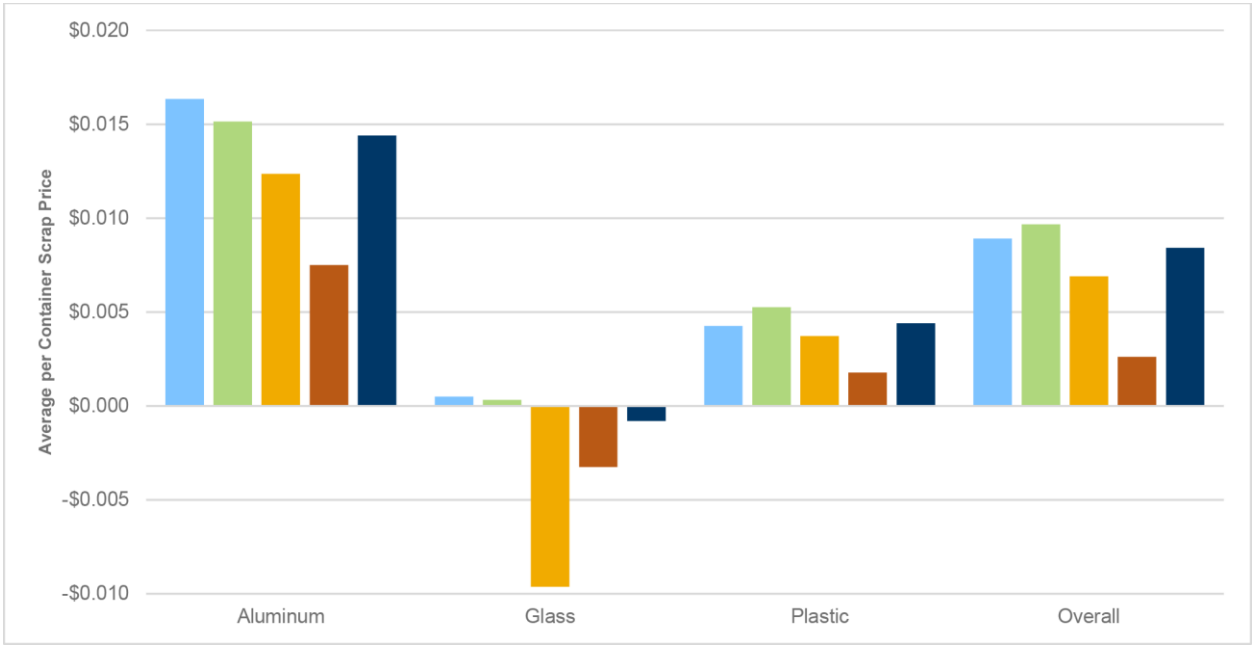


Exhibit ES-8
Average per Container Scrap Price by Material Type and Processor Status – FY16/FY17

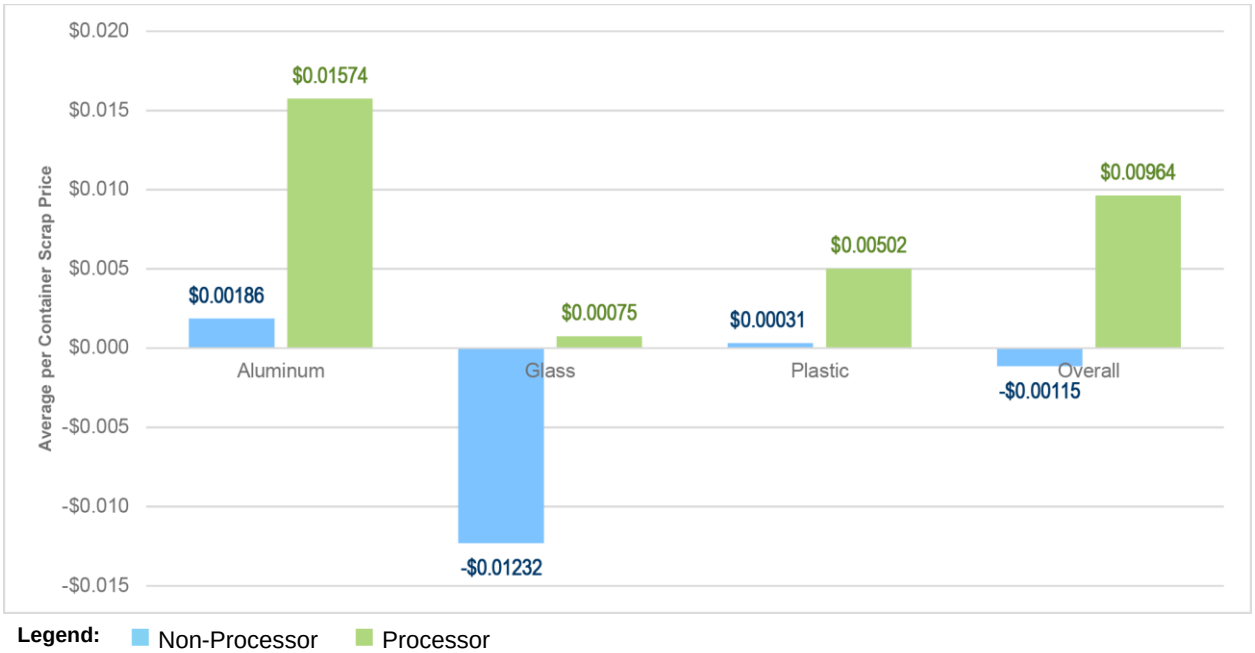


Exhibit ES-8 provides a comparison of non-processor and processor scrap payments per container. Unlike costs per container, which are similar for non-processor and processor CRCs, scrap payments are significantly different. Processor CRCs receive higher scrap payments for all material types. For aluminum, processors receive more than eight times more than non-processors, equivalent to 44 cents per pound

more. For glass, non-processors, on average, paid over one-cent per container, compared to processors that received, on average, a minimal payment of 0.075 cents per container (equivalent to 3 cents per pound, but CRCs still pay separate freight charges, equivalent to 5 to 6 cents per pound). For plastic, processors received an average of a ½-cent per container (9 cents per pound), sixteen times (16x) more than non-processors. Overall, processors received slightly less than one-cent per container in scrap payment, compared to a net payment to end-users of 1/10th of a cent per container for non-processors. In effect, non-processors' only source of revenue within the HI5 program is through handling fee payments.

E. Handling Fee Calculations and Adjustments

This section summarizes the results of Task 4 of the Study of Hawaii's DBC Handling Fees, and provides our handling fee calculation and adjustment process. This section also summarizes the results of Task 5 of the Study of Hawaii's DBC Handling Fees, Detailed Fiscal Analysis (Impacts on DBC Special Fund).

Cost of Recycling Adjustments

The study originally proposed that the handling fees for each material type would be determined by subtracting the scrap revenue from the cost of recycling:

Handling Fee = Cost per Container to Recycle – Scrap Revenue per Container

Crowe and the DOH ultimately decided to remove the scrap revenue per container from the handling fee calculation because of: 1) variability within the scrap market due to global market factors, and 2) CRCs have differing arrangements with end-users and brokers that dictate how much scrap revenue they receive. Crowe and DOH decided to base the handling fee calculation only on the cost of recycling. The result is higher handling fees than they would have been had we utilized the equation above.

To ensure that handling fees better reflect the costs of recycling in 2019, Crowe also incorporated several adjustments to increase the cost per recycling from the FY16/FY17 baseline. **Exhibit ES-9** provides an overview of the three adjustment factors.

Exhibit ES-9
Selected Adjustment Factors

Wage Indices	• 47.5% of costs wage-related • Minimum wage increases • **18.82% increase to wage costs**
COLA	• Commonly used to counteract impact of inflation • **3.7% increase to other costs**
Financial Return	• Industry accepted approach • Helps provide stability • **10% increase to all costs**

Handling Fee Recommendations

In total, these three adjustments increased the cost of recycling by 21.95 percent as compared to the FY16/FY17 average costs. We applied these adjustment factors to the cost per container for each material type and overall statewide, by county, and for processor/non-processors.

Exhibit ES-10 illustrates the recommended handling fees (in bold), as compared to the initial handling fee results, initial cost of recycling, and the current handling fees. The recommended handling fees represent an increase in per container payments across all container types for Honolulu County CRCs and an increase for all container types except aluminum and bi-metal for Hawaii, Maui, and Kauai County CRCs. Note that the DOH and Crowe utilized the recommended aluminum handling fee for bi-metal due to the extremely low quantity of bi-metal recycled.

Exhibit ES-10
Comparison of Recommended, Initial Results, and Current per Container Handling Fees

DBC Material Type	Recommended HF	Initial HF Results	Initial Cost of Recycling	Current Honolulu County HF	Current Neighbor Island HF
Aluminum	**3 cents**	1 cent	2 cents	2 cents	3 cents
Glass	**7 cents**	6 cents	6 cents	4 cents	4 cents
Plastic	**3.5 cents**	2 cents	3 cents	2 cents	3 cents
Bi-metal	**3 cents**	16 cents	16 cents	2 cents	3 cents

The recommended HF (in bold) would results in the following:

- $6.7 million increase in overall HF payments, based on FY18 redemption volumes
- 42 percent average increase in CRC HF payments, based on FY18 redemption volumes
- 17 percent to 71 percent increase in individual CRC HF payments, based on FY18 redemption volumes

Impact of Recommended Handling Fees on the DBC Special Fund

Crowe performed a fiscal impacts analysis to determine whether the DBC Special fund could support our handling fee recommendations through FY22. In total, Crowe developed seven scenarios based on varying economic, recycling, and regulatory conditions to project the handling fees fiscal impact on the DBC Special Fund. Our fiscal impacts analysis results indicate the DBC Special Fund can support the new handling fee payments with the existing 1-cent non-refundable container fee, with the exception of one scenario, the peak recycling scenario[2], through FY22. The DBC Special Fund maintained a positive ending balance and a substantial fund reserve, through FY22 in all scenarios, with the exception of the peak recycling scenario, indicating that the DOH would not need to adjust the recommended handling fees or increase the non-refundable per container fee from 1-cent to 1.5-cent.

[2] The peak recycling scenario assumes the possibility of redemption rates ranging from 72 to 80 percent, consistent with rates during FY09 through FY12.

F. Handling Fee Payment Implementation

This section summarizes the results of Task 6 of the Study of Hawaii's DBC Handling Fees. Crowe developed the Handling Fee Adjustment Model (Model) as a Microsoft Excel-based tool for the DOH to evaluate and determine potential handling fee adjustments in future years. On an annual basis, the DOH will review key indicators representing CRC cost categories and determine whether those indictors have changed significantly enough to warrant an upward adjustment in handling fees. There are six potential adjustment factors in the model:

- Wage index
- Minimum wage adjustment
- Cost of living adjustment (COLA)
- Health care adjustment
- Shipping adjustment
- Fuel adjustment.

In late 2019 or early 2020, the DOH will identify the most current metric for each of the indices and enter these metrics into the Model. With the exception of the shipping adjustment, all of the indices are available on government web pages. In order to determine a potential shipping adjustment, Crowe has prepared a short on-line survey for processor CRCs. The DOH may distribute the survey in late 2019.

Exhibit ES-11
Adjustment Factors for Recycling Cost Components

Recycling Cost Component	Applicable Adjustment
Direct Labor	Wage Index, Minimum Wage, or COLA
Indirect Labor	COLA or Health Care Index
Off-Island Transportation	COLA, Shipping Survey, or Fuel Index
Inter- and On-Island Transportation	COLA or Fuel Index
All Other Costs	COLA

The Model will determine which, if any, indices to apply to the appropriate percentage of the current handling fee. For example, 42 percent of the 3-cent aluminum handling fee supports direct labor (1.26 cents per container). If the minimum wage were to increase from $10.10 in 2018 to $12 in 2020 (a 16 percent increase), the Model applies that 16 percent increase to 1.26 cents, resulting in a new labor cost per container of 1.46 cents.

The Model takes the highest relevant adjustment factor for each cost component to apply to the relevant portion of costs specific to each of the three major material types. **Exhibit ES-11** summarizes the cost adjustment factors, and cost components that the adjustment factors apply to, within the Model. If an adjustment factor is greater than the COLA, the model will apply that adjustment factor (with highest adjustment) to the relevant cost component. The default adjustment is the COLA, based on the U.S Department of Labor's Bureau of Labor Statistics provided Consumer Price Index for Urban Hawaii.

Once all of the relevant adjustment factors are entered into the Model, the Model calculates the potential increases to handling fees for each material type. The DOH rounds handling fees to the nearest half-cent. For example, if the adjusted aluminum cost went from 3-cents to 3.1-cents, the DOH could leave the handling fee at the current rate. If the adjusted aluminum cost went from 3-cents to 3.4 cents, the DOH could increase the handling fee to 3.5-cents.

Crowe

Section 1

Introduction

1. Introduction

This Final Report of the Study of Deposit Beverage Container (DBC) Handling Fees provides an overview of the study, including:

- Overview of CRC operations
- Survey methodology
- Cost of recycling results
- Scrap revenue results
- Handling fee calculations and adjustments
- Impact of the recommended handling fee on the DBC special fund
- Methodology to evaluate and adjust handling fees in future years.

A. Purpose of the Handling Fee Study

This study of handling fees determined recommended per container handling fees by material type for Hawaii's DBC program (Program). The recommended handling fees are based on the results of this study of actual recycler costs. The results of this study are a critical element supporting the daily operations and financial status of the certified recycling centers (CRCs) and the Program. The current total handling payments to CRCs are approximately $16 million per year. The recommended handling fees will increase total annual handling fee payments to CRCs by approximately 42 percent. The study results are fundamental to support recycling in the state and to the financial viability of the Program.

B. Contractor Qualifications

The Department of Health (DOH) procured the services of Crowe LLP (Crowe) to perform this first of its kind study of the Hawaii DBC program's handling fees. Crowe leveraged their breadth and depth of knowledge and experience in beverage container deposit programs. Crowe brought unique qualities for this study of handling fees, which includes:

- **Proven ability to plan, implement, analyze, and report quantitative beverage recycling data** – The Crowe team has specific beverage container recycling experience, in combination with project management, field survey, statistical, and analytical skills. Unlike many traditional solid waste consultants or public auditors, Crowe brought to the DOH in-depth knowledge of recycling center operations, beverage container materials and markets, and the unique policy and program challenges of implementing beverage deposit systems.
- **Over 25 years of beverage container recycling, recycling program, and integrated waste management experience** – The Crowe team knows recycling and recycling operations. The team has been integrally involved with the development of California's Beverage Container Recycling and Litter Reduction Act almost since that program's inception in 1987. Crowe personnel conducted analyses of a wide range of integrated waste management and recycling programs, operations, policies, and stakeholders. Crowe gained the trust and respect of stakeholders that include small and large private businesses, industry trade groups, environmental groups, and local government entities.
- **Specific Program-related expertise** - Collectively, the Crowe team brought over 100 years of beverage container recycling experience to this engagement. Their management team members specifically for this Study each have at least 25 years' experience in recycling and integrated waste management. All project staff have specific recycling experience, having participated in cost surveys at beverage container recycling centers.
- **Directly relevant knowledge of recycling markets** – The Crowe team has over ten years of experience evaluating recycling materials markets. They conducted three comprehensive market analyses for the California Department of Resources Recycling and Recovery. In support of the 2015 CalRecycle cost survey, Crowe researched national, regional, and state scrap prices for aluminum,

PET, HDPE, and glass. Crowe regularly track scrap markets as part of our ongoing evaluation of the recycling industry.

- **Experience and improvement** – Crowe team members provided consulting services to California's Beverage Container Recycling and Litter Reduction Program dating back to 1991. They conducted eight processing fee and handling fee cost surveys for California, and are currently in the midst of their ninth. In total, the team has conducted over 1,500 site visit surveys to recycling centers. Their approach built on the best of California's approach, but focused and refined the methodology to better meet the needs of Hawaii's Program. For example, with 2,000 recycling centers and 18 billion containers, California must conduct cost surveys at a sample of recycling centers. However, because the scale is smaller (approximately 70 recycling centers and 635 million containers), they performed a census survey of all recycling centers to determine costs per container and scrap values.
- **Experienced, trained staff** – The Crowe team consisted of experienced and trained individuals who have all participated directly in conducting recycling cost surveys and are currently engaged in our ninth processing fee and handling fee CalRecycle cost survey. The project executive has been involved in California's recycling program since its inception and has led eight previous cost surveys. Additionally, Crowe staff have experience in conducting fieldwork, performing management and operational interviews; reviewing financial statements and labor information; cost reconciliation; completing workpapers; developing reports and recommendations; presenting findings to industry leaders and stakeholders; and performing quality control through CPA review.
- **Partnership with Hawaii based TRUSTA** – Crowe's partnership with TRUSTA, a member of Crowe Global, brings additional audit experience to the team and a local presence. TRUSTA provides audit, tax, and advisory services to domestic and international clients. TRUSTA, based in Honolulu, supported the Crowe team by providing audit staff for recycling center surveys.

C. Background of DBC Program and Handling Fees

In 2002, the State of Hawaii Legislature passed Act 176 (Bottle Bill), establishing the DBC Program under Chapter 342G, Part VIII, Hawai'i Revised Statutes. The DOH's Environmental Management Division, Solid Waste Branch administers the DBC Program to 1) promote recycling, 2) reduce litter, and 3) reduce the amount of waste sent to landfills. In 2005, Chapter 11-282 of the Hawaii Administrative Rules implemented the DBC program and established minimum standards for the collection of empty beverage containers. The program requires that all eligible aluminum, bi-metal, glass, and plastic (PET & HDPE) containers sold, donated, or otherwise distributed to consumers in the State have a deposit payment of $0.05 for each container.[1] Beverage containers excluded from the DBC program include those sourced from exempt commercial passenger-vehicle companies such as airplanes and cruise ships, where beverage containers are intended for consumption on the commercial passenger vehicle. Beginning in December 2007, the DOH phased in redemption of 68 fl. oz. containers.

The State also requires a non-refundable "container fee" in addition to the $0.05 deposit. The container fee, originally at $0.01 per container, increased to $0.015 in September 2012 as required when the statewide redemption rate exceeds 70 percent. Effective September 2015, the fee returned to $0.01, as the redemption rate fell under the 70 percent threshold in fiscal year 2014-15. This fee helps to provide Program operational support, Program administration, redemption center operator eligible handling fees, and in the early years of the Program, redemption center and recycling infrastructure improvement grants.

Beverage container manufacturers and distributors are required to pay deposits and fees for DBC Program containers into the DBC Fund. Manufacturers and distributors must report the number of DBCs sold and/or distributed into the State, paying deposits and container fees to the DBC Program on a monthly basis (or semi-annually for small companies). The manufacturers and distributors may pass the deposits and fees to their customers (e.g., retailers), who then may pass on the costs to consumers. Consumers may take their DBC program containers to a Certified Redemption Center (CRC) for redemption.

[1] Beverages covered through the DBC Program include all nonalcoholic drinks, except milk or dairy products, and limited alcoholic drinks (i.e., beer, malt beverages, mixed spirits, mixed wine)

Exhibit 1-1
Deposit Beverage Container Payment Flow

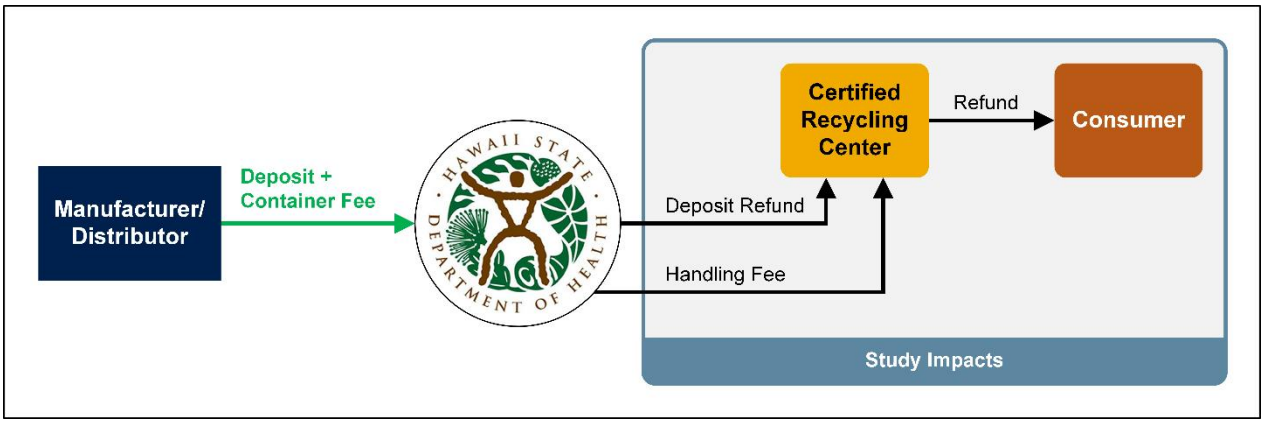


Exhibit 1-1 provides a simplified visual of the payment flow of the DBC Program. In addition to the flow of funds displayed, the program also supports program administration, operations support, and outreach efforts.

The DBC Program requires CRCs to submit the 5¢ Deposit Refund Request Form (DR-1) and Handling Fee Request Form (HR-1), at minimum, twice per month. CRC reports include number and/or weight of DBCs of each material type accepted, amount of refunds paid out, and number and/or weight of DBCs transported to out-of-state transport or to recycling facilities. In addition to populating the forms, recyclers must submit supporting documentation such as copies of out-of-state transport and weight receipts or recycling facility acceptance receipts. State law provides the program 30 days to reimburse CRCs.

Handling Fees

Per the State of Hawaii, Office of the Auditor's *Financial and Program Audit of the Deposit Beverage Container Program, June 30, 2014* report, dated April 2015, the Auditor describes the current payment process:

> *"The program (DBC Program) pays certified redemption centers 50 percent of the handling fees claimed at the time of the initial request by submitting weight tickets for the amounts shipped to end-user recycling facilities. The remaining balance is paid upon receipt of corroborating weight reports prepared by the end-user recycling facilities. The program also reimburses certified redemption centers for the amount of deposit refunds paid to consumers based on reports prepared by the certified redemption centers. The associated handling fees paid to the certified redemption centers are based on container equivalents from the weight of containers redeemed and sent to recycling facilities as reported by both the certified redemption centers and recycling facilities."*

In addition to reimbursing CRCs the $0.05 deposit refund paid out to consumers (through DR-1s), the program pays a "handling fee" for each container verified as being recycled (through HR-1s). Handling fees are paid for containers that are: 1) transported out-of-state; 2) received by an approved in-state company for an approved end use for recycling; or 3) received by a department-permitted facility; provided that the container is physically received by the redemption center. Hawai'i Revised Statutes, Chapter 342G-177 states that the department shall evaluate the handling fee at least once a year; however, the handling fee has not been adjusted since 2008. Any changes to the handling fee require a public notice at least 30 days in advance. Handling fees shall be not less than the prevailing deposit beverage container fee (currently one cent).

CRC Operation Categorizations

CRC operations vary significantly. These variances include location, operational complexity, number of locations, other business activities, and other factors. Primary categorizations included:

- **Operation location:** Oahu versus neighbor islands (Hawaii, Kauai, and Maui)

- **Material handling:** processor CRC operators versus non-processor CRC operators (CRC operators that send redeemed material to processor CRCs rather than processing the material and shipping to the end user)
- **Operating locations:** multiple site CRCs (companies that operate more than one site) versus single location CRCs (operate CRC at one site only)

The following subsection provides additional background to these operational variations.

D. CRC Operations and Challenges

Beverage container recycling in Hawaii is unique as compared to the continental United States. The DOH and Crowe recognized that to effectively conduct the handling fee study, it was important to understand the challenges faced by recyclers in Hawaii. Crowe conducted research and interviews prior to beginning the survey work. This Environmental Scan, described in the Methodology, provided input to the survey methodology and overall project approach. Much of the Environmental Scan interview time, and our supporting research, was focused on costs of operating CRCs. Hawaii is known for its high cost of living. In evaluating the cost of operating CRCs, to the extent possible, the detailed fiscal analyses considered changes in costs over time, and costs relative to other businesses in Hawaii and recycling operations in other states. For the Environmental Scan, we asked CRCs to identify the top three factors influencing their costs. Below, we identify and briefly discuss the cost categories that CRCs most often identified as among the three greatest:

- Personnel Costs – Labor
- Personnel Costs – Benefits
- Freight and Transportation

1. Personnel Costs – Labor

The first and most frequently mentioned cost challenge was labor. Operating a redemption center is labor intensive. Direct labor makes up approximately 40 percent of CRC costs. For security and accountability, CRCs typically staff two employees per center at any one time, and busy locations may require five or more employees. Sites that operate seven days per week must hire additional employees to maintain staffing levels throughout the week. Several interrelated factors influence the direct cost of labor:

- CRCs typically pay above minimum wage for entry-level workers, starting at $10.50 to $11 per hour. The consensus among CRC operators is that in order to attract workers they need to offer slightly more than minimum wage. Working at a CRC can be physically demanding. Workers must be able to handle multiple activities at any one time, including handling cash and dealing with potentially difficult customers.
- Minimum wage in Hawaii has increased 50 percent since 2006, and 19 percent during the 2015 to 2017 handling fee study period. The 2018 rate, $10.10 per hour, was the final increase specified in state legislation passed in 2014. The Governor is in favor of additional increases in minimum wage.
- Unemployment in Hawaii is currently about 2 percent, and has been declining since 2009. Unemployment rates vary by county, but in all but one case are less than the United States rates.
- Low unemployment makes hiring “competent, dedicated, trustworthy employees” even more challenging. Essentially, everyone who wants to work is able to find a job. One operator noted that they used to have as many as 20 job applicants per day and now might see one applicant per day. Much of Hawaii’s recent job growth has been in relatively low-wage sectors[2], directly competing with CRCs.
- Retention and turnover are big challenges for most CRCs. While many operators have some employees that have been with them for many years, others last less than a day. There are cases where CRCs have had to close locations temporarily or permanently due to staffing issues. Temporary

[2] The Economic Research Organization at the University of Hawai’i (UHERO). 2018 First Quarter – State Forecast Update: Not much lift from tax cuts in Hawaii’s soaring economy. March 2, 2018.

closures result when employees do not show up for work; permanent closures result when the CRC cannot find qualified employees to staff a location.

