

R. W. BECK  
City and County of Honolulu  
**CURBSIDE RECYCLING PILOT PROJECT  
EVALUATION REPORT**  
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# Section 1

## INTRODUCTION

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The City and County of Honolulu Department of Environmental Services (ENV) retained the firms of R. W. Beck, Hastings and Pleadwell and SMS Market Research to assess the viability of a curbside collection program for mixed recyclables and green wastes from single-family homes in Honolulu. A key component of this analysis was a four-month pilot program (the Program) for approximately 11,000 homes in the community of Mililani.

Throughout the Program, households in the pilot area maintained their current twice-per-week refuse collection schedule, with an additional recycling collection day scheduled on the day following the first refuse day. Green wastes and mixed recyclables were collected on alternating weeks (every other week by material). Households had the option to (i) alternate usage of their existing gray refuse cart between green wastes and mixed recyclables collection and refuse, or (ii) request delivery of a green cart to use for the mixed recyclables and green wastes, leaving the gray cart dedicated to refuse collection.

With short lead time, the ENV was tasked with launching a public education campaign to support the four-month Mililani Curbside Recycling Pilot. Based on other cities' reporting that more public education and outreach were needed as part of launching a curbside recycling program, the campaign attempted to reach the target audience in a variety of ways.

The campaign started with a formal press conference announcing the pilot program. Coverage from the announcement was sustained through relationships with all reporters identified with the issue. Expanded follow-up coverage provided specific details that illustrated how household behaviors hindered or helped with recovery rates.

An attention-getting, but reader-friendly, direct mail piece providing detailed participation instructions and new pickup schedules was sent to Mililani households in advance of the Program launch date. ENV staff reinforced these efforts by engaging Mililani community leaders and working with smaller Mililani media outlets (*Mililani Town Association Newsletter*, *Ka Nupepa*). Presentations were made to all Mililani neighborhood boards, and educational materials were distributed.

Mililani households were greeted curbside by City employees wearing special issue "Opala Team" t-shirts. The brightly colored shirts made it easy for residents to identify and approach team members and ask questions about participating in the Program. The uniforms also served to build team identification among City employees tasked with managing the Program and making themselves available as a resource to the community.

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The Refuse Division's Web site [www.opala.org](http://www.opala.org) was developed to be a resource to reporters covering the issue and to Mililani residents looking for instructions. The site also solicited feedback from participants for consideration.

After residents were provided with the opportunity to see how much of their household waste was recycled versus how much was left for disposal, they were asked to try a once-per-week refuse collection, with the option of requesting a second-day refuse collection.

Recyclables in the Program were collected single-stream rather than at the curb due to the following reasons:

- **Compatibility with the existing system** – Honolulu has implemented an automated system for collecting refuse. By implementing a single-stream recycling system, Honolulu will be able to use the same type of vehicles for both programs rather than purchasing a separate fleet for collecting recyclables.
- **Higher participation and recovery rates** – As shown in Table 1.1, the vast majority of communities that have converted from a source-separated to a single-stream recycling system experienced a significant increase in both participation and recovery rates
- **Reduced collection costs** – Collection costs typically comprise 50 percent of the annual expenditures for solid waste management systems<sup>1</sup>. By using automated vehicles to collect and transport the recyclables, Honolulu will be able to reduce collection costs through increased efficiency. These lower collection costs typically off-set the higher processing costs associated with single-stream systems. Honolulu experienced these net program savings during their 1990 recycling pilot program. The 1990 Kailua Curbside Pilot Project evaluated a curb-sort system vs. a commingled system. In the curb-sort system, 5,000 households were given three bins to sort glass, plastic, aluminum and newspaper, which were sorted further into six bins on the collection truck – green glass, clear glass, brown glass, plastic, aluminum, newspaper. In the commingled system, 5,000 households were given reusable bags for their mixed recyclables, which were collected in a front-loading packer truck, bag and all. The curb-sorted materials were delivered to the Kapaa Transfer Station and deposited into separate roll-off bins, then transferred to the recycling company. The bags of mixed recyclables were delivered to the recycling facility, where the bags were opened and the material sorted by type. The curb-sorted material generated revenue to the City. The commingled material incurred a processing cost. However, based on data from ENV, the collection costs associated with curb-sorting were significantly higher than commingled collection, resulting in higher overall net operating costs -- \$463/ton vs. \$265/ton.