- CRC's labor challenges reflect macroeconomic conditions beyond the control of the recycling program, making solutions challenging. CRCs have taken small steps to address the situation. For example, one CRC provides an employee referral bonus of $500, which has been a primary source of new workers. Another works with an employment agency to hire temporary workers. If temporary workers are a good fit, they will move ahead with permanent employment, reducing the paperwork and training burden that occurs when an employee lasts only a short time.

2. Personnel Costs - Benefits

Labor benefits are closely associated with labor, and were also universally cited as a major cost category for CRCs. The 2011 Hawaii Prepaid Health Care Act (Hawai'i Revised Statutes 393-1 et seq.) requires employers to offer and help pay for health insurance for employees that work more than 20 hours per week. The Act requires companies to pay for at least 50 percent of comprehensive coverage, including vision and dental. The law also requires that employees pay not more than 1.5 percent of their wages for the employee share. For a full-time minimum wage worker, that results in the employer covering all but approximately $25 per month. Most CRCs pay the full premium for the employee, and several CRCs we interviewed cover health insurance for the employee's family. While an additional cost, CRCs see providing full healthcare coverage for the family as a way to improve employee loyalty and retention.

As compared to much of the country, Hawaii is known for having an effective and economical healthcare system. However, according to the Hawaii Healthcare Project[3], healthcare costs in Hawaii have been increasing at a rate of 6.2 percent per year over the last several years. In 2009, more than 13 percent of the state's economy went to healthcare costs. In addition to health insurance, CRCs often provide 401K retirement plans, including a 3 percent safe harbor (matching) contribution.

3. Freight

The cost of shipping materials from the islands was among the top three costs identified by most CRCs. There are three primary transportation components affecting Hawaii CRCs: overseas freight, interisland freight, and on-island transport. The cost of overseas freight is a significant concern for CRCs. Essentially all HI5 recycled material is shipped off the islands to either mainland U.S. or Asia.

As discussed further below, there are currently no viable end-use markets for HI5 materials on the islands. The exception is bi-metal, a small fraction of all HI5 containers, which most redemption centers transport to Schnitzer Steel in Kapolei. CRCs ship HI5 materials in shipping containers to their end destination. End-users must be certified by the DOH. For the most part, CRC operators ship aluminum to the West Coast, where it is then rail transported to aluminum mills in the southeast. Occasionally CRCs send loads of aluminum to Asia. Most plastic is shipped to various end-users in Asia (China, Korea, Vietnam, Indonesia), as well as to California plastic reclaimers. Glass is shipped to Western Strategic Materials in Fairfield, California, via the Port of Oakland.

Processor CRCs universally cited overseas freight costs as a key operating cost category, and one that has been increasing over time. One CRC noted: "freight only goes up – it used to cost $1,200 to get a load of aluminum to Alabama, now it is $6,000." Another compared the cost of shipping a container of glass to Oakland, California at $500 in 2003, to $2,800 in 2018. The range of shipping costs currently is wide, with some brokers able to ship a container of HI5 materials to Asia for as little as $1,000, at the low end, to $6,000 to ship an insured container of aluminum to Los Angeles and then Alabama. Glass, which almost universally is shipped to Oakland, California, currently costs between $2,500 to $2,900 per container. Shipping a load of glass to Korea costs $1,000 per container. There are several factors that influence the cost of shipping, most of which are beyond the influence of the DBC program.

[3] Hawaii Healthcare Project, hawaiihealthcareproject.org, accessed March 12, 2018.

According to the Hawaii Department of Transportation, more than 80 percent of all goods consumed in Hawaii are imported, and essentially all of the imported goods enter the state through the island's ten commercial harbors.[4] At the same time, there are currently only two companies permitted to ship container cargo to the mainland United States from Hawaii ports: Matson Navigation Company and Pasha Hawaii Transport Lines, LLC. This creates a near-monopoly situation.[5] A third company, NYK Container, ships material between several ports in Asia and Honolulu.

Another factor complicating freight from Hawaii is that companies do not ship as frequently as they do from larger mainland ports. Two shipping companies send shipments to Asia once a week, and one sends shipments every other week. This makes logistics more complicated, and may require processors to store material longer than desirable before shipping.

A second factor influencing the cost of shipping in Hawaii is the Jones Act, or Merchant Marine Act of 1920. The Jones Act includes four provisions that affect shipping to and from U.S. ports: ships must be built in the United States, owned by U.S. citizens, carry a United States flag, and 75 percent of the crew must be U.S. citizens and permanent residents. The Jones Act was seen as necessary for national defense following World War I. Today, the Jones Act remains politically contentious, with members of both parties strongly for, and against, the Act.

There are several potential impacts to CRC operations resulting from the Jones Act. Foreign ships may only stop at one U.S. port. This limitation is generally considered to increase costs, particularly for non-mainland ports such as Hawaii, Puerto Rico, and Alaska. For example, economist Thomas Grennes of George Mason University wrote that Hawaii and Puerto Rico are unable to benefit from cheaper natural gas from the mainland because U.S. shipyards have not built any Jones Act-eligible liquefied natural gas tankers.[6]

One impact of the Jones Act is lost shipping volume. For example, a ship that is coming from China to the mainland cannot stop in Hawaii to offload or on-load partial cargo shipments, even if there is space on board.[7] Another impact of the Jones Act is a shortage of eligible ships. According to several reports, there are currently only 99 cargo ships that can be used for shipping to and from U.S. ports, down from 193 ships in 2000. Furthermore, these ships are older than the global fleet – 33 years as compared to 16 years. There are only a few shipyards in the U.S. with the capacity to build cargo ships, and reportedly the cost is three times more than ship building in Korea or Japan.[8]

It is difficult to quantify the influence of the Jones Act on costs of doing business in Hawaii, and the extent to which there even is an impact is under debate. A survey in late 2017 by the Honolulu Star-Advisor found that 84 percent of respondents wanted reform of the Jones Act and almost 50 percent wanted to see the Act eliminated.[9] One frequently discussed reform that would increase the number of Jones Act-eligible ships is to eliminate the requirement that ships be built on U.S. shores, a provision opposed by the shipping industry.

However, freight costs from Hawaii are significantly higher than from California ports. One broker stated that it costs $200 per container to ship from Los Angeles to Asia, $500 to ship from Oakland, and $1,200 to ship the same container from Hawaii to Asia. One reason for the significant price differential is that there is a large supply of empty containers ready for the return trip to Asia in California.

CRCs have little control over freight costs. The possible addition of a third shipping company between Hawaii and U.S. ports in 2020 may increase competition, thus lowering shipping costs.

---

[4] Hawaii Department of Transportation, http://hidot.hawaii.gov.

[5] Anecdotally, one CRC operator complained that the two companies even raise their prices on the same day.

[6] http://thehill.com/opinion/international/372744-repealing-antiquated-jones-act-would-be-a-boon-to-all-americans#.WntlMgbseqw.twitter.

[7] Under Jones Act rules, a Chinese ship could sail to Hawaii, off-load all cargo, and then sail empty to Los Angeles, resulting in a clearly inefficient use of cargo space.

[8] Joe Kent, Grassroot Institute of Hawaii, personal communication, March 9, 2018.

[9] http://www.grassrootinstitute.org/2017/10/politicians-missing-the-boat-on-jones-act/.

4. CRC Operational Variation

Not all CRCs are the same. There is a wide degree of variability among CRC operations and locations. As a result, the detailed financial analysis found a wide range of costs. Below, we identify a few of the major differences among CRCs and the impact these differences have on CRC operations. In many cases, these differences can influence costs in both directions. Crowe obtained costs of recycling from all CRCs that were operating during FY16 and FY17. As a result, the survey results incorporate all of these differences and the variation in costs, and represent the actual cost of recycling DBC containers in the State.

- **Urban versus rural** – each faces unique challenges; urban CRCs typically pay higher rent, and while there are more potential employees, there is more competition. Rural CRCs may pay lower rent, but find it harder to find employees. Rural CRCs must transport material further, particularly in Hawaii County.
- **Oahu versus neighbor island** – Access to employees and shipping is easier on Oahu, while rent is generally higher. Each neighbor island has unique characteristics:
  - Hawaii has many rural sites with the associated challenges, including higher cost on-island transportation
  - Maui has relatively high rent and transportation costs
  - Kauai has many smaller, non-processor CRCs and generally lower costs.
- **Processor versus non-processor** – Costs between these two very different types of CRCs were actually similar, but for different reasons. Processor CRCs are larger, and have an economy of scale in handling more containers. Non-processor CRCs are generally smaller and higher cost for the recycling operations they conduct. However, because they do not incur processing and shipping costs, their costs per container are similar to that of processors.
- **Multiple sites versus single location** – CRCs with multiple locations have increased economies of scale as compared to single locations. However, they also have additional on-island transportation costs and more staffing challenges.
- **Stand-alone CRC versus part of other business activity** – CRCs that are part of another business, such as a gas station, scrap metal recycler, or electronics recycler, may have more complicated operations, but also can spread the cost of operation across more profit centers.

[This page intentionally left blank.]

Crowe

Section 2

Handling Fee Survey Methodology

2. Handling Fee Survey Methodology

This study of Hawaii Deposit Beverage Container (DBC) Handling Fees included seven tasks. **Exhibit 2-1** briefly describes each task. This section describes the methodologies Crowe implemented to complete these seven tasks.

Exhibit 2-1
Crowe Project Work Plan Tasks

DBC Handling Fee Study – Contractor Tasks
1. **Conduct an "Environmental Scan"** – Conduct interviews and research to help establish methodological approach to detailed fiscal analyses and to identify factors in the changing environment that are likely to impact the cost of recycling Hawaii's DBCs.
2. **Conduct Detailed Fiscal Analysis (Recycler Costs)** – Conduct a detailed study, by surveying all Certified Redemption Centers (CRCs), to determine the actual cost of recycling Hawaii's DBCs by material type, statewide, county, and processor/non-processor.
3. **Conduct Detailed Fiscal Analysis (Recycler Scrap Values)** – Conduct a detailed study, by surveying all Certified Redemption Centers (CRCs), to determine the actual scrap values paid for Hawaii's DBCs by material type, statewide, county, and processor/non-processor.
4. **Recommend DBC Handling Fees** – Analyze the results of Task 2 and Task 3 to recommend revised handling fees for DBCs by material type, county, and processor/non-processor.
5. **Conduct Detailed Fiscal Analysis (Impacts on DBC Special Fund)** – Conduct a detailed fiscal analysis to evaluate redemption rates and the impact of the recommended handling fees on the DBC Special Fund.
6. **Describe a Process the Department may use to Regularly Evaluate the Handling Fee** – Develop a defensible process and procedures to regularly evaluate, and if necessary adjust, DBC handling fees.
7. **Presentation of Study Methodology and Findings/Recommendations** – Prepare and present study methodology and results to OSWM, Administrative Staff from the Department of Health, and public hearings.

A. Environmental Scan

This Environmental Scan was the first deliverable of the Study of Handling Fees for the Hawaii DBC Program.

The Environmental Scan provided the foundation for the remaining tasks of the handling fee study. The overall goal of the scan was to gain an understanding of the range of factors that influence CRC costs, operations, profits, and Hawaii scrap markets. The findings of the scan helped Crowe design the survey to obtain accurate information on CRC costs and revenues. Specific areas that the scan addressed included the following:

- What kinds of personnel and non-personnel costs are incurred by Hawaii CRCs when handling DBC material?
- What recent changes have been noted for these costs? Are there any recent trends observed (increase/decrease) for these costs? What are the likely causes of these changes/trends?
- What kinds of adaptive solutions have been proposed/discussed/implemented in response to any of the recent changes in costs?
- Are there unique operational considerations that might contribute to cost differences between different recycling companies in Hawaii?
- What types of industry data (international, national, Hawaii) is available to provide an estimate of scrap values for DBC material types (aluminum, bi-metal, glass, and PET/HDPE plastic)? What must the

program do to obtain/access this data?

- Are there any suggestions as to statute or administrative rules that need to be clarified to improve the way that the DBC program supports CRC operations?

Crowe began the Environmental Scan research in December 2017. The two key data gathering tasks consisted of secondary literature reviews and telephone and in-person interviews. Following the data gathering phase, Crowe analyzed and summarized the results.

Research

In order to gain a background understanding of Hawaii's Deposit Beverage Container (DBC) program and the characteristics of recycling in Hawaii, Crowe conducted extensive internet research and analyzed a number of industry, government, and trade group web pages.

In general, there was limited Hawaii-specific information on recycling trade group web pages and in recycling industry publications. None of the scrap pricing organizations provided information specific to Hawaii, although some had Pacific Area prices. Crowe found relevant economic data, general cost of living information, and information and varying perspectives on the Jones Act (Merchant Marine Act of 1920).

Interviews

Crowe conducted structured interviews with fifteen CRC operators, several government officials, two representatives from non-profits, and three brokers that handle HI5 recycled materials from CRCs. Most of the CRC and government official interviews were conducted in-person the week of February 5, 2018. Broker and additional interviews were conducted the first two weeks of March. For CRCs, the interviews covered the following areas:

- Overview of CRC operations
- Descriptions of materials handled, customers, and seasonality
- Material handling, processing, and shipping details
- Key factors influencing operational costs
- Structure of financial and scrap revenue data
- Perspectives on CRC operations and challenges
- Recommendations for the Hawaii DBC program.

For brokers, the interview covered some of the same overall questions, as well as details on freight, quality of materials, end-use destinations, and commodity payments.

B. CRC Surveys

This subsection describes the handling fee cost and scrap value survey methodologies (Tasks 2 and 3), from identifying the survey sample frame, to compiling survey data, and all the supporting tasks in between. There are seven key tasks described in this subsection:

1. *Survey Design and Purpose*
2. *Survey Scheduling, Logistics, and Confidentiality*
3. *Training Manual Development*
4. *Surveyor Training*
5. *Cost Model Development*
6. *Scrap Values Survey*
7. *Cost Survey Procedures.*

1. Survey Design and Purpose

Crowe developed the survey design for the cost survey in coordination with the Hawaii Department of Health (DOH). Given the relatively small number of CRCs in the State of Hawaii, the survey consisted of a census of all CRCs. The survey included two CRCs that are not currently operating, but were operating during the two fiscal years that the survey covered. One additional CRC was surveyed, but was later dropped from the survey due to possible non-compliance with certification. The cost results include nineteen CRC operators for the relevant fiscal years that they operated.

This handling fee cost and scrap value survey estimated costs per container and scrap payments per container during two fiscal years: FY16 (July 1, 2015 to June 30, 2016) and FY17 (July 1, 2016 to June 30, 2017). Crowe determined costs per container and scrap payments per container for aluminum, bi-metal, glass, combined plastics (PET and HDPE), and an overall cost per container. Note that the DOH does not collect recycling volume data for PET and HDPE plastics separately, and almost all CRCs do not handle the two plastics separately. Crowe utilized modeling and an estimate of the split of PET and HDPE containers to determine PET and HDPE costs. Crowe determined costs per container statewide, by county, and by processor/non-processor.

2. Survey Scheduling, Logistics, and Confidentiality

An important component of the cost survey involved scheduling site visits and communicating with CRCs. The survey team members coordinated scheduling and communication with recyclers.

Because conducting a cost survey fundamentally entails the collection of proprietary financial information, sensitivity to stakeholder relations is highly important. Without willing and active cooperation from CRC operators, determining the real costs and scrap revenues of beverage container recycling would be exceptionally difficult and the results would be hard to support. Our approach is to communicate with site operators, owners, and managers from the start of the process to help them understand what the handling fee survey entails; what information we are seeking to obtain; and the purpose of the handling fee survey.

For approximately ten CRC operators, the first stage of recycler communication was an email and follow-up telephone call to schedule an in-person interview as part of the Environmental Scan, conducted in February 2018. In April 2018, the DOH sent a letter, on DOH letterhead, informing CRCs about the handling fee survey site visits and the approximate timeframe of site visits. The letter also identified the expectations of the CRC, and introduced Crowe as the DOH's handling fee survey contractor. The DOH sent introduction letters to all CRC companies. In the second stage of communication, a Crowe survey team member established telephone contact with the CRC to schedule the site visit(s).

The survey team contacted the CRC operator directly, approximately one week before the site visit, for final visit confirmation. Site visits were generally conducted by a team of two surveyors, including accountants and/or recycling experts. Each survey team included at least one member with experience on prior cost surveys. Crowe conducted all surveys during May and June 2018.

Crowe also implemented and maintained a secure Microsoft SharePoint site for the transfer and storage of all handling fee survey CRC site files. The site allowed our cost survey team members to securely access files in the field; facilitated the efficient review of sites via a check-out workflow; and tracked the status of each site. Crowe's IT systems automatically backed up the secure SharePoint site on a daily basis.

To ensure confidentiality of CRCs' proprietary information, every Crowe and subcontractor employee that worked on the handling fee survey contract signed individual Confidentiality Agreements warranting that they will not disclose any information made available by each CRC operator. Also, each company contractor – Crowe LLP (Prime Contractor) and Trusta (Subcontractor) – also signed company Confidentiality Agreements.

3. Training Manual Development

Crowe prepared a comprehensive Training Manual for the handling fee survey. The Training Manual was based on a similar manual prepared for the California Department of Resources Recycling and Recovery. However, many aspects of the surveys for California and Hawaii are quite different. As a result, Crowe revised relevant sections of the manual and created new content when appropriate. The Training Manual includes ten chapters:

- Program Overview
- Cost Survey Fundamentals
- Conducting Site Tours and Interviews
- Site Memo
- Understanding Financial Documents
- Allowable Costs and Non-Allowable Costs
- Direct and Indirect Costs
- Labor Costs
- Site File Assembly, Workpapers, and Review Process
- Understanding Scrap Value Data

Each chapter emphasizes 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 and scrap value surveys. In addition, Crowe developed PowerPoint presentations covering topics in the Training Manual. The presentations include videos and activities specific to each training module. Crowe created work assignments and interactive exercises as part of the training.

4. Surveyor Training

Successfully completing the handling fee survey site visits requires knowledge of recycling, recycling practices, the HI5 program, the specific procedures of site visits, auditing, and financial cost accounting. All six members of the survey team participated in training.

Training consisted of two and one-half days of classroom training, a day of fieldwork, and a follow-up day of classroom training. On the day of fieldwork, each new survey team member conducted a CRC survey site visit with a highly experienced team member in order to provide “real-world” experience. The experienced survey team members guided new team members through the on-site and post-site visit procedures over the course of the visit. Following the field visit, the survey teams spent the remainder of the day 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 the classroom component of the training, Crowe prepared and presented PowerPoint presentations for each training module. A significant segment of the training sessions was spent on hands-on activities and preparing three site files (simple, intermediate, complex) using sample data. The training allowed team members to better understand the many variations of financial information, and other complicating issues, they would likely face in the field.

5. Cost Model Development

A primary aspect of the cost survey was a Microsoft *Excel* workbook consisting of 14 worksheets, the labor allocation cost model (cost model). The cost model was first developed for the California Beverage Container Recycling Program Processing Fee Cost Survey. Over many years, the model has been updated and revised to accommodate legislative and regulatory changes, as well as upgrades of *Excel*. Many aspects of the California cost model were applicable to Hawaii’s Handling Fee Survey. Crowe reviewed each worksheet and updated several components of the model to reflect Hawaii-specific characteristics. Crowe created two cost models for each CRC, one for FY16, and one for FY17, using the recycling volume information provided by the DOH. After each CRC site visit, the survey teams updated the models with CRC-specific financial and labor data, as described below.

6. Scrap Values Survey

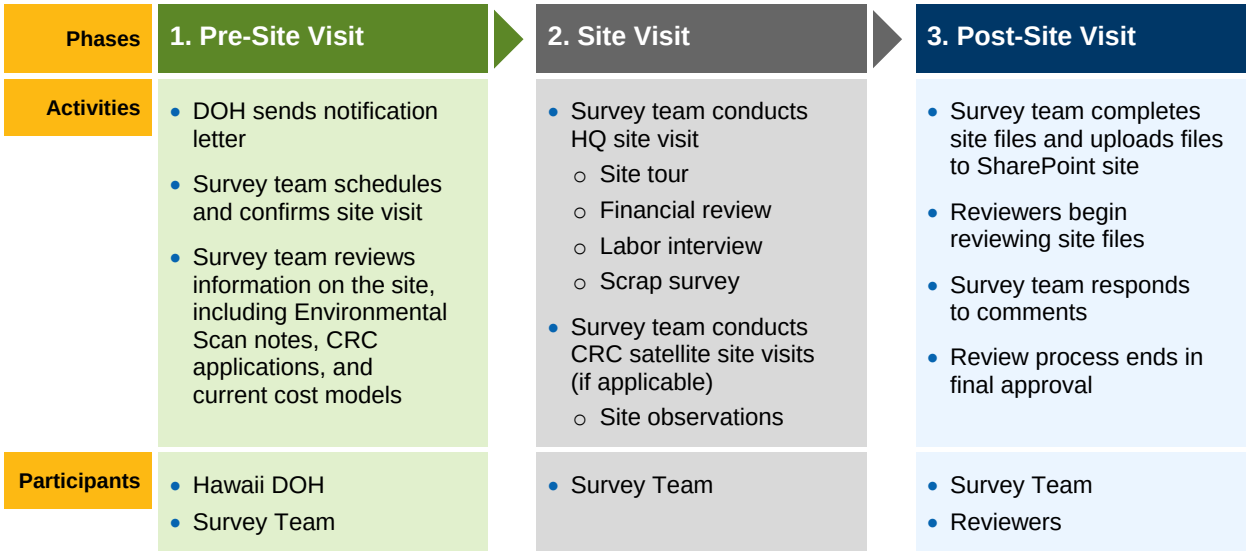
An important component of the Handling Fee Survey was obtaining scrap value data from each of the CRCs and for each material type. Crowe developed an Excel spreadsheet to capture scrap data from CRCs. When possible, the team obtained data from July 2014 through April 2018 in order to capture market variations over a longer time period than the two fiscal years of the survey. The customized spreadsheet captured applicable information on each scrap shipment, including: date, weight, scrap payment, scrap value per pound, shipping costs, combined shipping/scrap payment per pound, destination, and broker.

7. Cost Survey Procedures

There are three phases of an individual cost survey, illustrated in **Exhibit 2-2:**

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

Exhibit 2-2
Three Phases of the Cost Survey



Pre-Site Visit

Before conducting the on-site cost and scrap survey, the survey team obtained all available information about that site. Crowe entered recycling volumes for FY16 and FY17 into the two cost model *Excel* files for each site. The survey team evaluated the beverage container weight and container count information to identify the approximate size and scope of the survey. Much of the pre-site visit time was spent on travel logistics and mapping. If a site was interviewed as part of the Environmental Scan, the survey team reviewed the interview notes to develop a good understanding of the company's operations. Survey teams also reviewed CRC certification and solid waste permit applications provided by the DOH.

On-Site Visit

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

Another key on-site task was reviewing the financial information with site management, or a financial officer, to identify and categorize costs for calculating handling fees, direct (material specific), and indirect costs. Team members classified costs into one of the following categories:

- Direct labor
- Other labor
- General business overhead
- Transportation (on-island, interisland, off-island)
- Rent
- Depreciation
- Property taxes/ General Excise Taxes
- Utilities
- Supplies
- Fuel
- Insurance
- Interest
- Maintenance/repairs
- Not allowable

The next key task was conducting structured labor allocation interviews to determine the allocation of each employee's time first to CRC or other business, then to direct yard labor or all other labor, and finally by HI5 material type or other non-HI5 material type. The cost model uses this labor allocation information to allocate indirect costs and wages.

Survey teams obtained and reviewed scrap and shipment data for each of the material types. When possible, the teams obtained scrap data from July 2014 through April 2018.

In addition, the survey team made copies of all relevant financial, scrap, and wage information to include in the site file; reconciled labor costs with supporting financial documentation; obtained the site operator's signature on an affidavit attesting that the cost information provided was complete, accurate, and consistent with instructions; and determined that on-site survey procedures were followed.

For the nine companies with multiple CRC locations, survey teams conducted a site visit to each of the "satellite" sites. During these visits, the team observed material handling and overall operations. In most cases, the team interviewed employees on site to confirm observations.

Post-Site Visit

After the site visit, the survey team spent from 8 to 15 or more hours further compiling the site data, entering information into the cost models, completing the *Site Memorandum, Mini-Site Memorandums* (for satellite sites) and site file, and reviewing the site file. In most cases, site managers did not have all the necessary information available at the site visit, and the survey team had to telephone and/or email the CRC 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 container for each of the HI5 material categories recycled at the site. Finally, the survey team compiled and checked all workpapers, and conducted a reasonableness check of survey results before uploading the files to the project's secure SharePoint site for the manager to conduct the first of several independent office review steps.

C. Quality Control and Review Process

Data quality control (QC) was a primary focus of the handling fee survey project. Quality control procedures included four separate levels of review, and on average totaled 18 hours per site**.** These data QC procedures were essential to ensure that the survey results were fair, equitable, accurate, reasonable, justifiable, and defensible.

The quality control process included reviews to:

- Determine that costs were: verified to a documented source; allowable and reasonable; and reconciled to appropriate documentation
- Determine that site procedures were followed and documented by the appropriate site team member
- Verify data entry to the cost survey Excel workbook models
- Verify that the labor cost reconciliation was accurate
- Verify consistency of the labor allocations with Site Memorandum and site recycling volumes
- Verify that cost per container results were reasonable, or that outliers could be explained by site data information
- Prepare completed and cross-referenced work papers to document the final financial and labor data
- Verify that scrap and shipping data were reasonable and consistent with source documentation
- Create a separate secure file for each site with work papers, notes, and final determination of costs for each HI5 material.

This extensive quality control process, with five 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. Crowe approved data for the final cost per container and scrap value per container calculations after this extensive series of quality control reviews was complete.

Confidentiality was important for the cost survey. The data from each recycling site are not to be disclosed, as release of the data could potentially be compromising to a CRC business. As a result, Crowe developed formal policies regarding confidentiality. Records from each site were maintained securely at the Crowe offices after they were completed, and financial printouts and worksheet drafts with site-specific information were shredded. Computers were protected against unauthorized access through use of security software that requires a password to use our laptops. All electronic files related to site visits were stored on the secure SharePoint site within Crowe's domain, accessible by password only, to survey team members.

D. Data Compilation and Analyses

Once Crowe completed the final QC review of CRC site files, we utilized customized Excel models to extract data from each cost model. We compiled and analyzed CRC data by FY16, FY17, and combined over the two fiscal years. We determined costs per container by company, processor status, and county.

In addition, we analyzed CRC cost data by cost categories, including labor, indirect labor (benefits), general business overhead, transportation, rent, and insurance. We split transportation into three categories: on-island, inter-island, and off-island.

Finally, Crowe compiled and analyzed the scrap revenue data from each CRC. The extent and quality of scrap data was highly variable. To the extent possible, we grouped and summarized similar types of data, for example, scrap revenue without shipping versus scrap revenue that included shipping costs.

E. Handling Fee Recommendations

In developing our handling fee recommendations, Crowe utilized the Handling Fee Survey Fiscal Analysis cost per container results as a basis for further analysis. The Fiscal Analysis results provide recycling costs for FY16 and FY17 – the time period from July 1, 2015 through June 30, 2017. The recommended handling fees will go into effect on July 1, 2019. To ensure that handling fees more accurately reflect the costs of recycling in 2019, Crowe evaluated several factors that we could utilize to adjust the cost of recycling. Ultimately, Crowe made adjustments to increase the calculated cost of recycling based on the following three factors:

- Minimum wage increases
- Cost of living adjustments (COLAs)
- Financial return indices.

During our discussions with the DOH on the recommended handling fees and the variability in scrap revenue, Crowe and the DOH decided to base the handling fees on the costs of recycling. The result of this decision is a higher handling fee, particularly for aluminum and plastic, than it would have been had we subtracted scrap revenue from the cost of recycling. In essence, the recommended handling fee covers the adjusted cost of recycling, regardless of any scrap revenue that a CRC may receive.

F. Determining Impact on DBC Special Fund

After developing our recommended handling fees, Crowe evaluated the impact of the higher handling fees on the DBC Special Fund. We first evaluated economic, market, industry, social, and political factors that could influence beverage container sales and redemption. The intent of this first step was to identify factors that we could use in developing projections on sales and redemption. The factors we evaluated included the following:

- Beverage industry data
- Economic trends
  - Unemployment
  - Household income
  - Per capita income
  - Poverty
- Tourism data
- Population
- Other factors
  - Plastic regulations
  - DBC Program education
  - Waste-to-energy and curbside recycling
  - Climate change
  - Certified Redemption Center (CRC) availability.

Crowe developed two Excel-based models to evaluate the impact of the recommended handling fees on the DBC Special Fund through FY22. We developed a sales and redemption rate projection model using a combination of historical data provided by the DOH and market industry data. The sales and redemption model provided a basis for projecting reasonable sales and redemption volumes, and redemption rates by material through FY22. Utilizing the projected sales and redemption rates developed in the sales and redemption rate projection model, we then developed a fiscal impact model that projected expected fund activity (i.e. revenues, expenditures, fund administrative costs) with the recommended handling fees through FY22. Both models provide a framework to determine whether the DBC Special Fund could cover its liabilities with the recommended handling fees under an array of potential economic, recycling, and regulatory scenarios.

Next, Crowe developed scenarios based on varying assumptions on the status of the economy, recycling, and beverage markets over the next four years. Each scenario assumes different sales and redemption rates in order to demonstrate potential fiscal impacts to the DBC Special Fund. In total, Crowe developed seven (7) scenarios.

Scenarios are as follows:

- Baseline
- Economic Downturn – Moderate
- Economic Upturn – Moderate
- Economic Downturn – Major
- Economic Upturn – Major
- Plastic Regulation
- Peak Recycling.

Finally, Crowe analyzed the impact of the recommended handling fees based on the assumptions developed for each scenario. We describe the results of this analysis in Section 6.

G. Handling Fee Evaluation Model

Crowe developed a methodology for the DOH to determine whether, when, and how to increase handling fees. In developing the methodology, Crowe first evaluated cost items that, if increased, would result in noticeable increases in the cost of recycling. The cost items that we considered in developing the methodology include:

- Labor costs
- Healthcare costs
- COLA adjustments
- Fuel costs
- Shipping costs.

We prepared an Excel model that allows the DOH to readily obtain updated data on minimum wage, hourly wage indices, healthcare costs, and fuel costs. Once the DOH enters the new data, for example in January 2020, the model calculates the potential impact to the handling fee. Crowe developed the model to apply each relevant cost factor to the applicable share of costs of recycling. For example, if 37 percent of the aluminum cost per container is due to wages, then an increase in minimum wage would be applied only to 37 percent of the cost per container.

In order to determine changes in shipping costs, Crowe developed a short survey in the SurveyMonkey survey tool. The survey is designed to obtain information on glass and aluminum shipping costs from processor CRCs. This information can be incorporated into the Handling Fee Adjustment Model to determine whether an increase in shipping costs should be applied to the handling fee.

[This page intentionally left blank.]

Crowe

Section 3

Cost per Container Results

3. Cost per Container Results

This section presents cost per container results by material type, county, and processor status. In addition, this section provides a detailed analysis of CRC costs by major cost category, also by material type, county, and processor status.

A. Calculation

Crowe's handling fee survey methodology utilizes weighted average calculations for determining costs per container. The calculations are based on a two-step process, determining values per pound, and then per container (using DOH's containers per pound figures of 32 for aluminum, 5.9 for bi-metal, 2.4 for glass, and 18.8 for plastic). **Exhibit 3-1** provides an illustration of the cost per container calculation for aluminum. We utilized the same approach for each material type and for combined containers. We utilized the same weighted approach for all material types, company, county, processor-status, and statewide calculations.

Exhibit 3-1
Cost per Container Calculation for Handling Fee Survey

Weighted Average:

$$\frac{\Sigma \text{ Aluminum Costs}}{\Sigma \text{ Aluminum Pounds}} = \text{Aluminum Cost per Pound}$$

$$\frac{\text{Aluminum Cost per Pound}}{\text{Aluminum Containers per Pound}} = \text{Aluminum Cost per Container}$$

Crowe analyzed costs by FY16, FY17, and combined. There were relatively minor differences between the fiscal years. Thus, in order to utilize the most robust data, we combined the two fiscal year cost results.

B. Results by Material, County, and Processor Status

This section presents the weighted average cost per container results for each material type, county, and processor status. Below, we provide a series of graphs that illustrate cost per container results. These results are also provided in **Exhibit 3-2**. The costs presented in this section were directly calculated from the survey results, and do not include any adjustment factors.

Exhibit 3-2
Costs per Container to Recycle DBC Beverage Containers

Category	Aluminum	Bi-Metal	Glass	Plastic	Combined
Statewide	$0.0202	$0.1636	$0.0578	$0.0290	$0.0306
Non-Processor	$0.0222	$0.1596	$0.0543	$0.0252	$0.0295
Processor	$0.0198	$0.1647	$0.0584	$0.0297	$0.0308
Hawaii County	$0.0196	$0.1546	$0.0486	$0.0395	$0.0326
Honolulu County	$0.0193	$0.1645	$0.0590	$0.0276	$0.0295
Kauai County	$0.0190	$0.1237	$0.0487	$0.0248	$0.0276
Maui County	$0.0242	$0.1922	$0.0683	$0.0240	$0.0328

Exhibit 3-3
Cost per Container by Material Type, County, and Statewide (FY16/FY17)

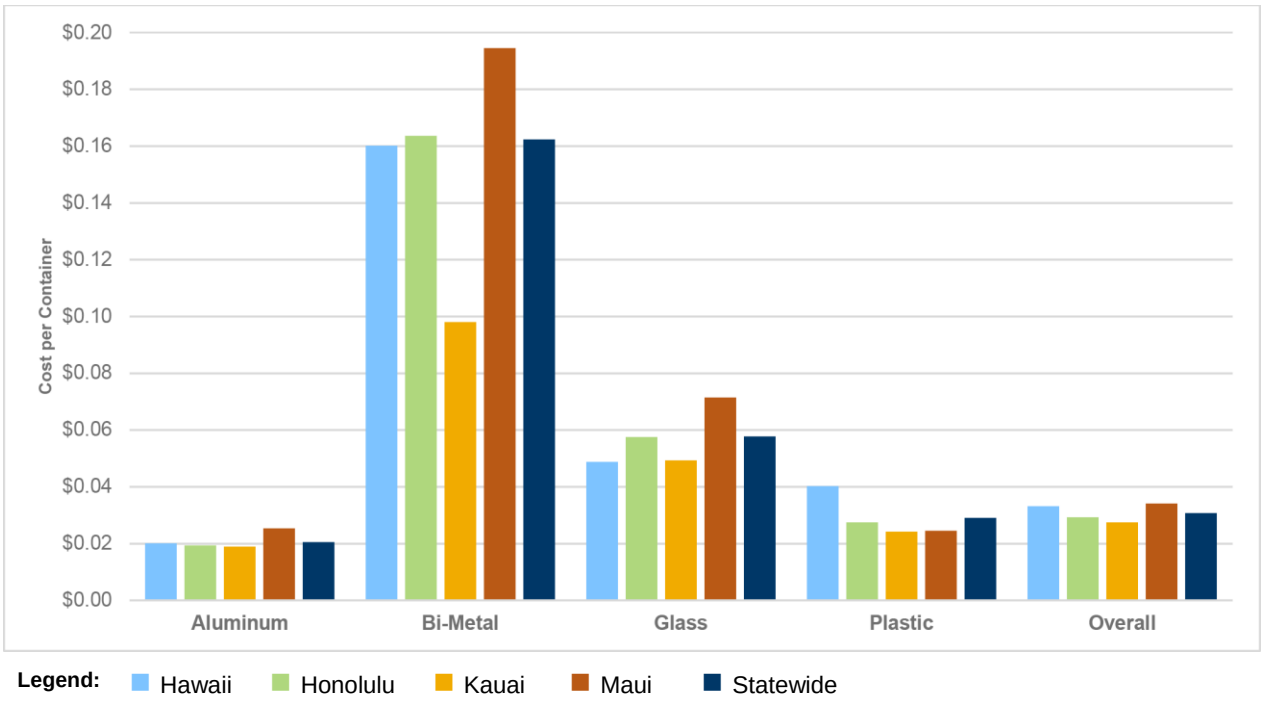


Exhibit 3-3 illustrates the cost per container for each material type, county, and statewide. With the exception of glass cost per container, Kauai County has the lowest average cost per container across the four counties and statewide. This is likely because in most cases there is no shipping associated with Kauai recycling, in addition to generally lower rent costs and minimal materials processing. For all materials except plastic, Maui County has the highest average cost per container. Maui's high cost per container appears to be driven by relatively high rent and transportation costs. Hawaii County has relatively higher plastic cost per container, primarily because of high on-island transportation costs from remote CRCs to headquarter locations.

Exhibit 3-3 also illustrates the substantially higher cost per container for bi-metal as compared to the other three material types. Bi-metal made up only 0.27 percent of HI5 containers recycled, 0.42 percent of HI5 tons recycled, and 1.4 percent of HI5 costs in FY16/FY17. There are several reasons contributing to the high cost per container to recycle bi-metal:

- Crowe's methodology allocates costs between the three major material types (aluminum, glass, and plastic) based on the percent of labor time spent on each major material type as determined by CRCs. Because less than one (1) percent of HI5 containers recycled are bi-metal, the model combines labor time for aluminum and bi-metal as CRCs handle those two container types similarly. The methodology further allocates the cost of aluminum and bi-metal at each CRC based on a sub-model that takes into account three factors impacting operations: the weight of each material, number of containers, and a volumetric factor. This model, tested and utilized in eight California cost of recycling surveys, provides a consistent basis for allocating costs between bi-metal and aluminum
- Given the extremely low volume of bi-metal CRC recycling, there is no economy of scale in handling the material; it is disproportionally labor-intensive to handle a small volume of material, resulting in a higher cost per ton of material handled as compared to aluminum
- The low number of containers per pound as compared to aluminum results in an even higher cost per container. The statewide average cost per ton for bi-metal, at $1,915 per ton, is 46% higher than the cost per ton for aluminum, at $1,309 per ton. However, there are only 5.9 bi-metal containers per pound in contrast to 32 aluminum containers per pound. The end result is a bi-metal cost per container that is almost 7 times higher than the aluminum cost per container.

Exhibit 3-4
Number of Containers Recycled by Material Type and County (FY16 and FY17)

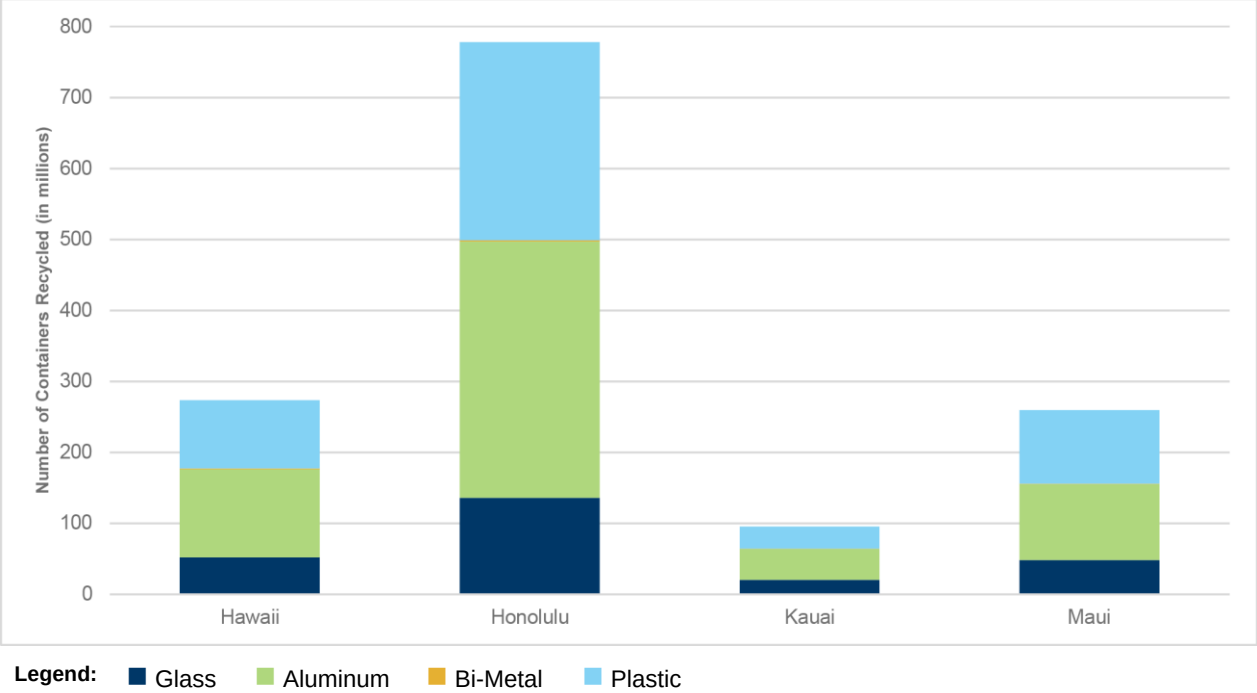


Exhibit 3-5
Comparison of Containers Recycled and Population by County

County	Containers Recycled (FY16 and FY17)	Percent of Containers Recycled	Population (July 2017)	Percent of Population
Hawaii	273,549,109	19%	200,381	14%
Honolulu	777,838,554	55%	988,650	69%
Kauai	95,203,173	7%	72,159	5%
Maui	259,600,452	18%	166,348	12%
Total	**1,406,191,288**	**100%**	**1,427,538**	**100%**

Glass also has a higher cost per container than aluminum, plastic, and the overall average. Much of the higher glass cost per container is due to the high transportation costs of glass.

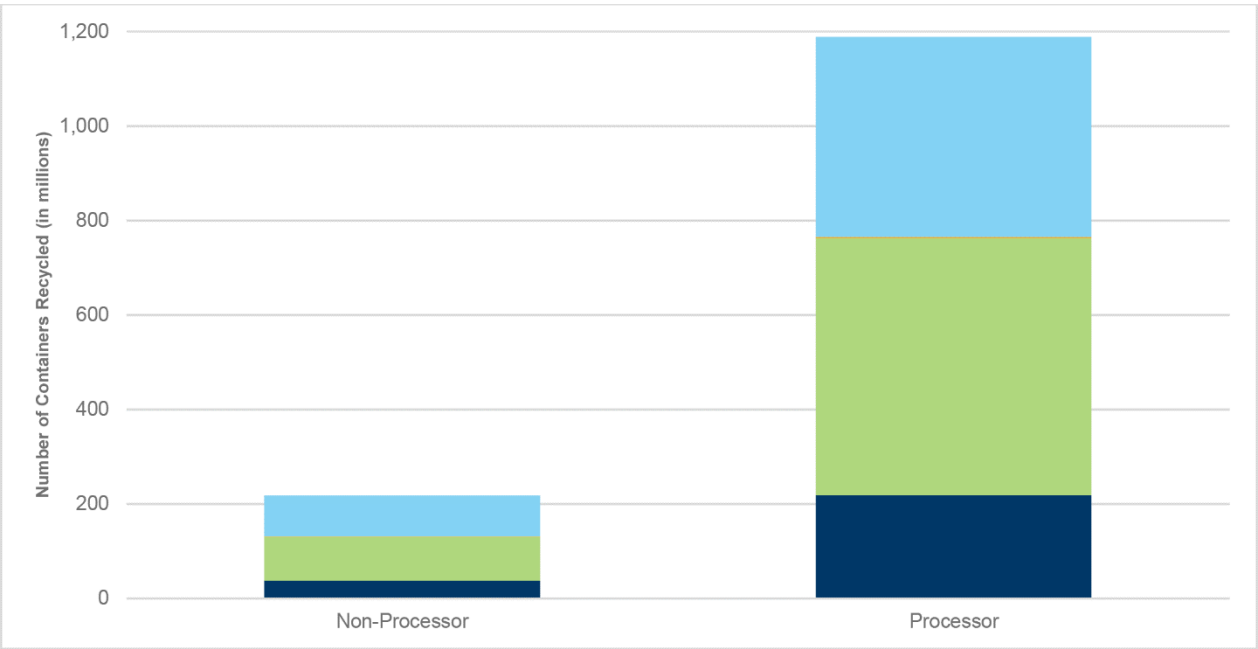
Exhibit 3-4 illustrates the total number of containers recycled in FY16 and FY17, by county and material type. More than one-half of all containers are recycled in Honolulu County. As **Exhibit 3-5** illustrates, Honolulu County recycles a smaller percentage of containers as compared to the overall population, while Hawaii and Maui Counties recycle more containers as compared to the overall population. The share of containers recycled by hotels and other commercial businesses may account for some of this difference.

Exhibit 3-6 provides a comparison of cost per container by material type for non-processor and processor CRCs. For aluminum, non-processor and processor costs per container are essentially equal. For all other materials, and overall, processor costs per container are slightly higher than non-processor costs per container. When comparing these two populations of CRCs, it is important to note that processor CRCs recycled 85 percent of HI5 containers in FY16/FY17, while non-processor CRCs recycled only 15 percent of HI5 containers, as illustrated in **Exhibit 3-7.**

Exhibit 3-6
Cost per Container by Material Type and Processor Status (FY16/FY17)

Legend: Non-Processor Processor

Exhibit 3-7
Number of Containers Recycled by Material Type and Processor Status (FY16 and FY17)



Legend: Glass Aluminum Bi-Metal Plastic

Processor CRCs spend proportionally more time handling HI5 containers, a primary driver in the higher cost per container. Processor CRCs bale aluminum, plastic, and often bi-metal, and crush glass. In addition, processors incur time and expenses related to loading and shipping containers to end-users.

Exhibit 3-8 provides a comparison of cost per container by material type for CRC companies that own multiple CRCs and CRC companies consisting of a single location. The costs per container are not consistently higher or lower by company and material type. **Exhibit 3-9** illustrates the number of containers recycled by single and multiple CRC companies by material type. Companies that operate multiple CRCs handle 80 percent of the containers recycled. However, not all single-company CRCs are small operations; there are a few single location CRCs that handle a relatively large number of containers (and are processor CRCs).

Exhibit 3-10, Exhibit 3-11, and Exhibit 3-12 provide a series of graphs that illustrate the distribution of costs per container for aluminum, glass, and plastic. The cost per container distribution is generally a bell-shaped curve, with most CRCs falling in a mid-range, and a few low and high-cost CRCs.

Exhibit 3-8
Cost per Container by Material Type and Single versus Multiple CRCs (FY16/FY17)

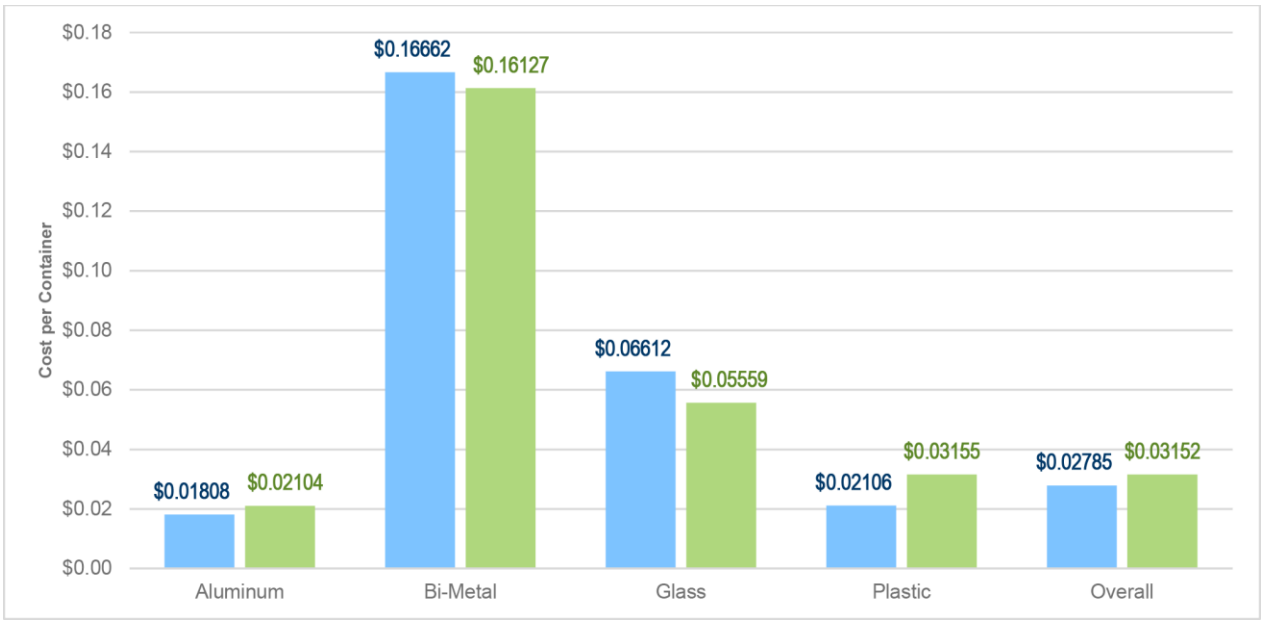


Exhibit 3-9
Number of Containers Recycled by Material Type and Single versus Multiple CRCs (FY16 and FY17)

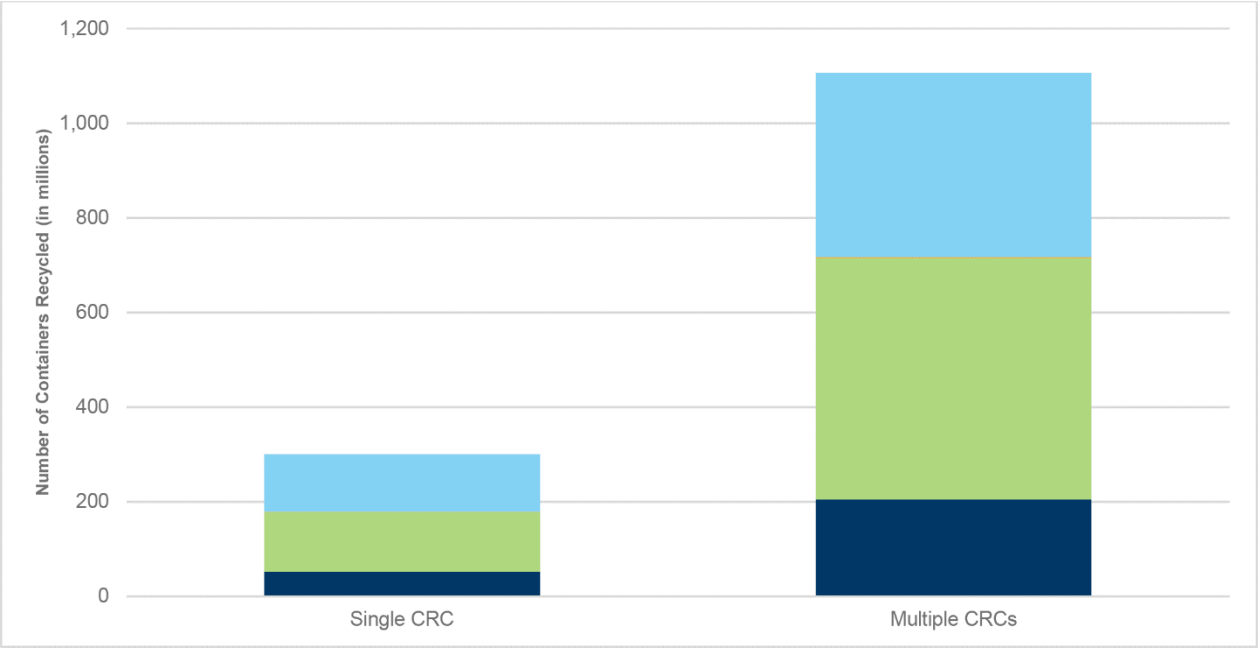


Exhibit 3-10
Distribution of Aluminum Cost per Container (FY16 and FY17)