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<sup>1</sup> 2001 *Managing Recycling Systems Workbook*, Solid Waste Management Association of North America

<sup>2</sup> Data provided by the City and County of Honolulu Department of Environmental Services

- **Decreased Litter** – Source-separated programs typically use bins without lids for containing the recyclables at the curb. Due to the lack of lids, lighter weight recyclables can cause litter problems if not properly contained. In a single-stream system, carts with lids are used, which reduces litter problems.

**Table 1.1**  
**Source-Separated at the Curb versus Single-Stream Collection Diversion and Participation Rates<sup>1</sup>**

Community	Change in Tons Recycled When Single-Stream Was Implemented	Change in Participation Rate When Single-Stream Was Implemented	Notes
San Diego, CA	Average pounds per household ↓ 4.4%	Setout rate ↑ 12% (From 47% to 59%)	<ul style="list-style-type: none"> <li>■ Collection frequency decreased from weekly to every other week.</li> <li>■ Converted from three-bin system to 95-gallon carts.</li> <li>■ Previous program only covered one-third of the City, which had high participation. When converted to single-stream, more households added to program, including neighborhoods with poor participation.</li> </ul>
Fresno, CA	↑ 260%	↑ 16% to 60%, depending on route	<ul style="list-style-type: none"> <li>■ Frequency of collection did not change.</li> <li>■ Increased education paired with conversion from two-bin to one cart system.</li> <li>■ Converted from two-bin system to 96-gallon carts.</li> </ul>
Brooklyn Park and Hennepin Recycling Group, MN	↑ 18% in Brooklyn Park; ↑ 14% in HRG communities	Setout rate ↑ 25% in Brooklyn Park; ↑ 21% in HRG (From 46% and 50%, respectively, to 71% in both)	<ul style="list-style-type: none"> <li>■ Converted from one bin with a curb sort system to a one-bin, single-stream system.</li> <li>■ Reduced frequency of collection from weekly to every other week.</li> </ul>
Plano, TX	↑ 3%	Setout rate ↑ 15% (From 56% to 71%)	<ul style="list-style-type: none"> <li>■ Converted from 96-gallon split-cart to 96-gallon single-body cart.</li> <li>■ Frequency of collection was reduced from weekly to every other week; however the City is considering going back to weekly collection.</li> </ul>

Community	Change in Tons Recycled When Single-Stream Was Implemented	Change in Participation Rate When Single-Stream Was Implemented	Notes
Richmond, VA	↑14%	Average setout rate ↑ 1.5% (From 21.5% to 23%)	<ul style="list-style-type: none"> <li>■ Frequency of collection (every-other-week) – was not changed.</li> <li>■ Use of 18-gallon bins – was not changed.</li> <li>■ Recyclables were no longer source-separated at the curb.</li> </ul>
Virginia Beach, VA	↑ 280% (From 9,500 tons per year to 36,500 tons per year)	Average setout rate ↑ 21% (From 55% to 76%)	<ul style="list-style-type: none"> <li>■ Frequency of collection did not change (every other week).</li> <li>■ Converted from 18-gallon bin to 95-gallon carts.</li> <li>■ Materials were added to program when converted to single-stream, including: #3 - #7 plastic bottles, magazines, chipboard, and office paper</li> <li>■ Customer base did not change.</li> </ul>

<sup>1</sup> Data has not been confirmed by actual field observations

As shown in Table 1.2, communities that convert from source-separated to single-stream recycling do experience some increase in their contamination rates. However, when the increase in diversion quantities is considered, most communities achieve a net increase in the quantity of recyclables recovered.