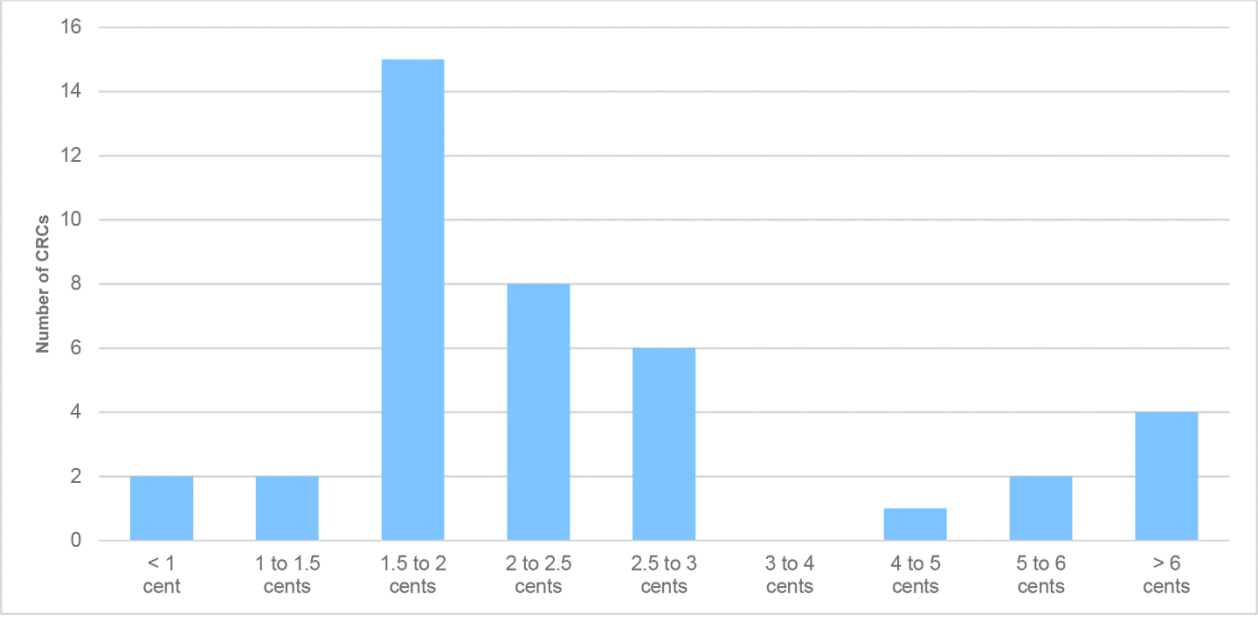


Exhibit 3-11
Distribution of Glass Cost per Container (FY16 and FY17)

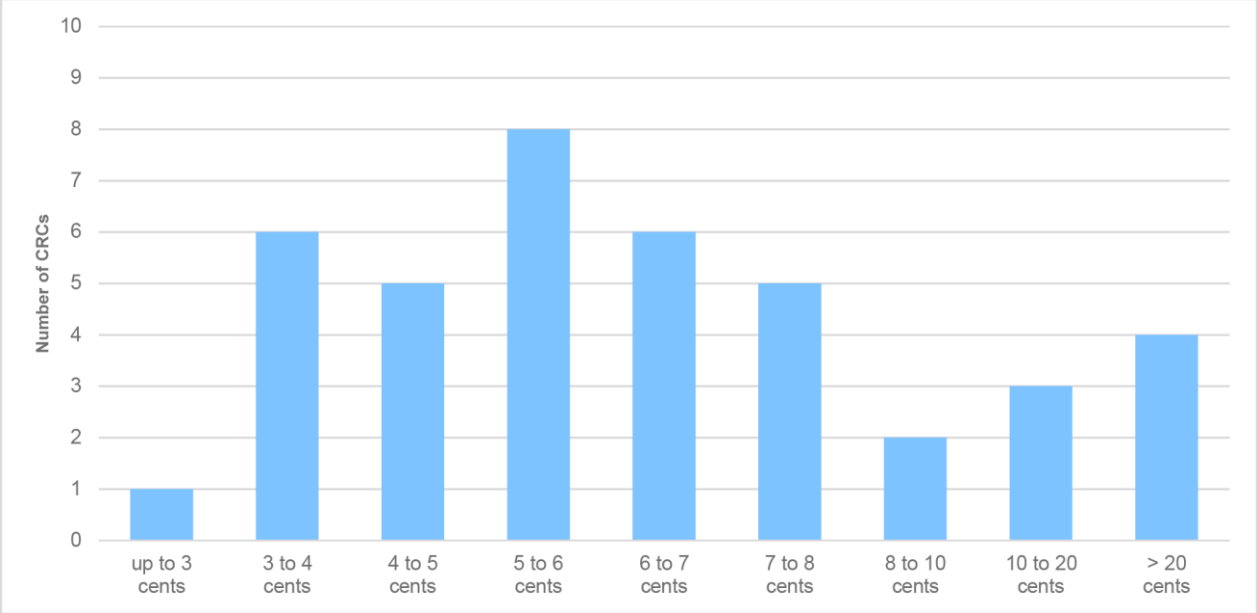
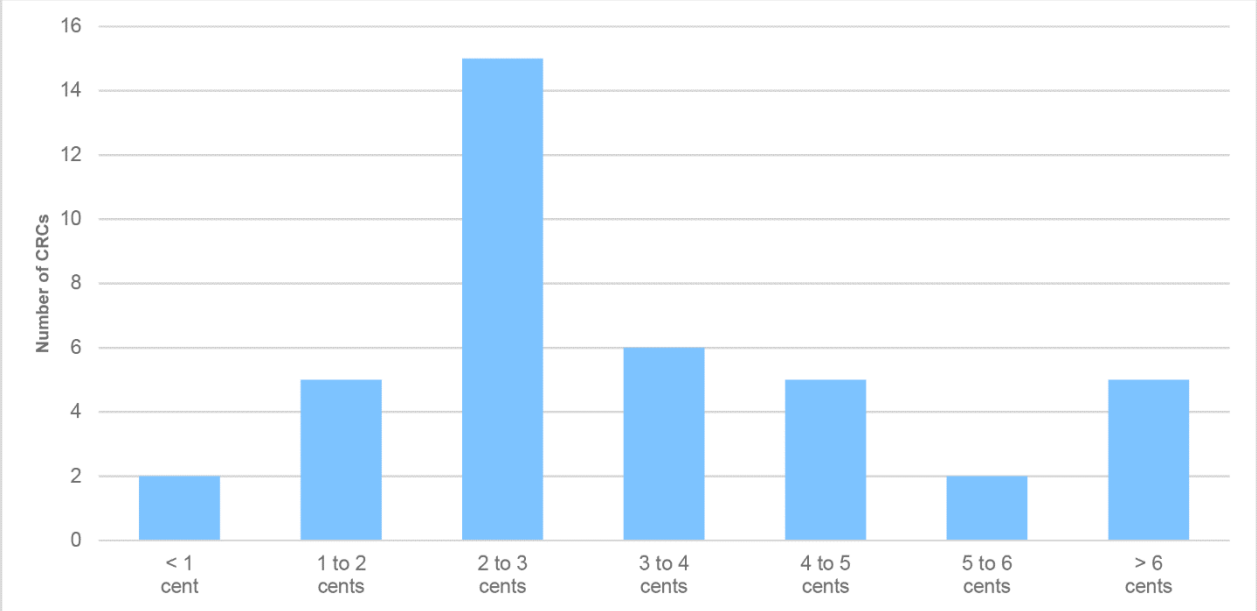


Exhibit 3-12
Distribution of Plastic Cost per Container (FY16 and FY17)



C. CRC Costs by Category

This section provides overall and categorical analyses of the statewide FY16 and FY17 combined costs. We provide more detailed cost estimates for the four cost categories that make up the largest share of CRC costs (labor, indirect labor, transportation, and rent).

One of the key on-site tasks 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 HI5 beverage container indirect and all materials indirect costs. Team members classified allowable costs into one of the following categories:

- Direct Labor (wages, owner's income)
- Indirect (all other) Labor (worker's compensation, health insurance, retirement, other benefits)
- General Business Overhead (administrative costs, accounting, office expenses)
- On-island Transportation
- Interisland Transportation
- Off-island Transportation
- Rent
- Depreciation
- Property Tax and General Excise Tax (GET)
- Utilities (telephone, water, waste disposal, electricity)
- Supplies (office supplies, bags, bins, buckets, uniforms, etc.)
- Fuel (propane, gasoline)
- Insurance (general liability, auto insurance)
- Interest
- Maintenance.

In the results that follow we combined several categories where costs are logically related. For example, we include depreciation under "equipment and equipment maintenance." Unless otherwise mentioned, this section discusses HI5 costs only. Non-HI5 costs accounted for 22 percent of total CRC costs. Non-HI5 costs, distributed across all cost categories, are related to handling of non-HI5 recyclables (scrap metal, batteries, e-waste, ADF glass, etc.) and other business activities (such as retail stores and commercial recycling). A few CRC companies that operate other business activities provided only CRC-related costs for purposes of the handling fee survey.

Overall Category Analysis

Exhibit 3-13 provides the annual average HI5 costs, by category, for CRCs for FY16 and FY17. Annual average HI5 CRC expenditures by company were $1,080,543. The top four categories were:

- Direct labor (37%)
- Transportation (combined) (17%)
- Rent (14%)
- Indirect labor (11%).

Each of the remaining categories accounted for between 0.2 percent and 5 percent of annual average CRC costs.

Exhibit 3-13
Average Annual HI5 Category Costs per CRC Company, Statewide (FY16/FY17)

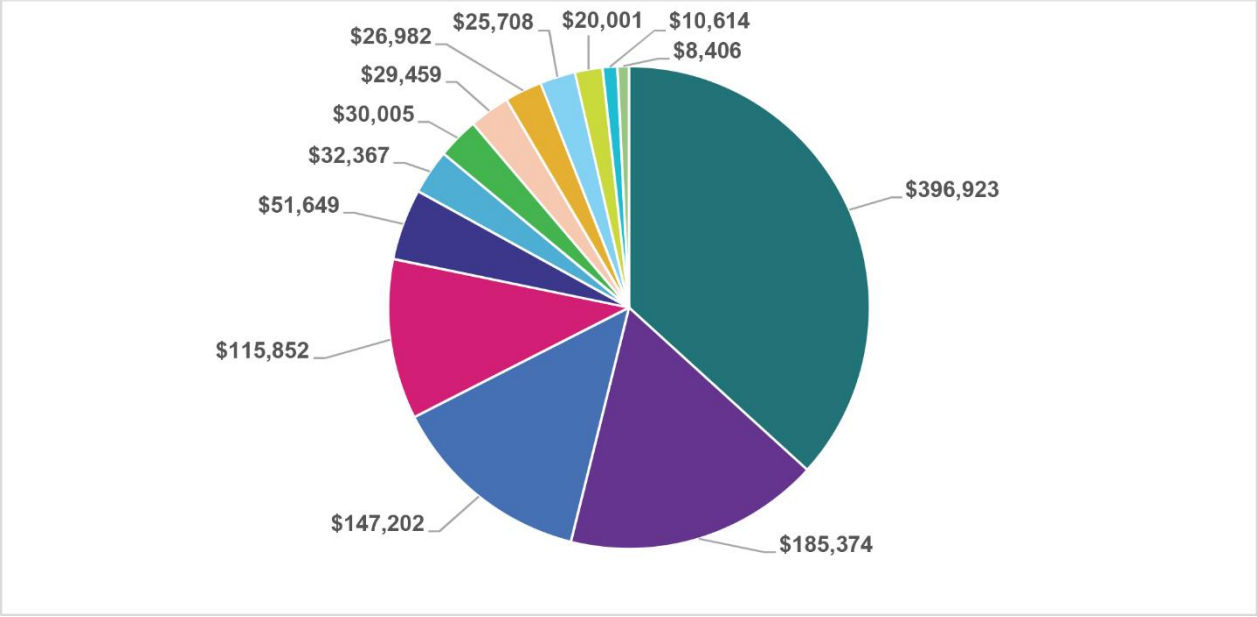


Exhibit 3-14 provides a comparison of annual average HI5 CRC costs, by category, by county, and statewide. In this exhibit (and the following), fuel, interest, general business overhead, and depreciation are combined. Average annual CRC costs for Hawaii and Honolulu Counties are significantly higher than those for Kauai and Maui Counties. This is largely because the average costs are dominated by larger CRC companies with multiple locations in those counties. Among the counties, certain categories are disproportionately higher or lower:

- Transportation makes up a larger percentage of expenses and rent is lower in Hawaii County
- Property tax/GET are higher and transportation is lower in Honolulu County
- Rent, direct labor, and indirect labor are higher in Kauai County
- Transportation is higher in Maui County.

Exhibit 3-14
Average Annual HI5 Category Costs per CRC Company by County (FY16/FY17)

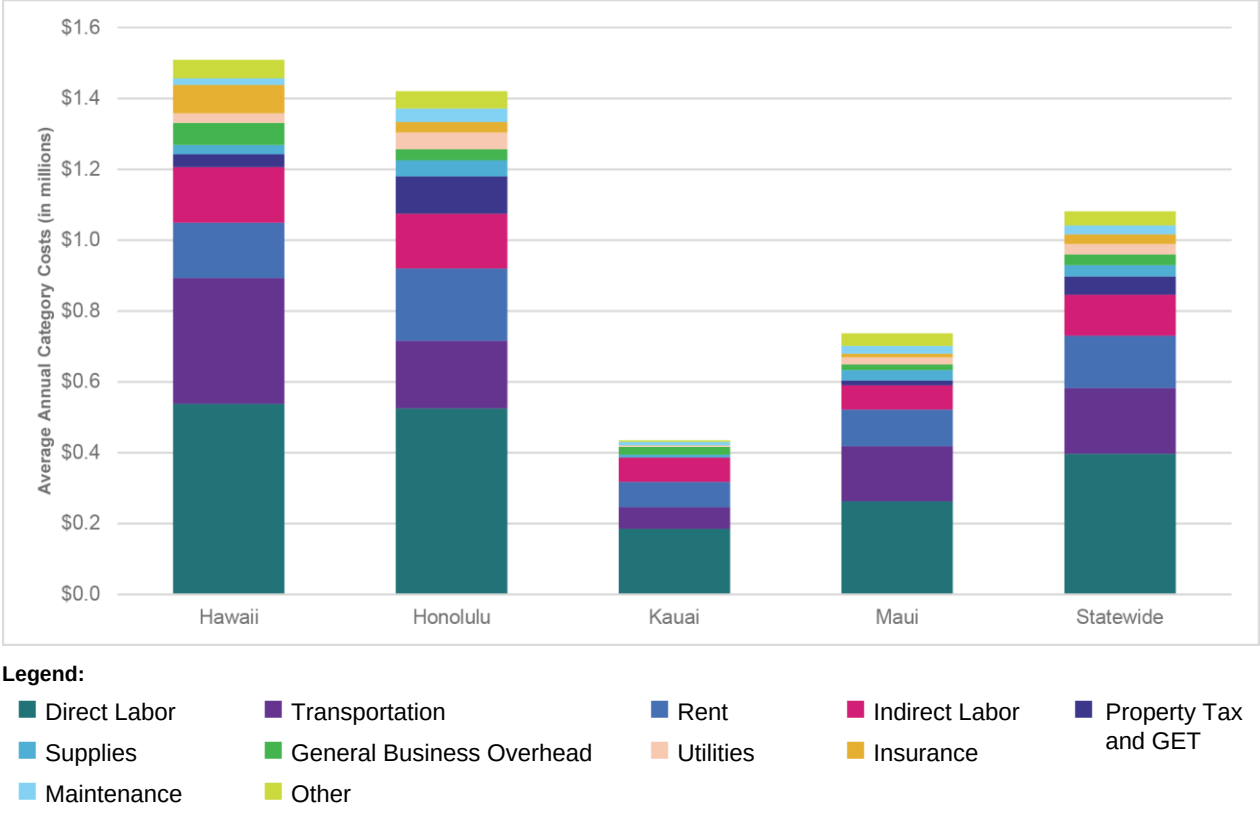
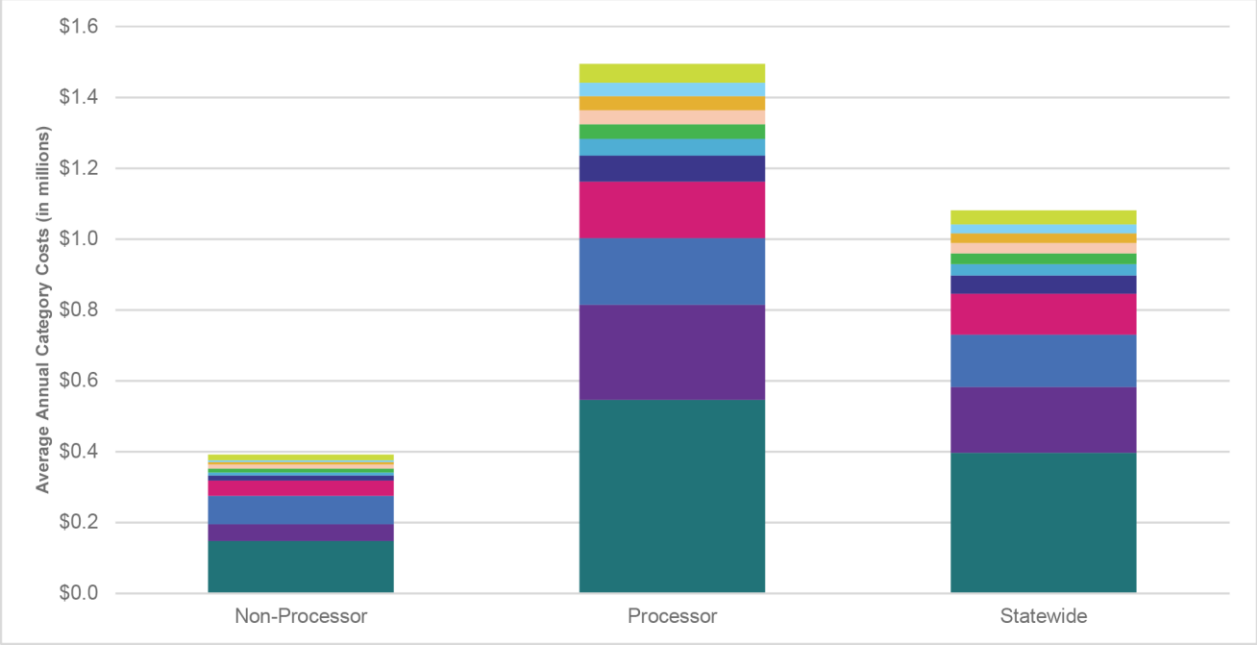


Exhibit 3-15 provides a comparison of annual average CRC costs for processors, those that do not (non-processors), and statewide. Reflecting the fact that they are generally larger multi-site companies, annual average CRC costs for processor CRCs are more than three times greater than for non-processor CRCs. Processor CRCs have proportionally higher costs for transportation, while non-processor CRCs have proportionally higher costs for rent. All other categories are relatively close when comparing percent of total expenses.

Exhibit 3-15
Average Annual Category Costs per CRC Company by Processor Status (FY16/FY17)



Direct Labor

As illustrated in Exhibits 3-13 to 3-15, Direct Labor makes up the largest share of CRC costs. Direct labor includes salaries, hourly wages, and owner's net income (for sole proprietorships and partnerships) for individuals actively engaged at CRCs. Direct labor activities at CRCs encompass a wide range of activities. On average, CRCs spent 81 percent of time on direct yard labor associated with HI5 recycling, consisting of:

- Assisting customers in sorting, inspecting, and weighing containers
- Cashiering
- Handling containers for storage (moving to bags, bins, piles, or shipping containers)
- Crushing glass
- Baling aluminum, plastic, and bi-metal
- Loading shipping containers.

The remaining 19 percent of time, classified in our models as “all other labor”, includes activities such as:

- Administration
- Reporting
- Site management
- Financial management
- Employee supervision and hiring
- Arranging sales and shipping.

Within Crowe’s model, the all other labor category also includes time spent by drivers. Driver time is a relatively small share of overall labor, accounting for at most 3 to 4 percentage points of the all other labor category. **Exhibit 3-16** provides a comparison of CRC company annual average HI5 direct yard labor (DYL), HI5 all other labor (AOL), and non-HI5 wages by county and statewide. **Exhibit 3-17** provides a similar comparison of annual average wages per CRC company for processors and non-processors. As expected, average annual processor wages are significantly higher, almost $760,000, as compared to non-processors at $179,000.

Most of the CRCs spent 80 percent or more of the total labor hours on HI5 activities. There were four CRCs that spent between 22 percent and 55 percent of total labor hours on HI5 activities and the remainder of time on non-HI5 activities. These businesses spent the remainder of their time on scrap metal, e-waste, commercial and airline recycling, or service station activities. In addition, there were a few CRCs that operate multiple lines of business, but provided financial and labor information for only the HI5 portion of their activities. Over the combined fiscal years and all CRCs, companies spent 81 percent of their total direct labor hours and 75 percent of wages on HI5 activities. In total for the two years, CRCs spent over 1 million hours and almost $16 million in wages on HI5 activities.

Exhibit 3-16
Comparison of Annual Average CRC Company Wages by Category and County (FY16/FY17)

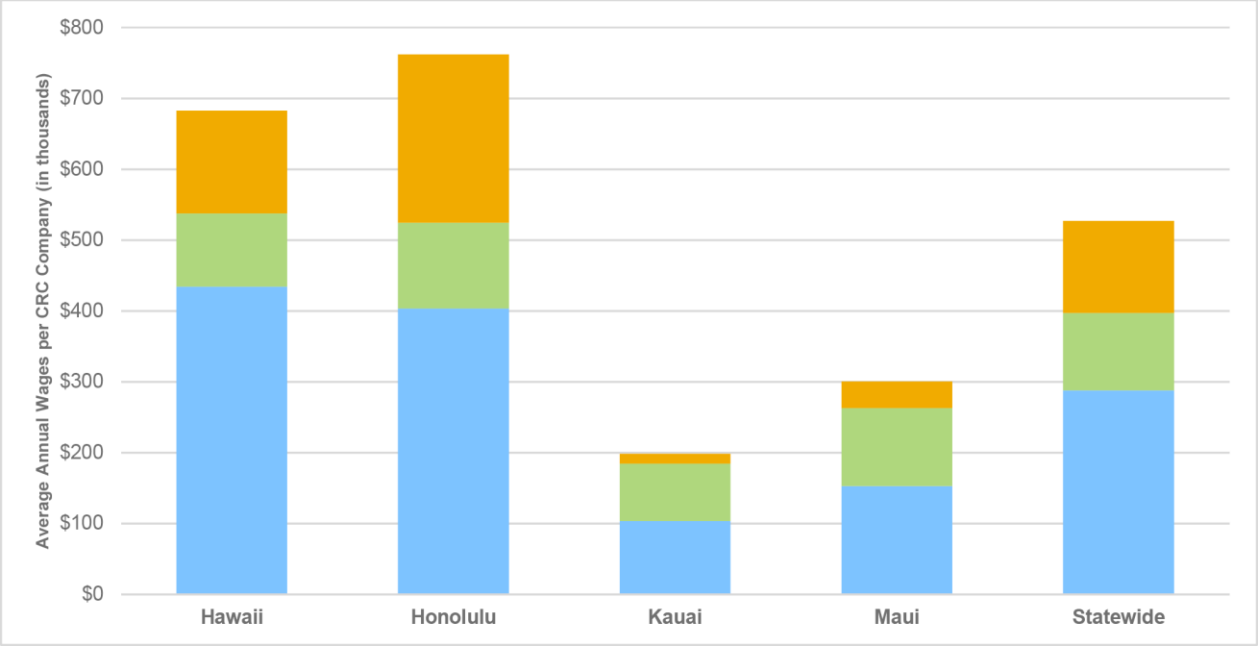


Exhibit 3-17
Comparison of Annual Average CRC Company Wages by Category and Processor Status (FY16/FY17)

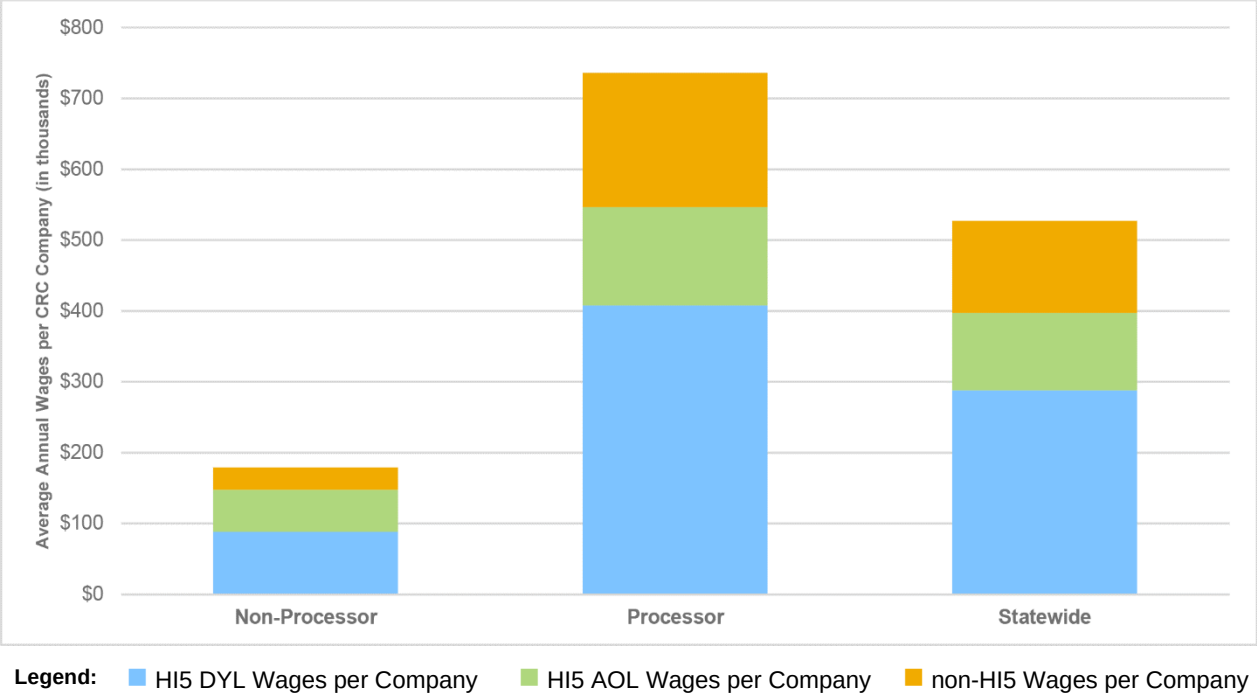
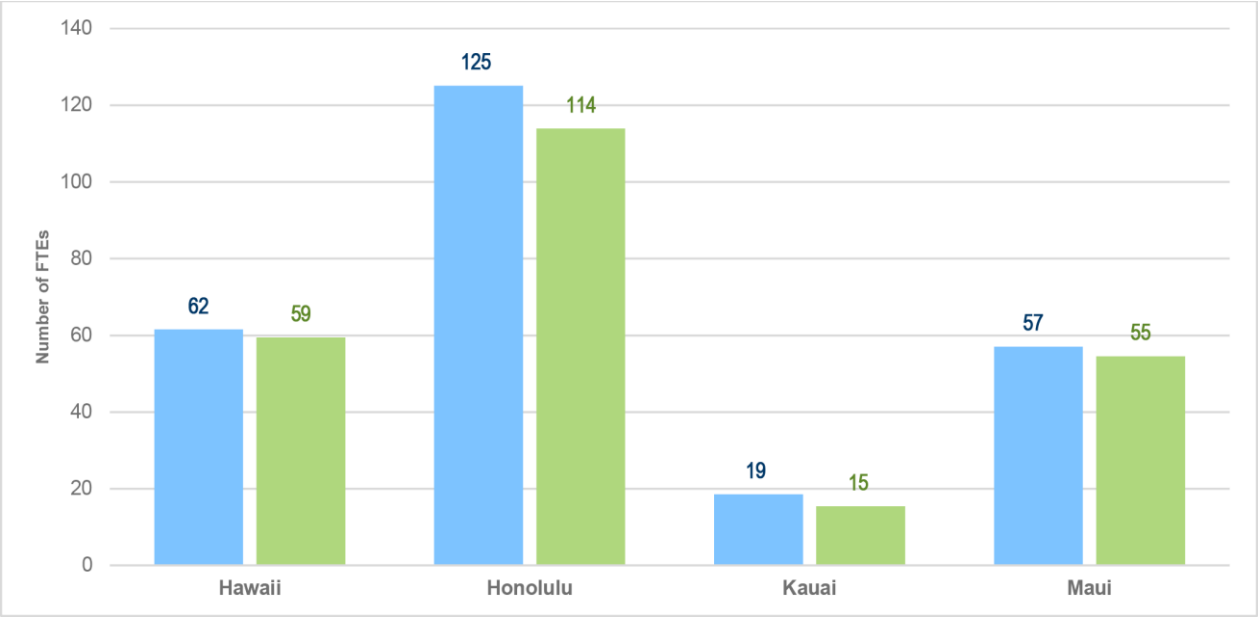


Exhibit 3-18 summarizes total annual full time equivalents (FTEs) involved in HI5 direct yard labor, HI5 all other labor, and non-HI5 activities averaged over the two fiscal years of the handling fee study. FTEs are based on 2,080 hours per year. Exhibit 3-18 illustrates that the majority of labor is directly involved in handling CRC materials. **Exhibit 3-19** provides a comparison of total annual HI5 FTEs (combined direct and all other labor hours) by county and fiscal year. In all cases, the number of FTEs declined between FY16 and FY17, reflecting the closure of CRCs. **Exhibit 3-20** provides a comparison of total annual HI5 FTEs (combined direct and all other labor hours) by processor status and fiscal year. The reduction in FTEs between FY16 and FY17 was greater for processor CRCs, again reflecting the closure of sites.

Exhibit 3-18
Total Annual FTEs and Hours by Labor Type (Averaged over FY16 and FY17)

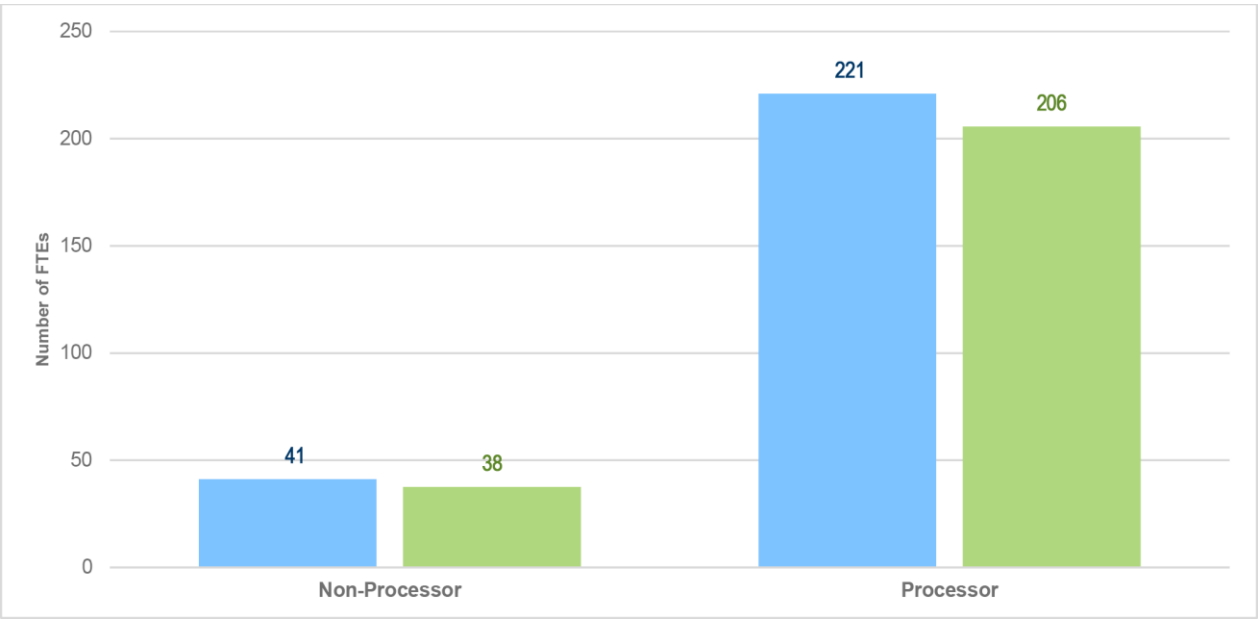
Labor Type	Total Annual FTEs (FY16/FY17)	Total Annual Total Hours (FY16/FY17)	Percent of FTEs
HI5 Direct Yard Labor	204	423,483	65%
HI5 All Other Labor	49	101,929	16%
Non-HI5 Labor	58	121,464	19%
Total	**311**	**646,876**	**100%**

Exhibit 3-19
Comparison of Annual HI5 FTEs by County (FY16 and FY17)



Legend: FY16 HI5 FTEs FY17 HI5 FTEs

Exhibit 3-20
Comparison of Annual HI5 FTEs by Processor Status (FY16 and FY17)



Legend: FY16 HI5 FTEs FY17 HI5 FTEs

Crowe calculated average hourly wages for HI5 direct yard labor, HI5 all other labor, HI5 labor (combining direct and all other yard labor), and total yard labor (incorporating non-HI5 activities). **Exhibit 3-21** provides a comparison of average hourly wages by county and statewide. In all cases, HI5 direct yard labor has the lowest hourly rate, while HI5 all other labor has the highest hourly rate. By company, HI5 direct yard labor hourly rates ranged from $7.75 to $24.01. HI5 all other labor hourly rates in most cases ranged from $15 to $36; however, there were two instances of high hourly wages ($103 and $174) and one instance of low hourly wage ($6) resulting from owners' income. These high (and low) wages represented only a small portion of site hours and did not significantly affect costs to recycle. Total wages per hour are slightly higher than HI5 wages per hour. Wages per hour in Honolulu County are higher in all categories than the other three counties. **Exhibit 3-22** provides a similar comparison of wages per hour for processors and non-processors. Processor hourly wages are higher in all categories than non-processor hourly wages.

Crowe also compared the time spent handling each of the HI5 material types based on the results of the labor allocation process. Crowe's cost survey methodology is essentially an activity-based approach that determines and utilizes relative hours spent on each material type and activity to allocate costs. The labor approach illustrated in the following two exhibits combines labor for aluminum and bi-metal; however, bi-metal labor hours are insignificant. For purposes of comparison, we calculated the labor hours per 1,000 containers recycled. This provides a metric to compare across counties and processor status. Time spent on a particular material depends on activities required to recycle the material (sorting, handling, crushing, baling, loading, paperwork, transporting, etc.) and the amount of material handled. It is important to note that 100 percent of time is accounted for in the model – so that time spent waiting for customers to arrive is still allocated across the container types at the same proportion as overall time for that employee.

Exhibit 3-21
Comparison of Average Hourly Wages by Labor Category and County (FY16/FY17)

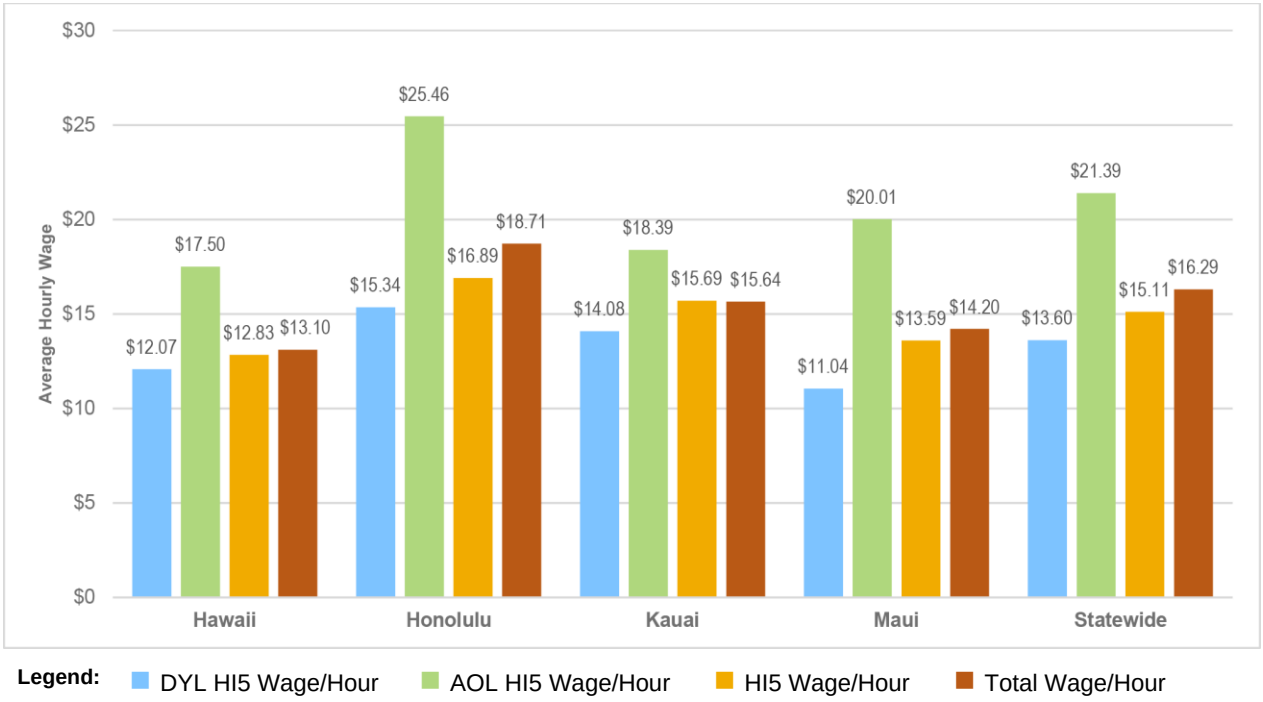


Exhibit 3-22
Comparison of Average Hourly Wages by Labor Category and Processor Status (FY16/FY17)

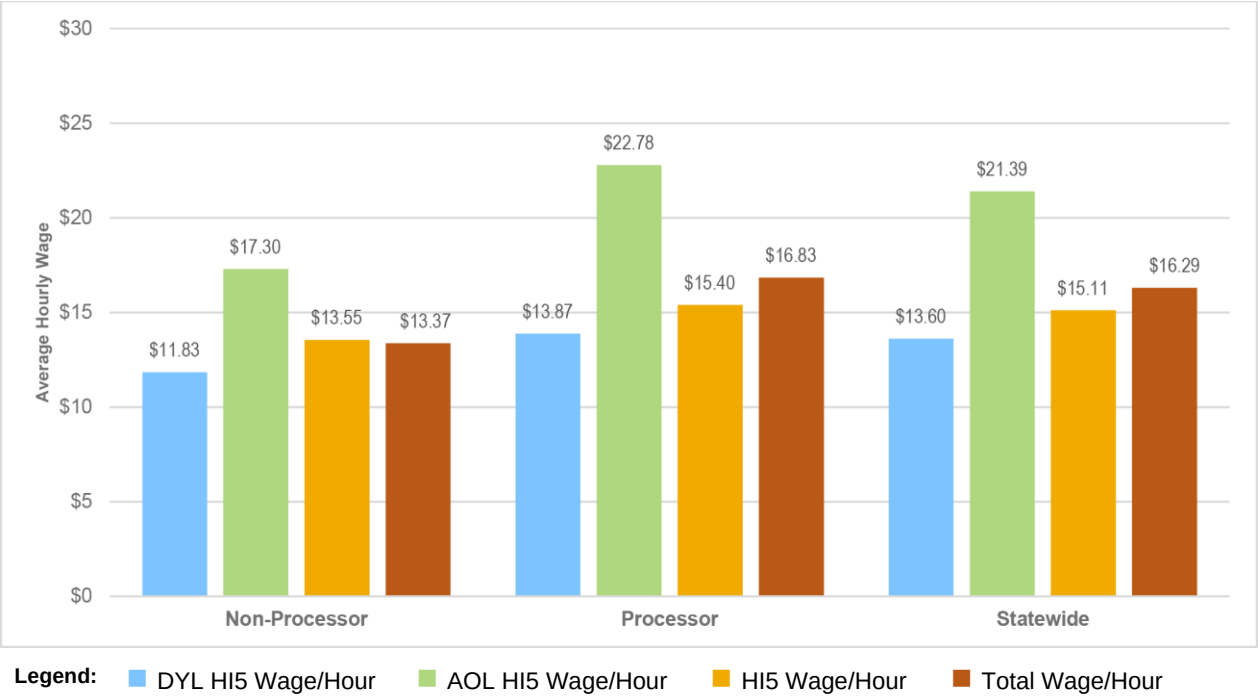
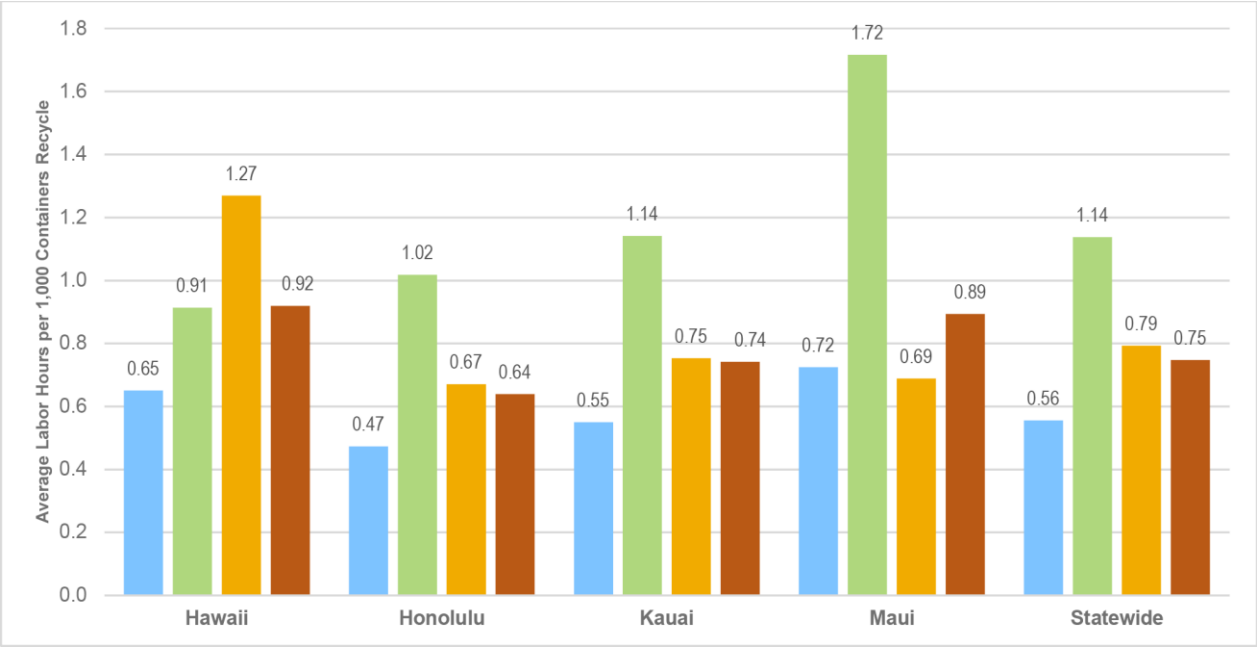


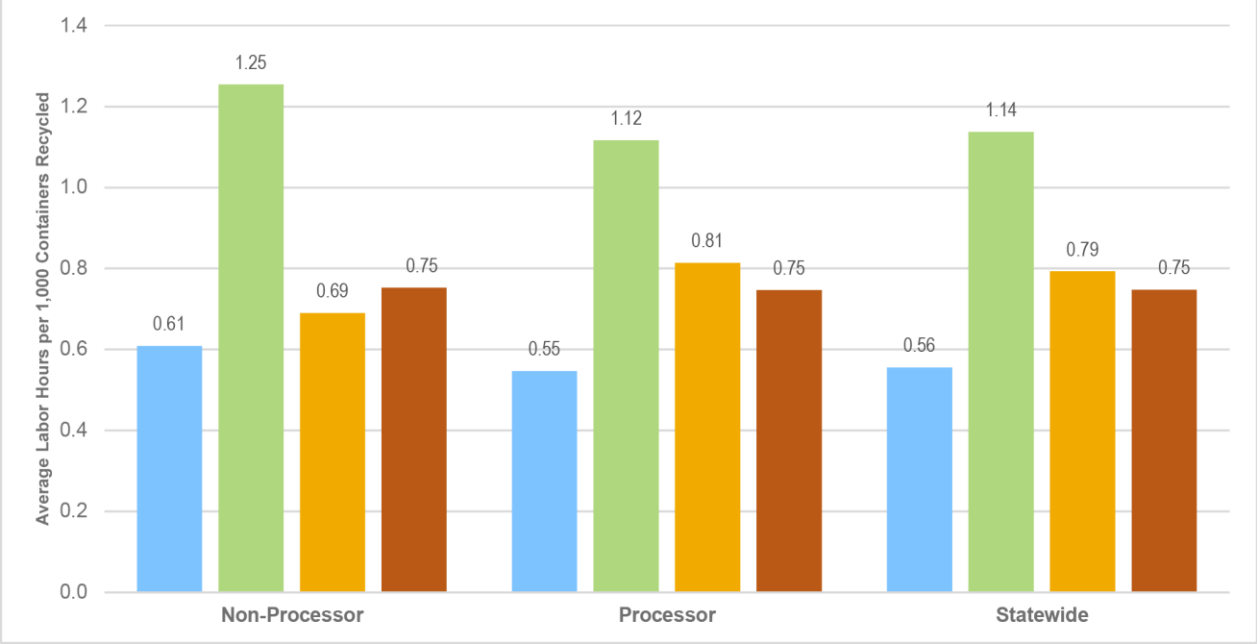
Exhibit 3-23 provides a comparison of labor hours per 1,000 containers by county. For all counties except Hawaii, glass takes the most time to handle. Glass labor hours per 1,000 containers is high largely because glass is heavier than the other materials. Handling 1,000 glass containers means handling over 400 pounds of glass, while handling 1,000 aluminum or plastic containers means handling 31 to 53 pounds of material. The higher plastic labor rate in Hawaii County, as well as higher overall labor rate is due to the amount of time spent transporting material across the County. Maui County also has particularly high labor hours per 1,000 containers, particularly for glass. In Maui, the quantity of containers recycled is relatively low (an average of 21 million per CRC company per year). **Exhibit 3-24** provides a similar comparison between non-processors and processors. On a per-1,000 container basis, these two groups spend close to the same amount of time. However, processor CRCs recycle significantly more containers overall than non-processor CRCs, thus gaining efficiencies in handling the material.

Exhibit 3-23
Comparison of Average Labor Hours per 1,000 Containers by Material Type and County (FY16/FY17)



Legend: AL/BM Hours per 1,000 containers; Glass Hours per 1,000 containers; Plastic Hours per 1,000 containers; HI5 Hours per 1,000 containers

Exhibit 3-24
Comparison of Average Labor Hours per 1,000 Containers by Material Type and Processor Status (FY16/FY17)



Legend: AL/BM Hours per 1,000 containers; Glass Hours per 1,000 containers; Plastic Hours per 1,000 containers; HI5 Hours per 1,000 containers

Indirect Labor and Insurance

Indirect labor costs are closely associated with direct labor costs. Typical indirect labor costs include employee retirement and health benefits, accrued vacation and holidays, payroll taxes, unemployment tax, and workers' compensation. The 2011 Hawaii Prepaid Health Care Act (Hawaii Revised Statues 393-1 et seq.) requires employers to offer and help pay for health insurance, including partial coverage for vision and dental. The statewide annual average for indirect labor was $115,852 in FY16 and FY17. The overall range of indirect labor costs were $0 to over $650,000. Companies with multiple locations averaged $30,200 per site for indirect labor in FY16 and FY17. In comparison, companies with a single location averaged $36,092 for indirect labor in FY16 and FY17.

Exhibit 3-25 provides average indirect labor costs comparison by county and Statewide. Hawaii County, with an average of $157,192 in indirect labor expenses, exceeds those of the other Counties. With an average of $153,981, Honolulu County's indirect labor costs were close to Hawaii County. In comparison, Kauai and Maui come in at the low end, with approximately $68,000 in average indirect labor cost expenses. Differences in average indirect labor costs by county are driven by direct labor costs.

Exhibit 3-26 provides an average indirect cost comparison for processor and non-processor companies. The significant difference in indirect costs between processors and non-processors is reflective of the tendency for processors to have more complex operations than those of non-processors, which would require additional labor.

Exhibit 3-25
Comparison of Average Annual Indirect Labor Costs by County and Statewide (FY16/FY17)

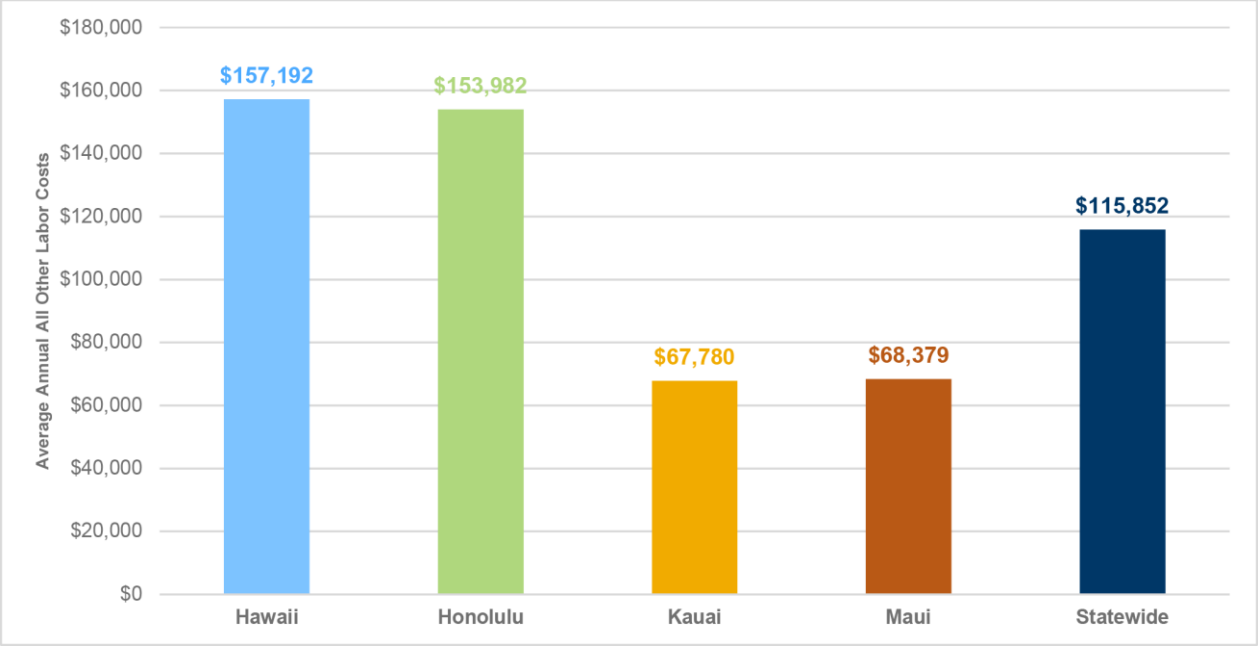
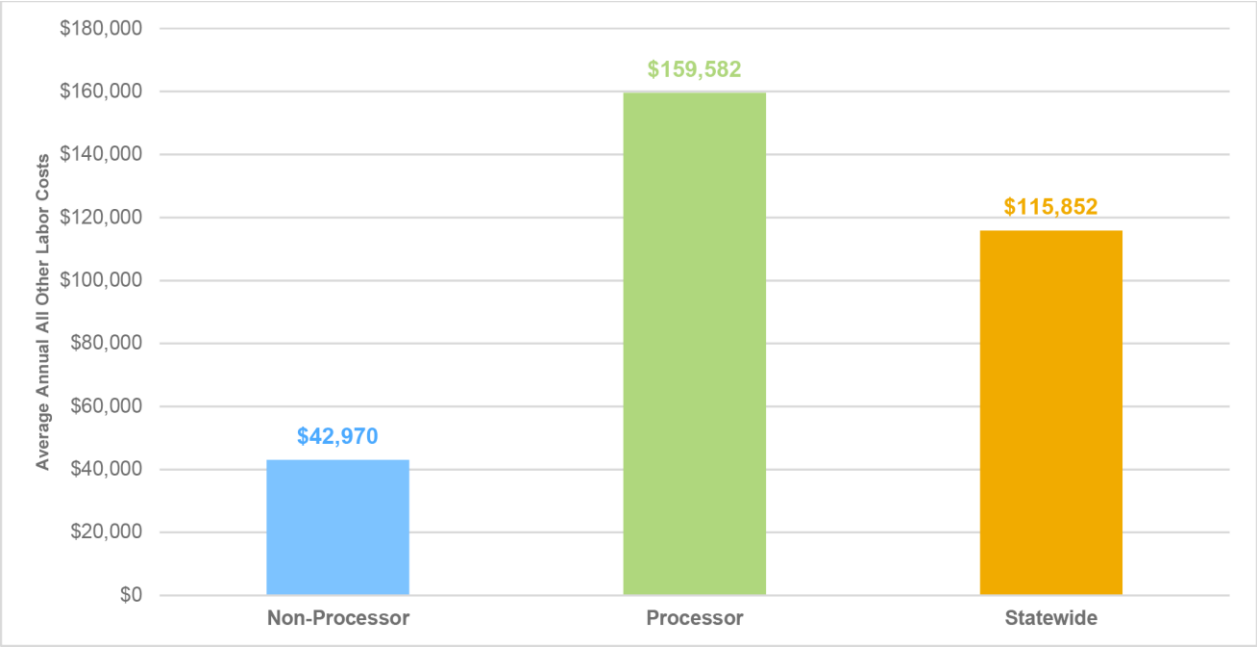


Exhibit 3-26
Comparison of Average Annual Indirect Labor Costs by Processor Type (FY16/FY17)



Transportation

Transportation is the second highest HI5 cost category, behind direct labor. During the fieldwork phase of the handling fee survey, Crowe identified three transportation cost subcategories:

- **On-Island Transportation** – Transportation of materials from CRCs to end-users, the port, or from satellite CRCs to headquarter CRCs. CRCs may conduct their own on-island transportation, incurring costs for fuel, auto insurance, trucks, tires, and maintenance. Often, the CRC will hire a third-party trucking company to transport materials. In a few instances, end-users picked up material from the CRC, charging a separate shipping fee. During handling, all material types are transported on-island at least a minimal distance.
- **Interisland Transportation** – Transportation of materials, typically in shipping containers, from one island to another. In a few instances, CRCs shipped material from neighbor islands to Oahu. The majority of interisland shipping was from Kauai to Oahu, or Molokai and Lanai to Maui or Oahu. Aluminum, plastic, and bi-metal were most likely to be shipped interisland.
- **Off-Island Transportation** – Transportation of materials in shipping containers from Hawaii to the mainland United States ports (usually Los Angeles, Oakland, or Seattle) or to Asia. All HI5 aluminum, glass, and plastic are shipped off-island. However, some aluminum and most off-island plastic transportation does not incur a line-item cost because end-users or brokers deduct the shipping cost from the scrap payment. HI5 bi-metal is shipped to Seattle or Asia, or inter-island to Oahu. In some cases, processor end-users charged non-processor end-users a shipping charge to cover off-island shipping. Crowe classified these charges as off-island transportation.