**Table 1.2**  
**Source-Separated at the Curb versus Single-Stream Collection Contamination Rates**

Community	Change in Contamination Rate When Single-Stream Implemented	Contamination Rate
San Diego, CA	↑ By an unknown amount (First quarter 2002 residue rate is 6.1%)	6%
Brooklyn Park and Hennepin Recycling Group, MN	Relatively unchanged	3%
Plano, TX	↑ 15%	19%
Richmond, VA	Unchanged. It is 1% - 2%.	1%-2%
Virginia Beach, VA	↑ ≈14%	19%
Seattle, WA (North End)	↑ Slightly	3.9%

Another concern with single stream collection is the marketability of the processed recyclables. Single-stream collection may yield higher contamination rates for the materials entering the processing facility. However, technologies and processing techniques have resulted in facilities being able to successfully market most materials.



## Section 2 FINDINGS

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To estimate the responses and actions of Mililani households regarding a curbside recycling Program, three separate surveys were completed. The first survey was done in September 2003, before the implementation of the Program, and was used to gauge general attitudes and willingness to participate in the Program. The second survey was completed in December, during the Program, and was used to estimate the public's response to the Program after they had time to participate. The third survey was completed in late January, as the Program was wrapping up. The third survey was used to see how the attitudes and responses of the residents of Mililani had changed after having gone through the entire Program.

Each of the three surveys consisted of a sample size of 400 randomly selected households. The sample error of the sample taken is less than 5 percentage points at the 95 percent confidence level.

Throughout the duration of the Program, public opinion surveys were supplemented with daily field observations on three collection routes within Mililani. Each route consisted of 900 households and a daily count was conducted of the number of households that set out either a green or gray cart on their respective collection days for green wastes and recyclables. Each cart that was set out was manually inspected to gauge contamination levels. Contamination and composition of all materials collected in Mililani were tracked at both the recycling center and composting facility. The weight of each load was also recorded. All information was reviewed for accuracy and compiled into a database.

### Program Variables Evaluated

R. W. Beck assessed the impact of the following Program variables based on three months of actual Program data:

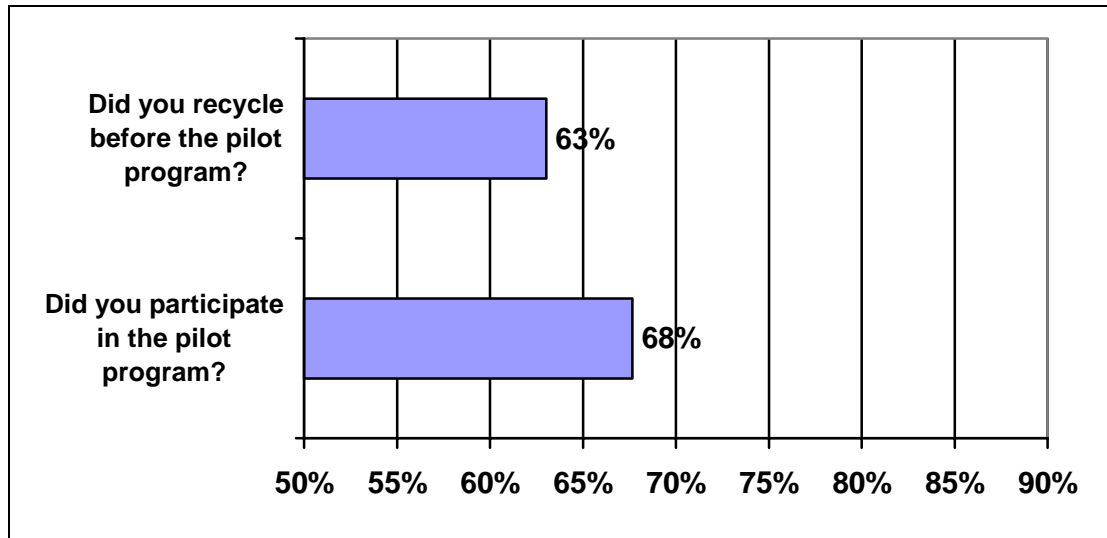
- Impact on recycling;
- Participation/setout rates and cart preference;
- Composition and contamination levels;
- Customer satisfaction; and,
- Willingness to reduce the frequency of refuse collection.