Exhibit 3-27 illustrates the split of transportation costs between these three categories by county and statewide for FY16 and FY17 combined. As the exhibit illustrates, the majority of shipping costs are for off-island transportation of materials. Only Kauai and Maui Counties have significant interisland shipping, while all counties incur some on-island shipping. Hawaii County incurs the highest proportion of on-island shipping to transport containers from satellite sites to company headquarters for processing.

Exhibit 3-28 provides a comparison of total HI5 transportation costs as a percent of total HI5 costs by county, statewide, and processor status for FY16 and FY17. In many of the subsequent graphs, Crowe presents the two fiscal years separately in order to understand changes in transportation cost between fiscal years. The share of transportation costs increased overall and for processors between the two fiscal years, but was inconsistent by county. Transportation costs represent a greater share of costs for Hawaii and Maui Counties as compared to Honolulu and Kauai Counties. Hawaii County incurs high on-island transportation, while Maui County incurs high interisland transportation. Transportation costs reflect a higher share of HI5 costs for processors than for non-processors due to off-island shipping.

Exhibit 3-29 illustrates the per container transportation cost for each material type, by county. Glass transportation was significantly higher statewide. Nearly all HI5 glass is shipped to Strategic Materials in Northern California at a cost of $2,100 to $2,900 per shipping container. Shipping containers typically carry between 40,000 and 48,000 pounds of material. As the heaviest material, glass incurs the highest cost. Plastic transportation was also relatively high, but as noted above, is primarily due to on-island shipping. Aluminum transportation was the lowest of the major materials, with much of the cost due to interisland shipping from Maui. On average and across all counties, it costs approximately ½ cent per container to transport HI5 beverage containers.

Exhibit 3-27
Percent of Transportation Costs by On-Island, Interisland, Off-Island by County (FY16/FY17)

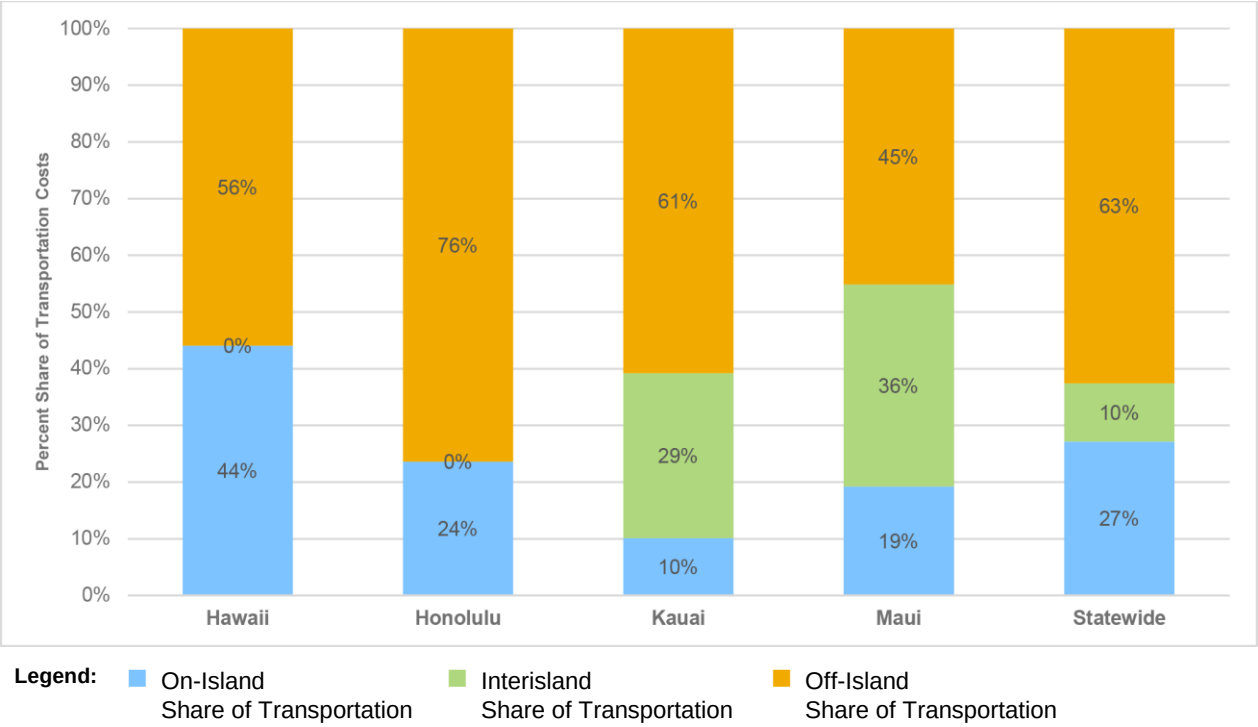
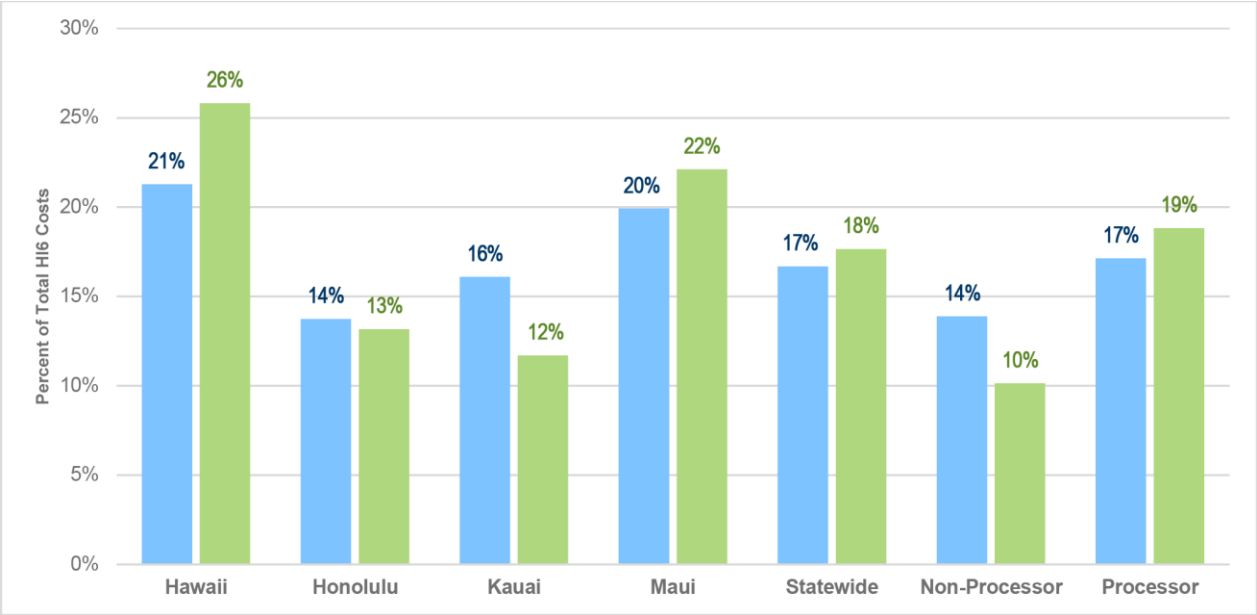
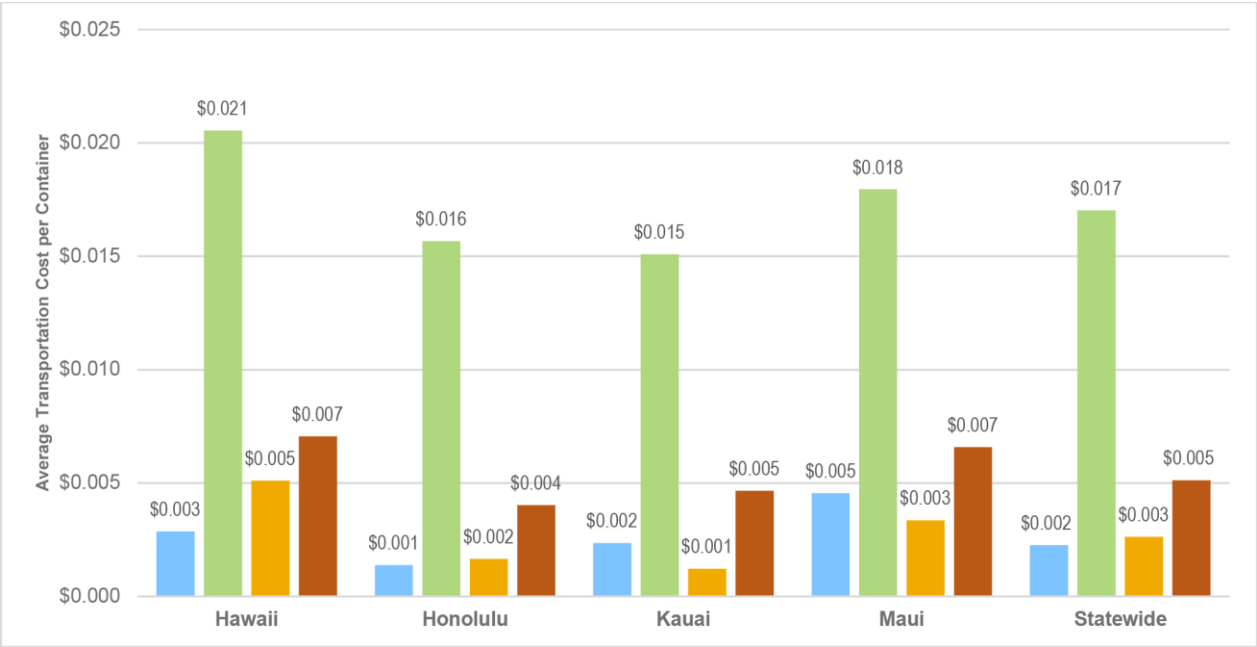


Exhibit 3-28
Transportation Costs as a Percent of Total HI5 Costs by County and Processor Status (FY16/FY17)



Legend: Transportation as % of HI5 Costs – FY16 Transportation as % of HI5 Costs – FY17

Exhibit 3-29
Average Transportation Costs per Container by County (FY16/FY17)



Legend: AL-BM Transportation per Container Glass Transportation per Container Plastic Transportation per Container HI5 Transportation per Container

On average, CRC companies spent approximately $185,000 per year on transportation. **Exhibit 3-30** provides comparisons of average transportation costs per company, by material type, county, and fiscal year. Note that aluminum and bi-metal transportation costs are combined in these exhibits; however, the costs essentially represent aluminum costs as bi-metal is a small share of these two materials. In general, average transportation costs increased between FY16 and FY17. This was apparent in Crowe's evaluation of shipping costs, which saw an upward trend over time. Exhibit 3-30 also illustrates higher shipping costs for glass, Hawaii County, and Honolulu County, and lower shipping costs for aluminum and plastic (except Hawaii County), and for Kauai.

Exhibit 3-31 provides a similar comparison of average CRC company transportation costs by material type, fiscal year, and processor status. Exhibit 3-31 illustrates that non-processor transportation costs are significantly lower in all cases. For non-processors, transportation consists primarily of on-island hauling containers from the CRC to the end-user. Non-processors on Kauai and Maui may also incur interisland transportation charges and off-island transportation fees, charged by the processor, embedded in scrap fee or payment. Processors may incur on-island or interisland transportation for moving materials, but primarily incur off-island transportation.

Exhibit 3-30
Average Annual Transportation Costs per CRC Company by Material Type and County (FY16/FY17)

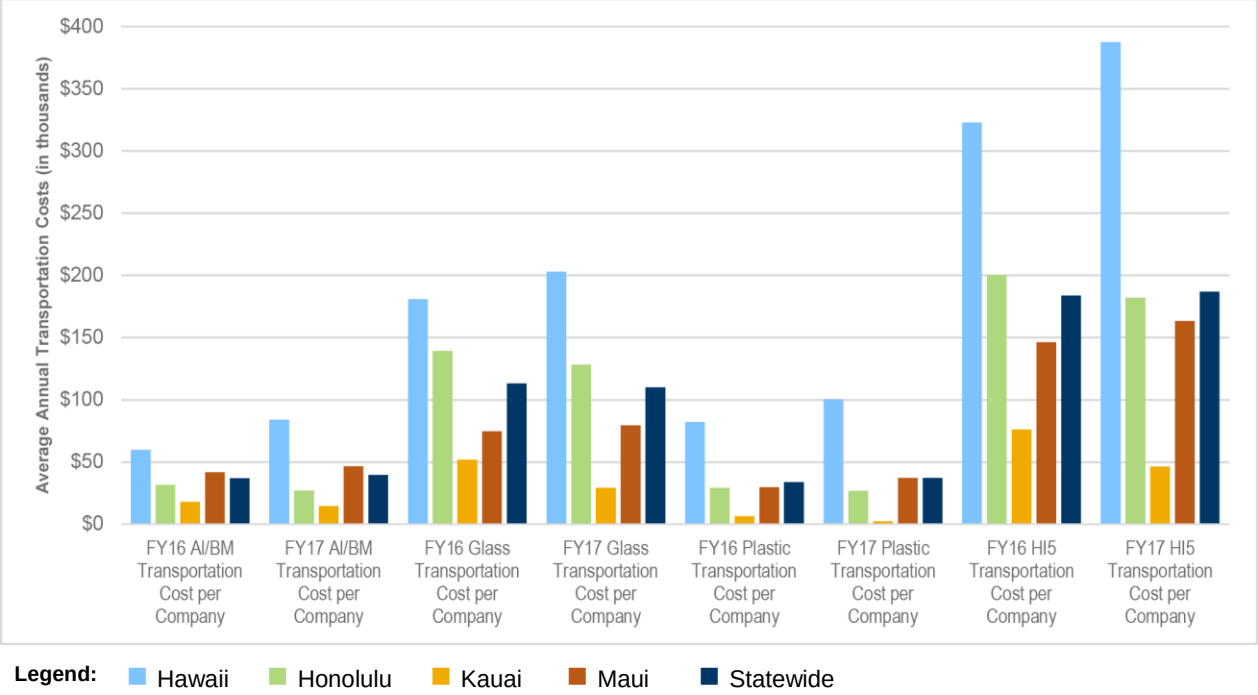
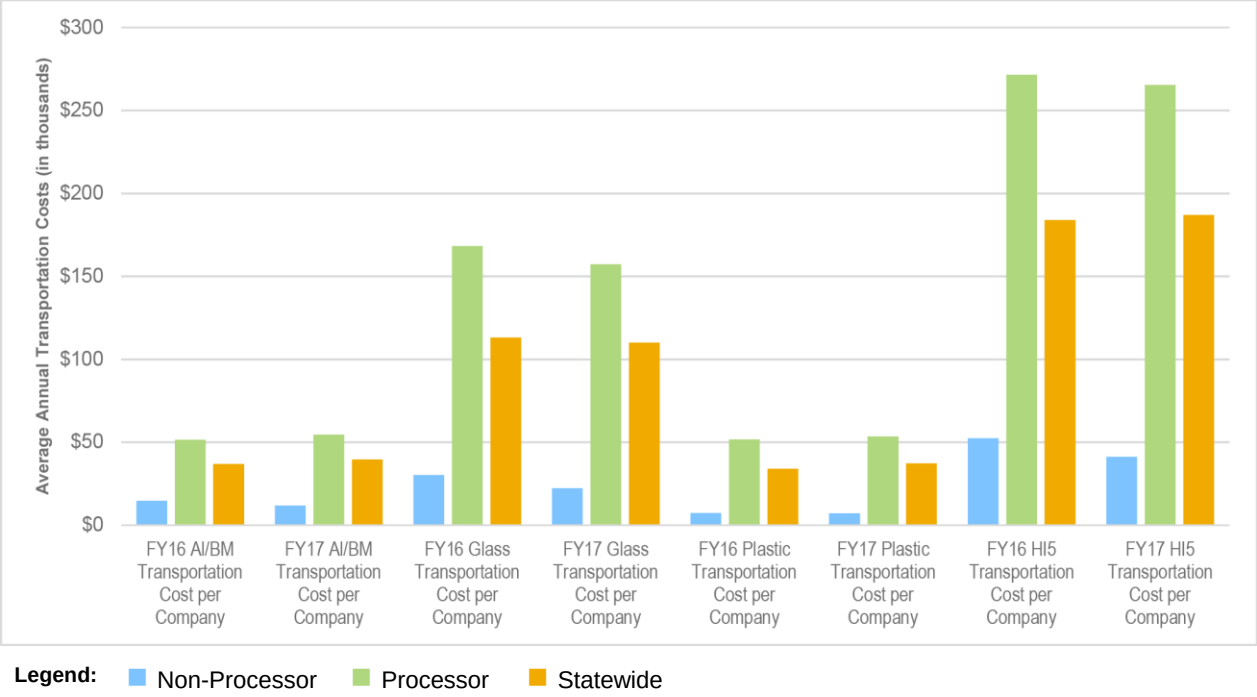


Exhibit 3-31
Average Annual Transportation Costs per CRC Company by Material Type and Processor Status (FY16/FY17)



Rent

As illustrated in Exhibits 3-13 to 3-15, rent is the third largest cost for CRCs. Crowe considers "rent expenses" as costs companies pay to lease property that houses their operations. In some cases, CRC owners also own the property that houses their operations and will charge the company rent. Rent expenses also include costs incurred to rent equipment. Of the 20 sites surveyed, Crowe identified only three companies that reported equipment rental. Typical rent expenses vary for each company and depend on the following factors:

- Property square footage or acre size
- Urban versus rural
- Commercial versus residential
- Processor versus non-processor
- Island differentiations
- County subsidizations
- Headquarters versus satellite locations

Of the 20 sites surveyed, 10 companies operated single locations and 10 companies operated multiple locations. On average, companies with a single location paid $66,871 annually; and companies with multiple locations paid $47,086 annually, per location. The statewide average annual rent expenses are $147,202 for FY16 and FY17. The overall range of rent per location ranged from $451 to $249,901.

Exhibit 3-32 provides statewide average costs between companies that own, rent, or both own and rent their properties. Of the 20 sites surveyed, six (6) companies own, eight (8) companies rent, and six (6) companies own and rent their properties. On average in FY16 and FY17, companies that owned property paid $84,863 annually; companies that owned and rented properties paid $311,660 annually; and companies that rented property(s) paid $70,612 annually.

Exhibit 3-32
Comparison of Average Annual Rent Costs between Companies that Own, Lease, or Both (FY16/FY17)

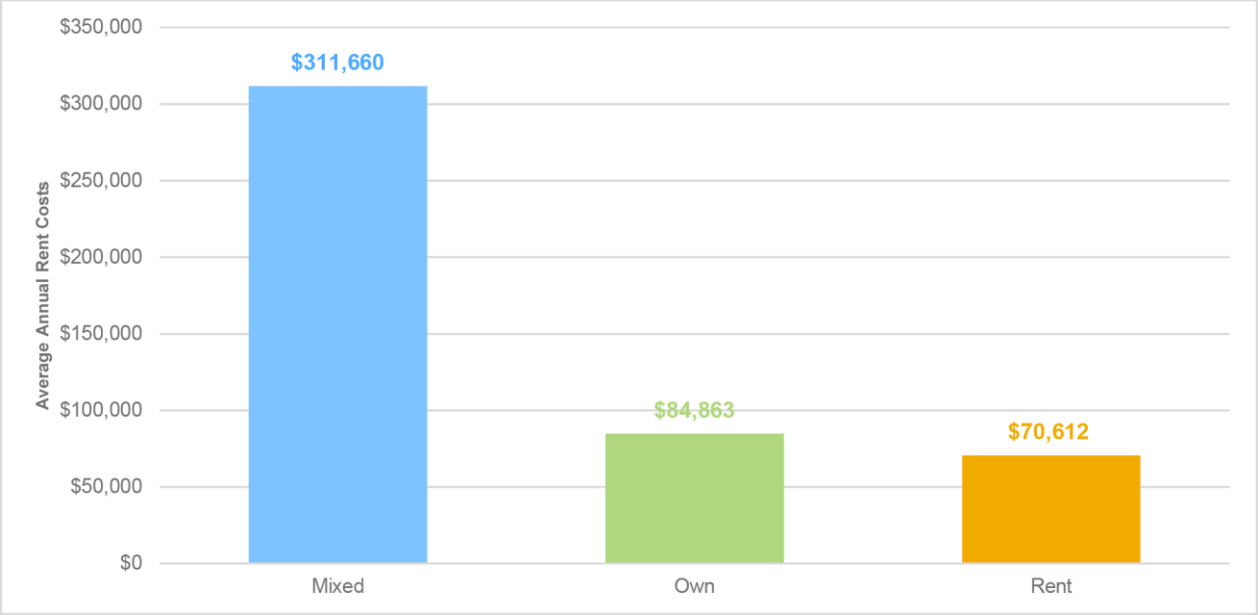


Exhibit 3-33 provides average rent costs comparison, by county and Statewide. Honolulu County, with an average of $204,364 in rent expenses far exceeds those of the other Counties. In comparison, Kauai comes in at the low end at $71,786 in average rent expenses. Differences in average rent costs by county are primarily driven by lease subsidizations or the number of headquarters located in a specific county. Honolulu County has the most headquarter locations, which tend to be larger compared to satellite locations, and does not offer lease subsidizations. Hawaii and Kauai Counties offer lease subsidizations, which drive down rent costs for a portion of CRCs. These Counties also have the least number of headquarter locations.

Exhibit 3-34 provides an average rent cost comparison for processors and non-processors. Similar to other cost categories, the significant difference in rent costs between processors and non-processors is reflective of the tendency for processors to have more complex operations than those of non-processors, which would require additional property or operational space to run the CRC. Another factor to consider is that very few of the non-processor companies operate multiple sites, which eliminates the possibility of additional rent costs from satellite sites.

Exhibit 3-33
Comparison of Average Annual Rent Costs by County and Statewide (FY16/FY17)

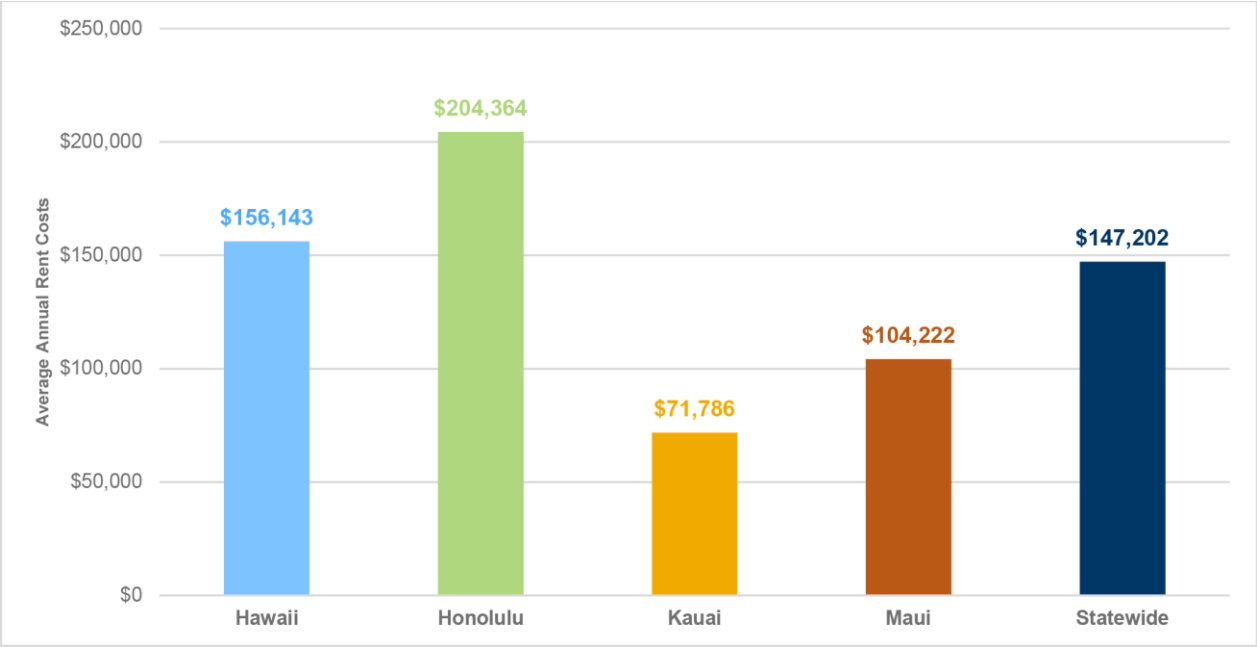
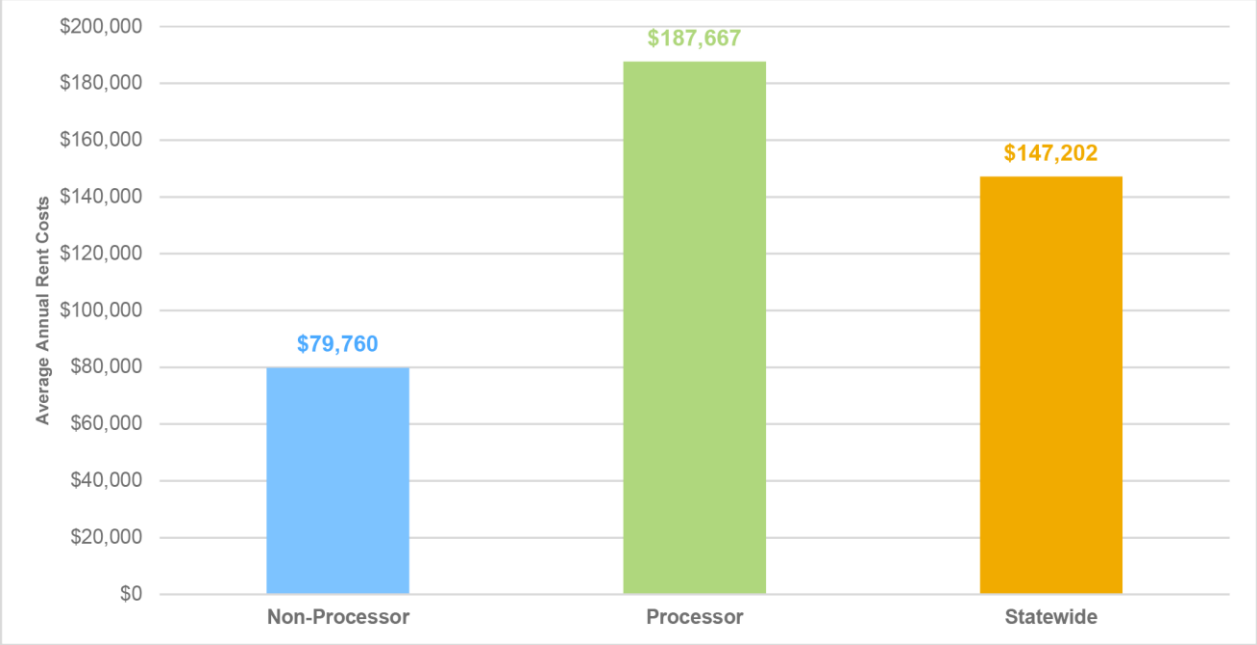


Exhibit 3-34
Comparison of Average Annual Rent Costs by Processor Type (FY16/FY17)



[This page intentionally left blank.]

Crowe

Section 4

Scrap Revenue Results

4. Scrap Revenue Results

This section summarizes the results of Task 3 of the Study of Hawaii's Deposit Beverage Container (DBC) Handling Fees, the Detailed Fiscal Analysis (Recycler Scrap Values). Ultimately, the scrap revenue data was not utilized in developing the handling fee recommendations. Had the scrap revenue been included, it would have led to a lower handling fee for aluminum and plastic.

A. Calculation

Crowe's handling fee survey methodology utilizes weighted average calculations for determining scrap values per container. The calculations are based on a two-step process, determining values per pound, and then per container (using DOH's containers per pound figures of 32 for aluminum, 5.9 for bi-metal, 2.4 for glass, and 18.8 for plastic). **Exhibit 4-1** provides the calculation of the aluminum scrap value per container. We utilized the same weighted approach for all material types, company, county, processor-status, and statewide calculations.

Exhibit 4-1
Scrap Value per Container Calculation for Handling Fee Survey

Weighted Average:

$$\frac{\Sigma \text{ Aluminum Scrap Payments}}{\Sigma \text{ Aluminum Pounds}} = \text{Aluminum Scrap Payment per Pound}$$

$$\frac{\text{Aluminum Scrap Payment per Pound}}{\text{Aluminum Containers per Pound}} = \text{Aluminum Scrap Payment per Container}$$

B. Results by Material, County, and Processor Status

This section provides the scrap payments per container, as determined by the handling fee cost survey. We provide the results by combined FY16 and FY17.

In conducting the scrap payment portion of the handling fee cost survey, Crowe requested scrap payment data from CRCs for the time period July 2014 through April 2018 by individual shipment. Most CRCs provided a complete set of data by shipment, including shipping costs if incurred. A few companies provided portions of the requested data, or summaries covering all shipments during a time period. Additionally, we found that the scrap data provided was not consistent among CRCs, by processor status, and by material type. For example, processor CRCs paid separate shipping on aluminum in some cases, but more typically the end-user subtracted shipping costs from the scrap payment. Assuming typical mainland shipping costs of $2,500 per container load and 45,000 pounds, this could result in a reduction in scrap payment of approximately 5 cents per pound to cover shipping. At the same time, these CRCs do not incur shipping costs for these loads (which shows up in a lower cost per container). Because of the wide variation in scrap data, the results of the scrap portion of the survey are less robust than the cost per container results. Crowe did not utilize scrap revenue in determining the handling fee, thus we provide the scrap data for informational purposes only.

For plastic, there were only a few instances where end-users did not subtract shipping costs from the scrap payment. Thus, shipping costs for plastic are low (or non-existent), and scrap payments reflect that approximately 5 cents per pound shipping cost (or less if shipping to Asia). Processor CRCs almost always incurred a per-load shipping charge for glass. Processors that handled glass from non-processor CRCs sometimes charged the non-processor an additional fee to help cover glass shipments. Often,

non-processor CRCs did not receive any payment from processor CRCs that served as their end-user. This is the reason that non-processor CRCs had significantly lower per container scrap payments as compared to processor CRCs.

Exhibit 4-2 provides a visual summary of the combined FY16/FY17 scrap payments per container by material and county. Aluminum receives the highest scrap payment per container, typically between 1 and 1 ½-cents per container (equivalent to 32 to 48 cents per pound). Scrap payments for bi-metal dropped from as much as $40 per ton to zero during the study time period, reflected in the very low cost per container. Glass received a small positive payment in Hawaii and Honolulu counties, offset by a negative payment (i.e. CRCs having to pay the end user to take the material) in Kauai and Maui Counties. Plastic received a positive scrap payment of almost ½ cent per container (equivalent to under 10 cents per pound). Overall, the scrap payment was positive, but less than one-cent per container.

Exhibit 4-3 provides a comparison of non-processor and processor scrap payments per container. Unlike costs per container, which are similar for non-processor and processor CRCs, scrap payments are significantly different. Processor CRCs receive higher scrap payments for all material types. For aluminum, processors receive more than eight times more than non-processors, equivalent to 44 cents per pound more. For bi-metal, non-processors received no scrap payment, while processors received a small scrap payment (on average, payments for bi-metal have been zero for all CRCs since 2017). For glass, non-processors, on average, paid over one-cent per container, compared to processors that received, on average, a minimal payment of 0.075 cents per container (equivalent to 3 cents per pound, but CRCs still pay separate freight charges, equivalent to 5 to 6 cents per pound). For plastic, processors received an average of a ½-cent per container (9 cents per pound), sixteen times (16x) more than non-processors. Overall, processors received slightly less than one-cent per container in scrap payment, compared to a net payment to end-users of 1/10th of a cent per container for non-processors. In effect, non-processors' only source of revenue within the HI5 program is through handling fee payments.

Exhibit 4-2
Average per Container Scrap Price by Material Type and County – FY16/FY17

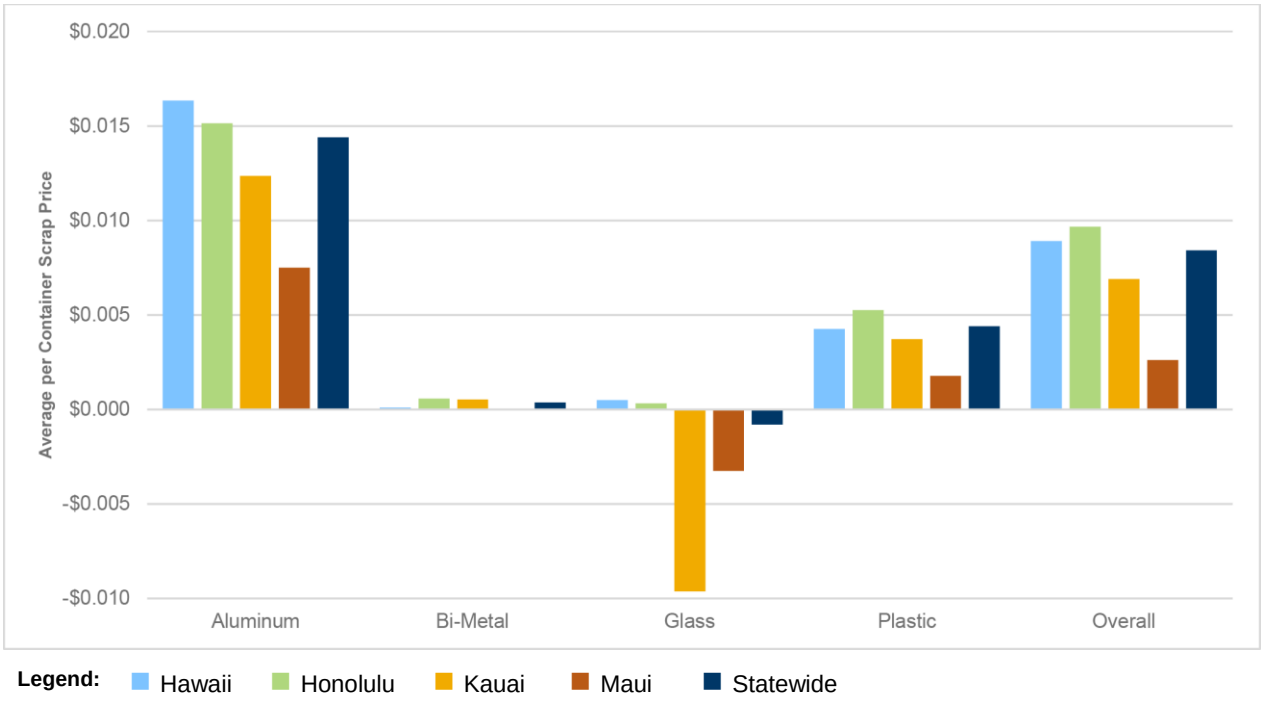


Exhibit 4-3
Average per Container Scrap Price by Material Type and Processor Status – FY16/FY17

C. Comparison to Western U.S. Scrap Markets

Recycled beverage container materials are a global commodity. Like any other commodity, scrap prices are determined by economic factors well beyond the State of Hawaii. For example, the scrap price of PET is highly correlated with the price of oil because a byproduct of gasoline refining is a feedstock for PET production. When oil prices are high, virgin PET prices are high, driving up PET scrap prices. Conversely, low oil prices drive down the price of virgin PET, which in turn drives down the price of scrap PET. Similarly, aluminum scrap prices vary with broader economic trends in mining industries, construction, and energy. Recycled glass has low or no scrap value, and is singularly controlled by Western Strategic Materials, essentially the only glass end-user.

Scrap prices are also a primary driver of CRC profitability. CRCs receive revenue from scrap prices, handling fee payments, and in some cases other business activities (scrap metal, curbside collection, electronic recycling, gas stations, etc.). Those CRCs that rely only on HI5 recycling are highly dependent on scrap prices to sustain their businesses. During the Environmental Scan interviews, many CRCs complained that scrap prices, particularly for PET, had fallen in recent years. Several CRCs cited the decline in scrap prices as a key reason for CRC closures in 2015.

Exhibit 4-4 provides a comparison of Southwest region PET scrap prices with scrap prices from the six Hawaii CRC processors that had consistent data over the July 2014-April 2018 period. We calculated a three-month rolling average to smooth short-term variation. The exhibit illustrates the variation in scrap prices over time, as well as a consistent 9-cent per pound discount in Hawaii scrap prices as compared to the Southwest region. The discount reflects, in part, the additional shipping cost to transport PET from Hawaii to the mainland.

Exhibit 4-4
Comparison of Hawaii and Southwest Region PET Scrap Prices (3-month Rolling Average)

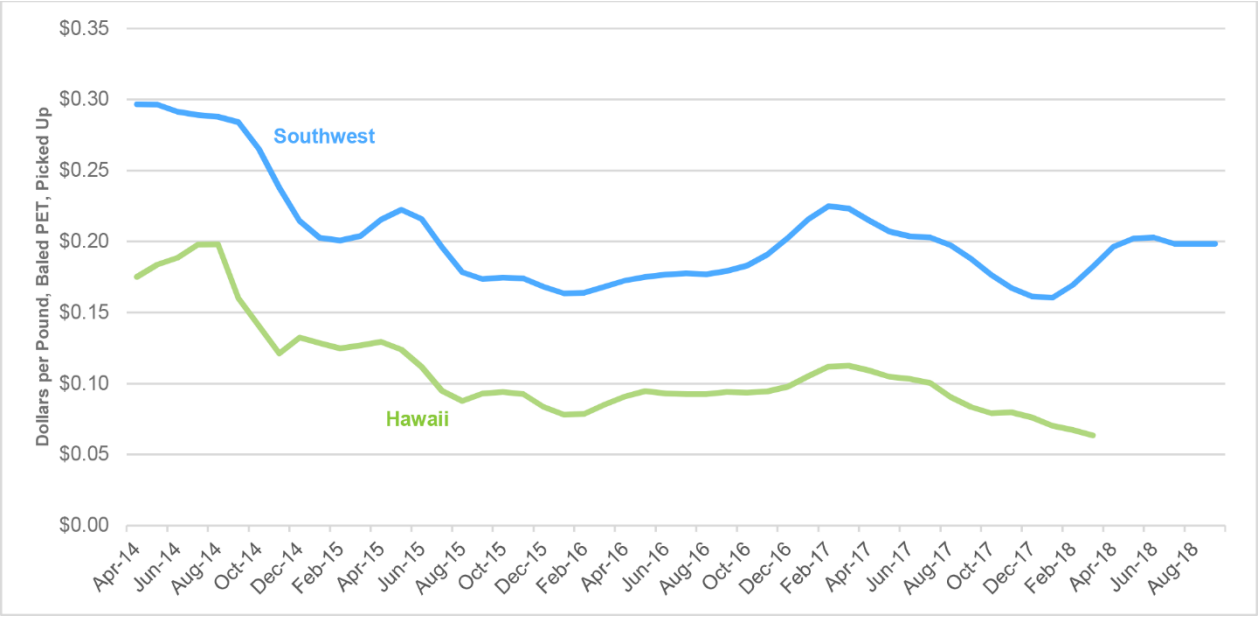
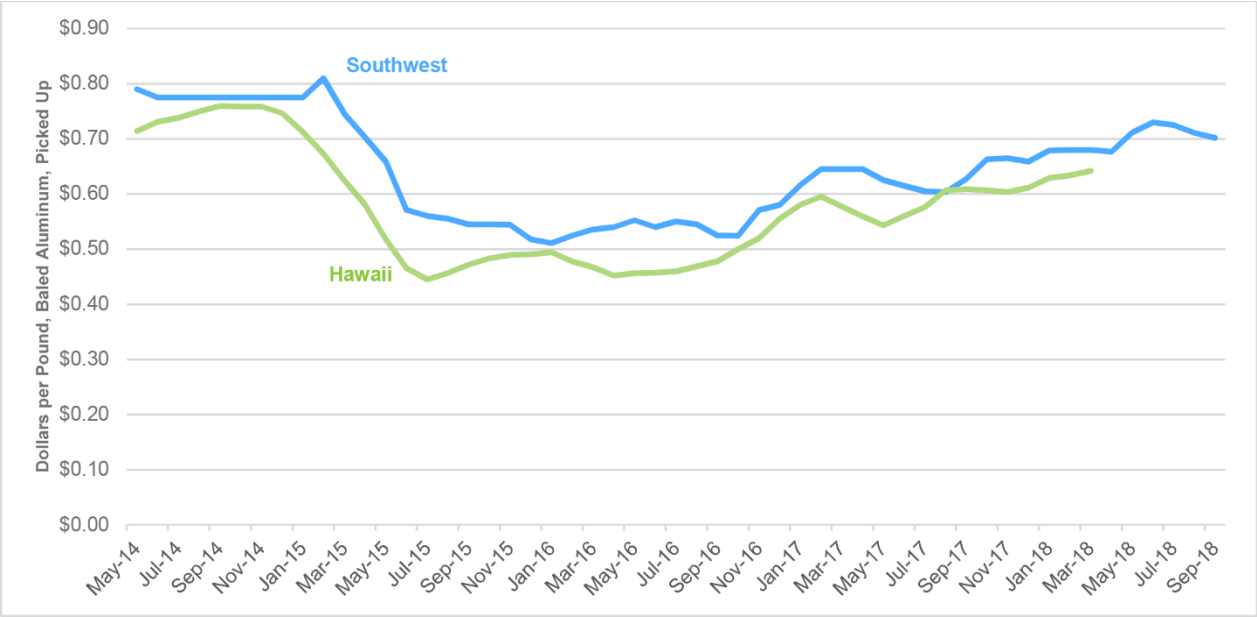


Exhibit 4-5 provides a similar comparison of Southwest region aluminum scrap prices with scrap prices from the same six Hawaii CRC processors. For consistency, the Hawaii scrap data reflect only shipments for which shipping costs were subtracted from scrap payments. For aluminum, Hawaii scrap prices were, on average, 6-cents per pound less than Southwest prices, again primarily due to the additional shipping cost. While aluminum scrap prices were trending upward in the first half of 2018, the exhibit clearly illustrates the variability in scrap prices. Volatility in aluminum prices is particularly difficult for recyclers to absorb because aluminum is by far the most profitable HI5 material to recycle.

Exhibit 4-5
Comparison of Hawaii and Southwest Region Aluminum Scrap Prices (3-month Rolling Average)



In evaluating the impact of scrap price variability on the cost – scrap differential, Crowe considered tying adjustments to the handling fee to changes in the Southwest region aluminum and PET scrap prices. However, after further evaluation and discussions, Crowe and the DOH determined that removing the scrap price from the handling fee calculation would provide a more consistent handling fee payment. This consistency benefits CRCs, who will be able to plan for the payment to cover their costs, and the DOH, who will not need to continuously recalculate and update the payment. Had the scrap revenue been included, it would have led to a lower handling fee for aluminum and plastic.

[This page intentionally left blank.]

Crowe

Section 5

Handling Fee Calculation and Adjustments

5. Handling Fee Calculation and Adjustments

This section describes the handling fee calculation and adjustment process that Crowe and the DOH utilized to determine the recommended handling fees, shown in **Exhibit 5-1.**

Exhibit 5-1
Recommended per Container Handling Fees

DBC Material Type	Per Container Handling Fee
Aluminum	3 cents
Glass	7 cents
Plastic	3.5 cents
Bi-metal	3 cents

A. Initial and Recommended Handling Fees

The Study of Hawaii's Deposit Beverage Container (DBC) Handling Fees originally proposed that the handling fees for each material type would be determined by subtracting the scrap revenue from the cost of recycling:

Handling Fee = Cost per Container to Recycle – Scrap Revenue per Container

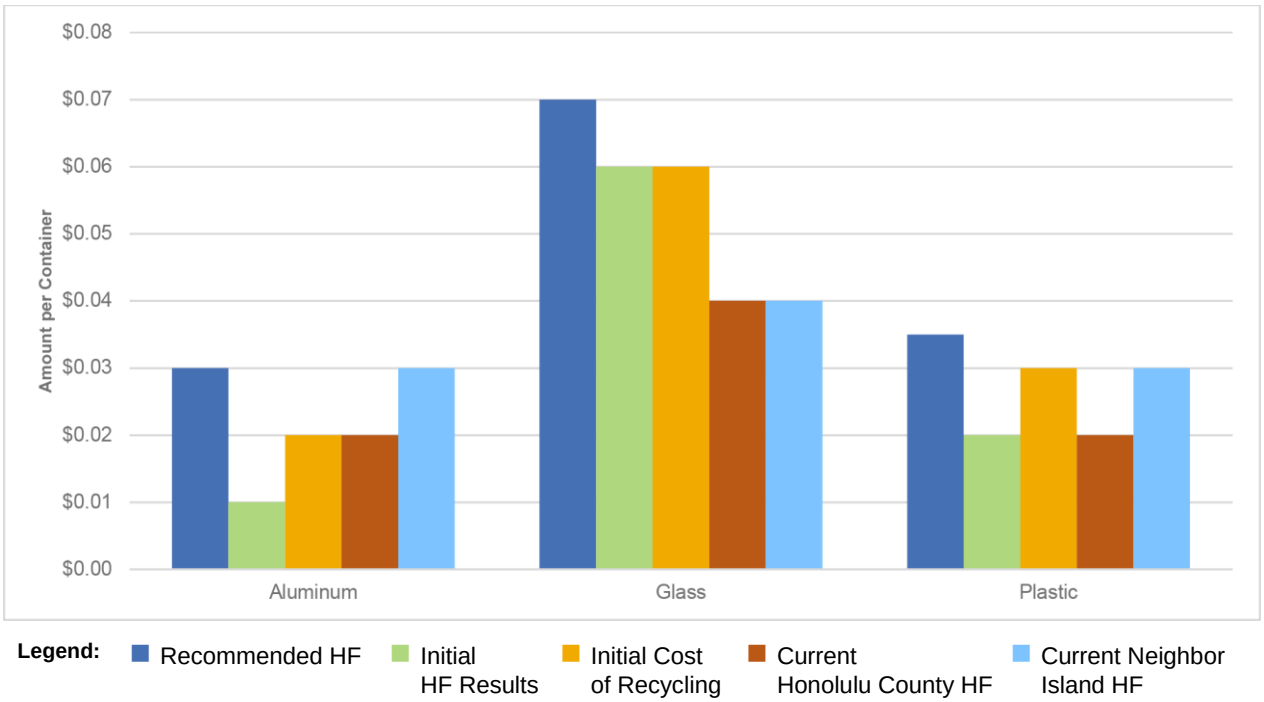
As discussed in Section 4, scrap revenue is highly variable due to global market factors. In addition, Certified Redemption Centers (CRCs) have differing arrangements with end-users and brokers that dictate how and how much, scrap revenue they receive. As a result, Crowe and the DOH decided to remove the scrap revenue per container from the handling fee calculation, and base the handling fee on only the cost of recycling. The result is higher handling fees than they would have been had we utilized the equation above.

Exhibit 5-2 illustrates the recommended handling fees (in bold), as compared to the initial handling fee results, initial cost of recycling, and the current handling fees. The recommended handling fees represent an increase in per container payments across all container types for Honolulu County CRCs and an increase for all container types except aluminum and bi-metal for Hawaii, Maui, and Kauai County CRCs. **Exhibit 5-3** provides a graphical comparison of recommended and current per container handling fee (HF) payments (excluding bi-metal). Note that the DOH and Crowe based the bi-metal handling fee on the recommended handling fee for aluminum due to the extremely low quantity of bi-metal.

Exhibit 5-2
Comparison of Recommended, Initial Results, and Current per Container Handling Fees

DBC Material Type	Recommended HF	Initial HF Results	Initial Cost of Recycling	Current Honolulu County HF	Current Neighbor Island HF
Aluminum	**3 cents**	1 cent	2 cents	2 cents	3 cents
Glass	**7 cents**	6 cents	6 cents	4 cents	4 cents
Plastic	**3.5 cents**	2 cents	3 cents	2 cents	3 cents
Bi-metal	**3 cents**	16 cents	16 cents	2 cents	3 cents

Exhibit 5-3
Graph Comparison of Recommended, Initial Results, and Current per Container Handling Fees



B. Adjustment Factors

In developing our handling fee recommendations, Crowe utilized the Handling Fee Survey Fiscal Analysis cost per container results as a basis for further analysis. The Fiscal Analysis results provide recycling costs for FY16 and FY17 – the time period from July 1, 2015 through June 30, 2017. To ensure that handling fees better reflect the costs of recycling in 2019, Crowe's recommendations incorporate several adjustments to make the costs more current. We evaluated six potential factors and ultimately selected three adjustment factors to increase the cost per recycling from the FY16/FY17 baseline. The three selected adjustment factors are listed below. We describe the basis for the adjustments in the remainder of this section.

- Wage adjustment
- Cost of living adjustment
- Financial return adjustment.

Based on these three factors, Crowe made the following adjustments to the FY16/FY17 cost of recycling:

- An adjustment of 18.82 percent applied to direct and indirect labor to account for the increase in minimum wage since the study period.
- A COLA adjustment of 3.70 percent (covering 1.5 years) applied to all non-labor costs.
- A reasonable financial return of 10 percent applied to all costs.

In total, these three adjustments increase the cost of recycling by 21.95 percent as compared to the FY16/FY17 average costs. We applied these adjustment factors to the cost per container for each material type and overall statewide, by county, and for processor/non-processors. **Exhibit 5-4** illustrates the adjusted costs per container by material type and county. **Exhibit 5-5** illustrates the adjusted costs per container for non-processors and processors.