### Impact on Recycling

A recycling program such as the Mililani curbside program can affect recycling behavior in two distinct ways. It can increase the number of households that recycle, and it can also increase the frequency and amount of material that is recycled.

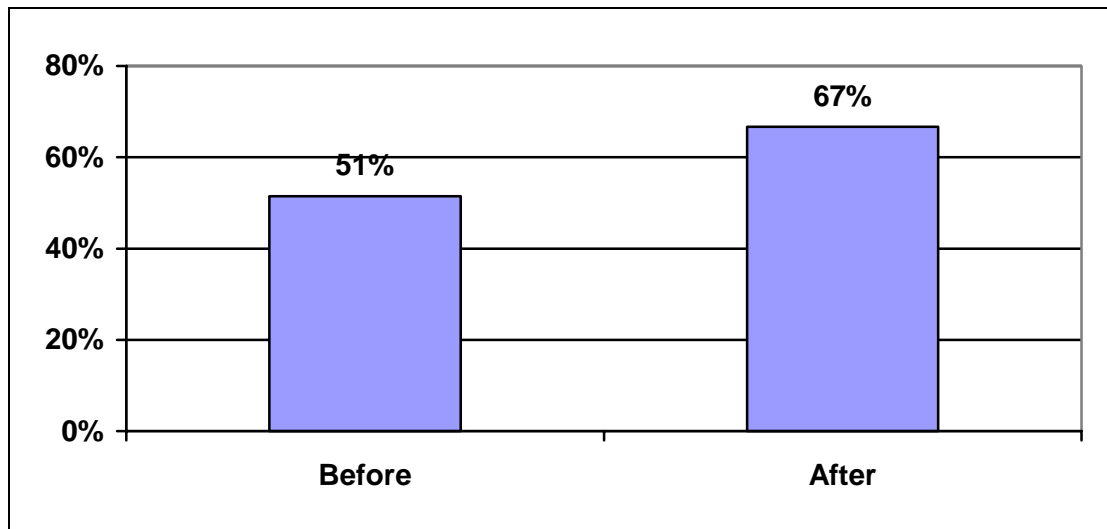
All Mililani residents living in single-family homes were eligible to participate in the Program. Of the 11,000 households in the Program 68 percent said they had actually participated in the Program.

Figure 2.1  
Recycling Behavior of Households in Single Family Homes



While 68 percent of eligible households participated in the Program, 63 percent of households said they recycled before the Program started. This seems to indicate that the Program did not influence many non-recycling families to start recycling. The majority of those that recycled previously did so through drop-off and school recycling programs.

Figure 2.2  
Households in Single Family Homes that Recycled at Least Once a Month



Nearly all households that participated in the Program recycled regularly, compared with only about two-thirds of households that recycled regularly before the Program. The increase in activity is likely due to the convenience of the curbside program; noting, however, that many of the households that recycled through the curbside service would likely have still recycled through other school and drop-off recycling programs, since they recycled before the curbside program began. Another potential factor influencing this behavior is the publicity the Program received from the City and the press.