Exhibit 5-4
Average Adjusted Cost, by County

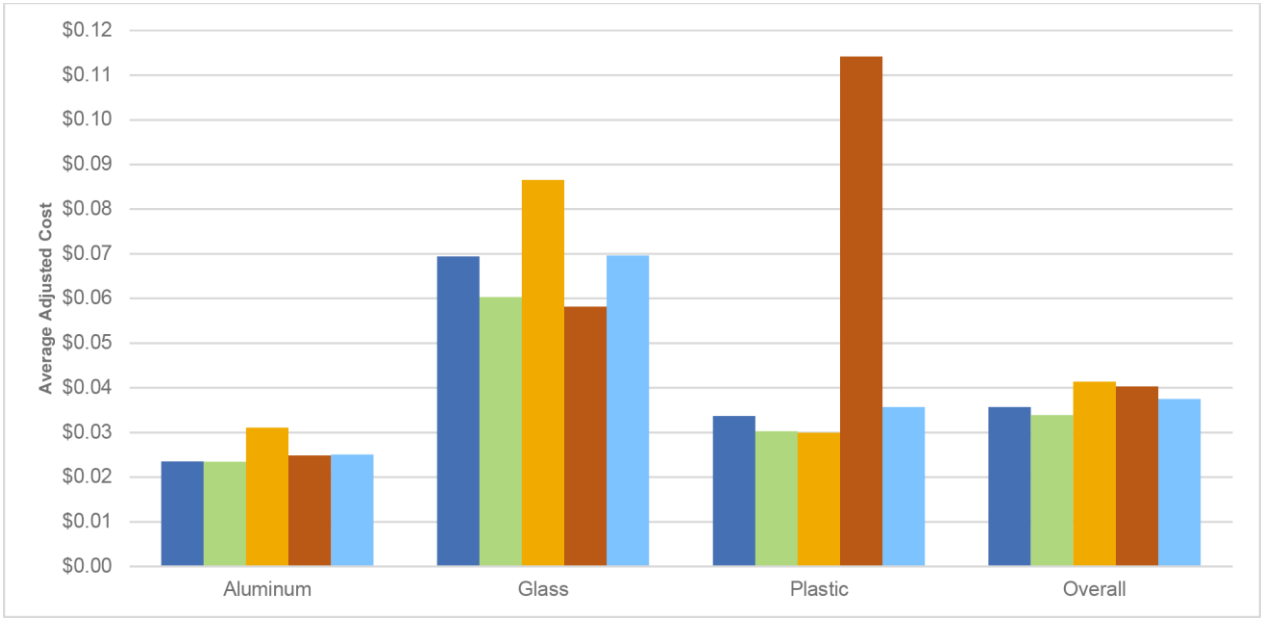
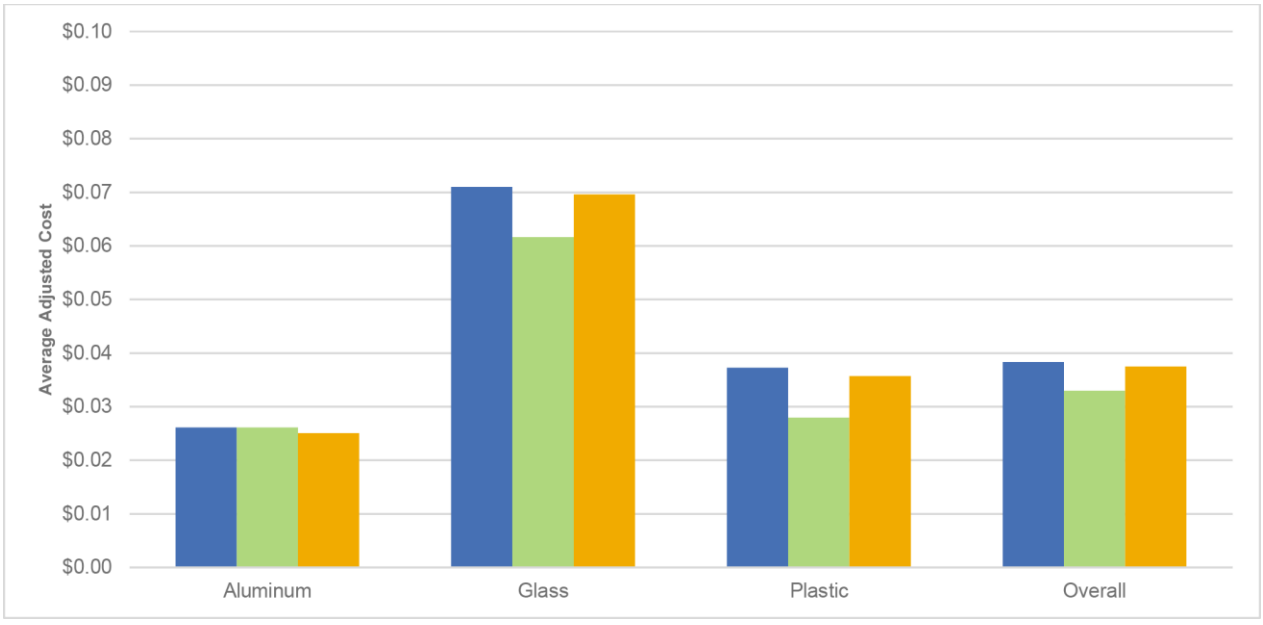


Exhibit 5-5
Average Adjusted Cost, by Company Type



Wage Adjustment

Representing roughly 47.5 percent of costs amongst recyclers, labor costs (wages, fringe benefits, employer taxes, etc.) are a significant factor in overall recycler costs. Crowe looked at several sources of data on wage fluctuation, including consumer price indices, Hawaii's minimum wage increases, and other available publications.

Crowe analyzed the U.S. Department of Labor's Bureau of Labor Statistics (BLS) data for Hawaii specific wages. This included reviewing broad populations (e.g., all industries, private sector jobs) and narrowed industry sectors (e.g., waste management, waste collection) over a ten-year period. The rates in industry specific (Consumer Price Indices) CPIs tended to fluctuate greatly from year to year, with some years resulting in a decrease (lower wage). The broader industry indices tended to pace more closely with what one would expect from cost of living increases, usually between one to four percent year-over-year increases.

Crowe also reviewed Hawaii's minimum wage. Minimum wage in Hawaii increased 50 percent since 2006, and 19 percent during the 2015 to 2017 handling fee study period. The 2018 rate, $10.10 per hour, was the final increase specified in state legislation passed in 2014. There are ongoing discussions about further increases in minimum wage; however, the wage is currently holding at $10.10.

Though minimum wage was stable for several years prior to 2014, it has increased year-over-year through 2018. Crowe compared the minimum wage percent increase to that of various wage indices. The index changes are less pronounced than the change in minimum wage during the surveyed years (FY16/FY17) and 2018. As certified redemption center labor tends to fall closer to minimum wage levels than in other professions, CRCs feel the impact more directly. During the Environmental Scan interviews, several CRCs told us that they had to pay wages several dollars per hour above minimum wage in order to attract and retain reliable employees.

Due to recent minimum wage shifts, Crowe determined a fair and reasonable method to reflect more current wage expenses in the FY16/FY17 costs, is to use minimum wage percent increases as a basis for the adjustment. The average wage expenses, which are roughly at 2016 levels (the midpoint of July 1, 2015 – June 30, 2017), increased by 8.82 percent between 2016 and 2017 and 9.54 percent between 2017 and 2018. The combined increase in wages since 2016 is 18.82 percent. Crowe applied the increase to labor category expenses (e.g., wages, fringe benefits, workers' compensation) to adjust the survey years cost data to current levels.

Cost of Living Adjustment

Cost-of-Living-Adjustments, or COLAs, are commonly used to counteract the impact of inflation. For example, social security benefits include a recurring COLA adjustment; and waste hauler agreements commonly include COLA-based fee adjustments during non-base years. COLAs typically equal the percentage increase in the CPI for a specific period. The Social Security Administration uses BLS's CPI for Urban Wage Earners and Clerical Workers (CPI-W). Depending on the arrangement, a municipality and garbage hauler may determine a regional CPI (e.g., Western Region) is appropriate.

The BLS provides half-year reporting of CPI statistics for urban Hawaii. This index provides a focused representation of Hawaii's economic environment, rather than broader regional (Western Region), or national CPI data. In this case, the BLS published half-year statistics through the first half of 2018, and annual numbers through 2017.

In order to represent a reasonable adjustment of the FY2016/FY2017 costs to 2018 costs, Crowe calculated adjustments based on fiscal 2017 to 2018 averages, and a half-year, year-over-year comparison of the first half of 2017 and first half of 2018. The resulting adjustment is a 2.02 percent increase for 2017 and 1.65 percent increase for 2018. This equates to an overall adjustment of 3.70 percent. Crowe adjusted non-labor survey costs, using the urban Hawaii index, to determine 2018 levels.

Financial Return Adjustment

Crowe evaluated other standard mechanisms to adjust for overall costs associated with recycling. Crowe identified financial return indices as an industry accepted approach to provide additional resources and economic incentives for recyclers. We researched how recycling and solid waste collection programs use financial return indices as a tool to stabilize profit volatility for program participants.

Government recycling programs typically use financial return indices in order to assist recyclers in mitigating potential losses from volatile scrap markets and rising recycling costs. For example, the California Department of Resources Recycling and Recovery (CalRecycle) applies a financial return index called a "reasonable financial return" (RFR) when adjusting costs of recycling. CalRecycle applies the RFR as a percentage to recycling costs used to determine processing fee payments to recyclers. Currently, CalRecycle utilizes an RFR of 16.6 percent for rural recyclers and 11.5 percent for all other recyclers. The RFR is utilized as follows:

$$\text{California Processing Payment} = \text{Cost of Recycling} \times (1 + \text{RFR}) \times (1 + \text{COLA}) - \text{Scrap Value}$$

Similar to CalRecycle's RFR, many local government solid waste collection programs also use financial return indices when adjusting for collection rates for waste and recycling. Solid waste collection programs typically provide instructions for applying financial return indices to adjust collection rates in a rate adjustment manual or policy, which provides for a transparent and consistent means for adjusting costs associated with collecting solid waste.

Financial return indices are a relevant approach to adjusting recycling costs because they provide an effective and fair basis for giving recyclers a rebate-like return on their costs. Financial return indices also ensure that recyclers receive a percentage back on recycling expenditures regardless of economic and market conditions. Recyclers participating in Hawaii's DBC program face rising operational costs, such as on-island/intra-island/off-island transportation, and volatile scrap markets. A financial return index, similar to the RFR, would potentially assist Hawaii's recyclers to mitigate these particular economic and market conditions. In addition, adjusting costs with a financial return index would help maintain a sustainable marketplace where it is profitable for recycling firms to provide recycling services and redemption opportunities for the public in the long term.

Through our research efforts, Crowe found that industry wide RFR is typically about 10 percent. We recommend a 10 percent RFR in addition to applying a wage and COLA adjustment of recyclers' costs.

[This page intentionally left blank.]

Crowe

Section 6

Handling Fee Implementation

6. Handling Fee Implementation

This final section of the report considers implementation of the handling fee over the next several years. Crowe first evaluated the impact of the recommended handling fees on the status of the Deposit Beverage Container (DBC) Special Fund. In the second subsection, we describe a model to adjust the handling fee in subsequent years, and consider triggers to conduct handling fee surveys in the future.

A. Impact of Handling Fee on DBC Special Fund

Crowe developed two models to evaluate the impact of the recommended handling fees on the DBC Special Fund. The first model provides a basis for projecting sales, redemption, and redemption rates for beverage containers through FY2022. The second model provides a basis for determining the impact of the recommended handling fees on the DBC Special Fund through FY2022 under a range of different scenarios. Crowe developed the scenarios based on varying assumptions on the status of the economy, recycling, and beverage markets over the next four years.

Crowe developed a sales and redemption rate projection model using a combination of historical data provided by the DOH and market industry data. After developing baseline projections of sales and redemption through FY2022, we identified six additional scenarios that describe an array of economic and policy conditions. The purpose of the scenarios was to provide a wide range of possible sales and redemption rates to test whether there would be sufficient funds available for the recommended handling fee payments. The scenarios are as follows:

- **Baseline:** sales based on industry projections by beverage type; redemption based on 11-year historical average.
- **Scenario #1 Economic Downturn – Moderate:** modest increase in unemployment and decreased household income leading to decreased sales and increased redemption as compared to baseline.
- **Scenario #2 Economic Downturn – Major:** significant increase in unemployment and decreased household income leading to more substantial reduction in sales and increased redemption as compared to baseline.
- **Scenario #3 Economic Growth – Moderate:** modest reduction in unemployment and increased household income leading to increased sales and decreased redemption as compared to baseline.
- **Scenario #4 Economic Growth – Major:** significant reduction in unemployment and increased household income leading to more substantial increase in sales and decreased redemption rate as compared to baseline.
- **Scenario #5 Plastic Regulation:** a scenario reflecting the increased negative attention to single-use plastic. We reduced the sales growth projection for plastic water bottles from 7.9 percent to 4 percent, resulting in a one percentage point reduction in plastic sales. The model holds redemption rates and sales for the other materials steady.
- **Scenario #6 Peak Recycling:** a scenario taking into account the possibility of redemption rates ranging from 72 to 80 percent, consistent with rates during FY09 through FY12. This scenario reflects more significant increases in redemption than the Economic Downturn- Major scenario, and the largest drain on the DBC Special Fund.

To determine the impact of the various sales and redemption scenarios, in combination with the recommended handling fees, Crowe developed the second model to calculate the flow of revenue and expenditures to the DBC Special Fund for FY18 through FY22. The Fiscal Impact Model incorporates the DBC Special Fund beginning balance, deposits by material type, container fees by material type, program administration, redemption payments, and handling fees. Crowe evaluated the baseline and each of the six scenarios over the five fiscal year period.

Overview of Results

The fiscal impacts analysis reveals trends that are useful in preparing the DBC Special Fund for uncertain economic, recycling, and regulatory conditions beyond FY22. The analysis, in general, indicates the following trends:

- In economic downturn (moderate and major) scenarios, the DBC Special Fund's expenditures exceed revenues due to a decrease in beverage container sales and an increase in redemption rates
- In economic growth (moderate and major) scenarios, the DBC Special Fund's revenues exceed its expenditures due to an increase in beverage container sales and a decrease in redemption rates.

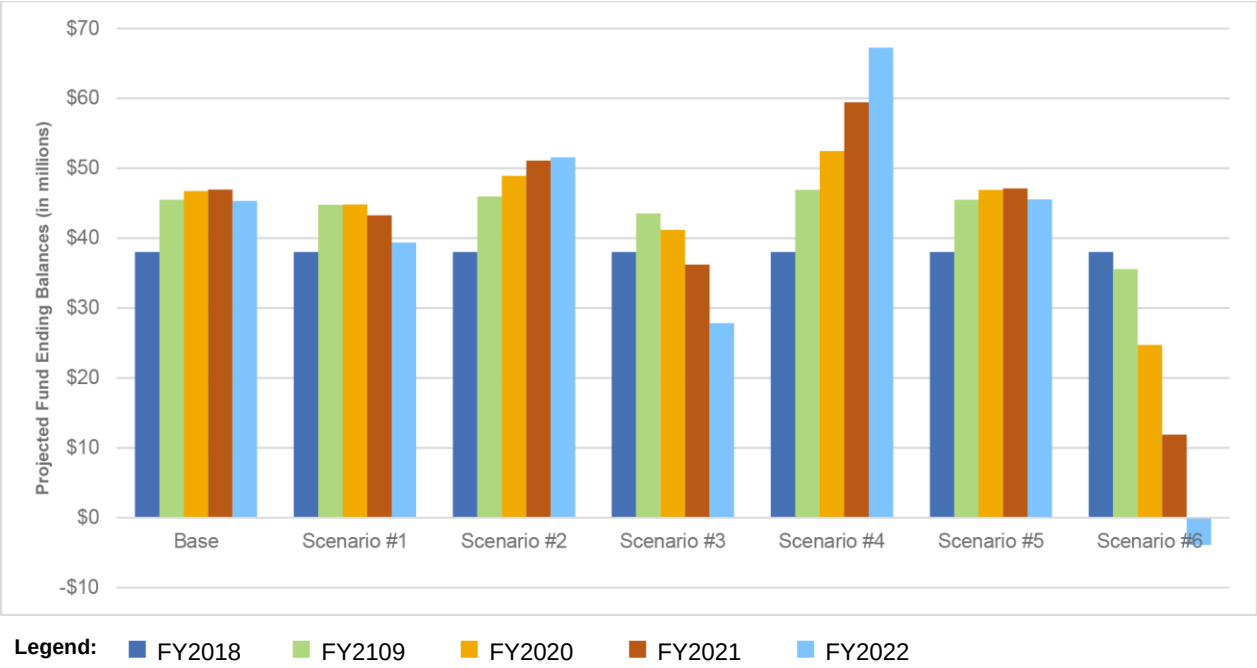
By knowing these trends, the DOH can establish redemption rate thresholds that would signal when to adjust either handling fees or the non-refundable per container fee in order to maintain a positive fund balance.

Our fiscal impacts analysis results indicate the DBC Special Fund can support the new handling fee payments with the existing 1-cent non-refundable container fee, with the exception of the peak recycling scenario, through FY22. The DBC Special Fund maintained a positive ending balance through FY22 in all scenarios, with the exception of the peak recycling scenario, indicating that the DOH would not need to adjust the recommended handling fees or increase the non-refundable per container fee from 1-cent to 1.5-cent. Note that our analyses start with a FY18 ending fund balance of almost $38 million. Below we provide highlights from our results:

- With the exception of the peak recycling scenario, the DBC Special Fund maintains, on average, an ending balance of approximately $46 million through FY22. This signifies the DBC Special Fund will maintain adequate coverage for its expenditures (deposit returns, handling fee payments, and fund administrative costs) through FY22 even under economic downturn conditions.
- With the exception of the peak recycling scenario, the DBC Special Fund maintains, on average, approximately 1.7x the amount needed to cover its expenditures through FY22.
- In the baseline scenario, the DBC Special Fund's expenditures exceed revenues in FY22 due to the increase in the recommended handling fees.
- The economic downturn (moderate and major) and peak recycling scenarios create the most "stress" on the DBC Special Fund. In the economic downturn (moderate and major) and the peak recycling scenarios, the DBC Special Fund's expenditures exceed revenues starting in FY19 due to increases to projected redemption rates. In the peak recycling scenario, the DBC Special Fund's ending balance was negative by FY22 indicating that the DOH would need to increase the non-refundable per container fee from 1-cent to 1.5-cents or adjust handling fee payments downward.
- In both economic upturn scenarios, revenues exceed expenditures due to an increase in projected beverage container sales and a decrease in redemption rates.

Exhibit 6-1 provides a summary comparison of projected DBC Special Fund ending balances by scenario through FY22. The economic downturn scenarios (#1 and #3) and peak recycling scenario (#6) show a decline in the DBC Special Fund ending balance through FY22. The economic growth scenarios (#2 and #4) show an increase in the DBC Special Fund ending balance through FY22.

Exhibit 6-1
Comparison of Projected DBC Fund Ending Balances by Scenario



Fund Coverage Ratio

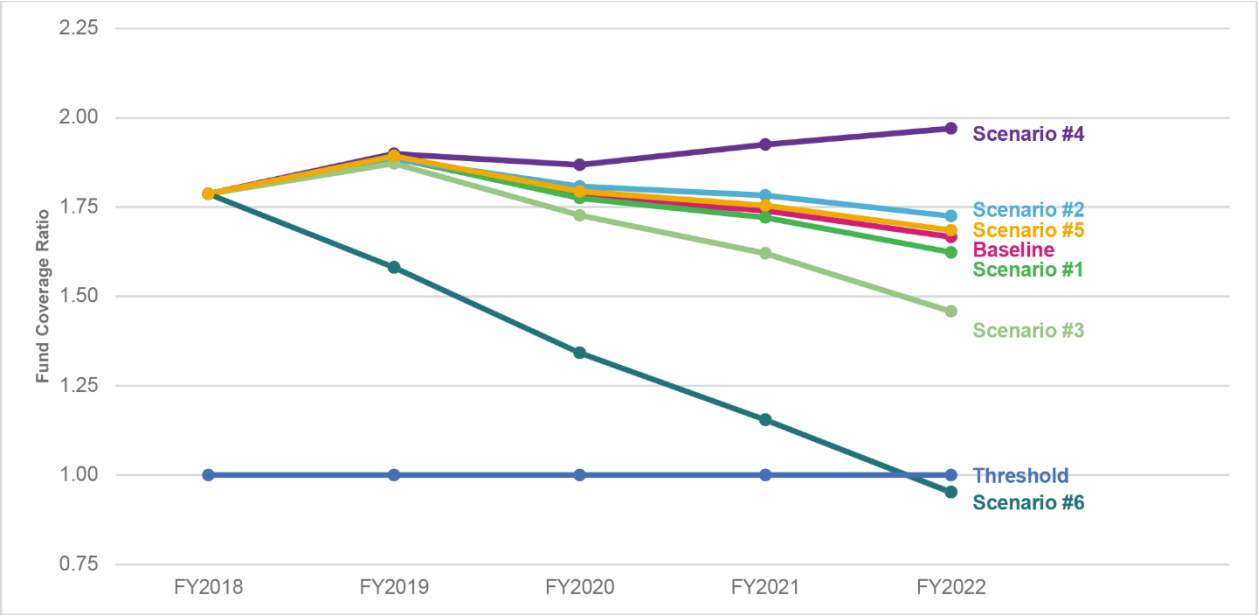
The fund coverage ratio is a comparative metric to determine if the DBC Special Fund can cover its expenditures under each scenario. The fund coverage ratio provides an assurance that the DBC Special Fund has the necessary funds on hand to weather any short-term economic volatility. For example, if the DBC Special Fund has a fund coverage ratio of 1.5, then this means the fund has 150 percent of the necessary funds to cover its expenditures. Conversely, if the DBC Special Fund has a fund coverage ratio of 0.9, then this means the fund has only 90 percent of the necessary funds to cover its expenditures. The fund coverage ratio is calculated as follows:

$$\textit{Fund Coverage Ratio} = \frac{\text{Fund Beginning Balance + Revenues}}{\text{Expenditures}}$$

Exhibit 6-2 provides a summary comparison of the DBC Special Fund projected coverage ratio under each scenario. If the fund coverage ratio is above 1.0, then this signifies the DBC Special Fund can cover its expenditures. If the fund coverage ratio is below 1.0, then this signifies the DBC special Fund cannot cover its expenditures.

With the exception of the peak recycling scenario, the DBC Special Fund coverage ratio is above the 1.0 threshold through FY22. This indicates the DBC Special Fund has more than 100 percent of the necessary funds to cover its expenditures under the majority of economic, recycling, and regulatory conditions through FY22. In the event that the DBC Special Fund's coverage ratio nears 1.0, such as in the peak recycling scenario, then the DOH should consider either increasing the existing 1-cent non-refundable container fee or decreasing the handling fee payments.

Exhibit 6-2
Comparison of Projected DBC Fund Coverage Ratios



B. Handling Fee Evaluation and Adjustments in Future Years

The recommended handling fees implemented as a result of this Study of DBC Handling Fees represents the first time that the DOH has adjusted the handling fees since the Program's inception in 2005. Due to the ongoing changes in costs, operations, and recycling markets, the DOH intends to make annual adjustments to the handling fee in future years. The final task of the Study of DBC Handling Fees was to develop a methodology that would allow the DOH to: 1) annually evaluate handling fees; 2) determine the extent of adjustment needed (if any), and; 3) implement the appropriate adjustment tool(s). Below, we summarize the results of Crowe's evaluation.

Crowe's research for this task focused on identifying economic indicator metrics that reflect key CRC cost categories, developing a model to calculate an annual adjustment to handling fees based on these indicators, and finally to evaluate whether and when to next conduct a fiscal survey of CRCs to determine costs of recycling.

Handling Fee Adjustment Model

Crowe developed the Handling Fee Adjustment Model (Model) as an Excel-based tool for the DOH to annually review key indicators representing CRC cost categories and determine whether those indictors have changed significantly enough to warrant an upward adjustment in handling fees. There are six potential adjustment factors in the model:

- Wage index
- Minimum wage adjustment
- Cost of living adjustment (COLA)
- Health Care adjustment
- Shipping adjustment
- Fuel adjustment.

In late 2019 or early 2020, the DOH will identify the most current metric for each of the indices and enter these metrics into the Model. With the exception of the shipping adjustment, all of the indices are available on government web pages. In order to determine a potential shipping adjustment, Crowe has prepared a short on-line survey for processor CRCs. The DOH may distribute the survey in late 2019.

Exhibit 6-3
Adjustment Factors for Recycling Cost Components

Recycling Cost Component	Applicable Adjustment
Direct Labor	Wage Index, Minimum Wage, or COLA
Indirect Labor	COLA or Health Care
Off-Island Transportation	COLA, Shipping, or Fuel
Inter- and On-Island Transportation	COLA or Fuel
All Other Costs	COLA

The Model will determine which, if any, indices to apply to the appropriate percentage of the current handling fee. For example, 42 percent of the 3-cent aluminum handling fee supports direct labor (1.26 cents per container). If the minimum wage were to increase from $10.10 in 2018 to $12 in 2020 (a 16 percent increase), the Model applies that 16 percent increase to 1.26 cents, resulting in a new labor cost per container of 1.46 cents.

The Model takes the highest relevant adjustment factor for each cost component to apply to the relevant portion of costs specific to each of the three major material types. **Exhibit 6-3** summarizes the cost factors and components they apply to within the Model. If any adjustment factors are greater than the COLA, the model will apply them to the relevant cost component. The default adjustment is the COLA, based on the Consumer Price Index for Urban Hawaii.

Once all of the relevant adjustment factors are entered into the Model, the Model calculates the potential increases to handling fees for each material type. The DOH rounds handling fees to the nearest half-cent. For example, if the adjusted aluminum cost went from 3-cents to 3.1-cents, the DOH could leave the handling fee at the current rate. If the adjusted aluminum cost went from 3-cents to 3.4 cents, the DOH could increase the handling fee to 3.5-cents.

Handling Fee Adjustments in Future Years

The Model, including input from the shipping cost survey provides a mechanism for the DOH to estimate likely increases in CRC costs to recycle annually. This approach provides a means to determine the need to adjust handling fees as long as there are no significant changes to the industry or economic climate. Factors that could result in more significant changes in CRC costs to recycle include, but are not limited to:

- Shifts in the mix of beverage containers sold (container types and/or beverages)
- Shifts in recycling markets and the availability of end-use markets
- Increase or decrease in the number of CRCs operating in the State or in specific regions
- Shifts in the number of processor or non-processor CRCs
- Increase or decrease in recycling rates for one or more DBC materials
- Other changes in the beverage or recycling industries
- Recycling or solid waste policy and program changes
- Significant shifts (positive or negative) in economic indicators such as unemployment and household income.

There is no formula for when changes in these factors could lead to changes in the cost of recycling DBC beverage containers. Given the dynamic state of recycling and the economy, it is likely that within two to three years of the initial study, there will have been enough change in one or more of these factors to warrant a new survey of CRC costs to recycle. We recommend that the DOH conduct a Study of DBC Handling Fees within two years of the initial study, and every two to four years subsequently, depending on the extent of changes to the industry and the economic climate.

[This page intentionally left blank.]