## Participation/Setout Rates and Cart Preference

### Mixed Recyclables

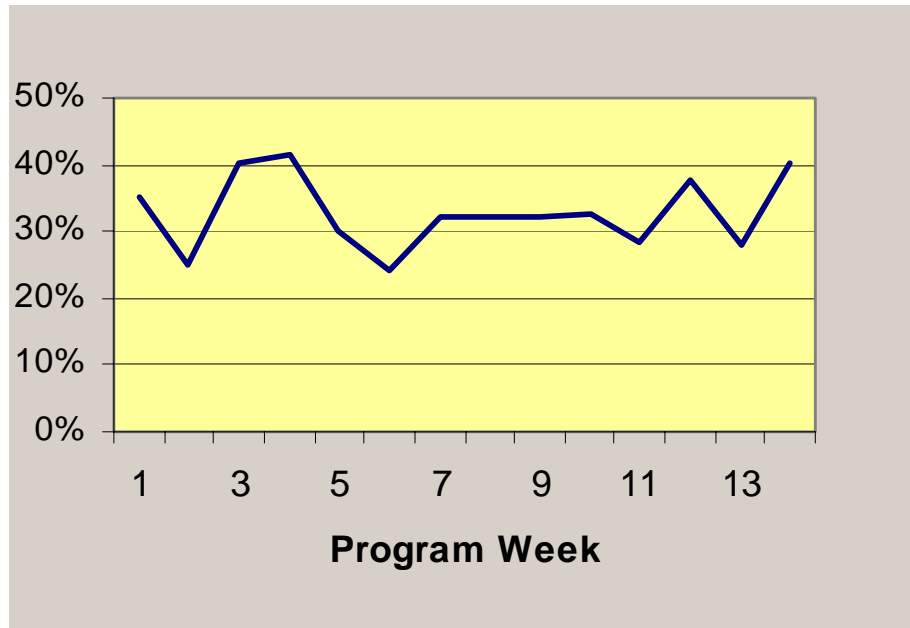
Program participants were permitted to set out the following mixed recyclables:

- Aluminum cans;
- Glass bottles and jars;
- Plastic bottles and jugs;
- Newspaper and,
- Corrugated cardboard.

In January 2004, approximately 400 homes were surveyed via telephone to determine participation rates. Based on this survey, it was determined that 68 percent of the households participated in the Program. However, this does not mean that 68 percent of the homes surveyed set out recyclables each week. Throughout the Program, setout rates were obtained from three collection routes. As shown in Figure 2.3, setout rates for these collection routes fluctuated between approximately 30 and 40 percent, and

the average setout weight per participating household on each collection day was 0.01 tons or 20 pounds.

Figure 2.3  
Set out Rates for Recyclables

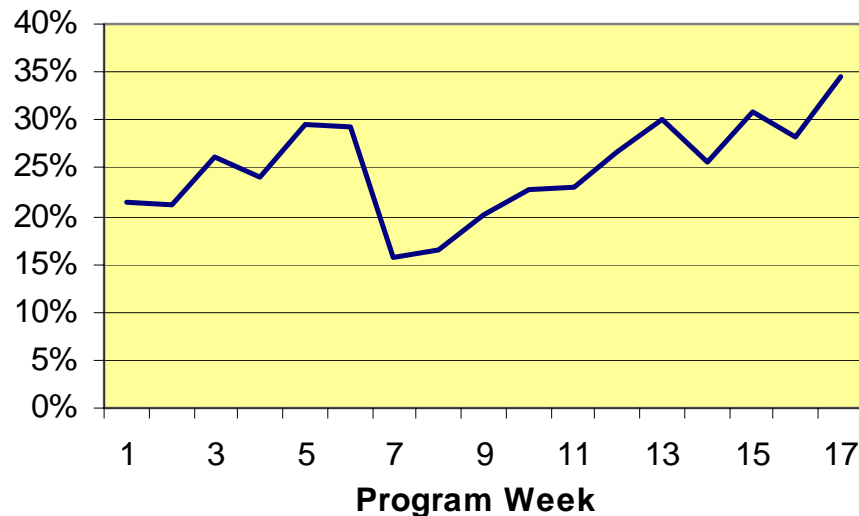


Thus, based on a household participation rate of approximately 68 percent and average setout weight of .01 tons, R. W. Beck estimates that about 24,700 tons of mixed recyclables would be collected annually island-wide, assuming that between 30 and 40 percent of the participating households would set out their recycling cart each collection day if collection were provided every other week. If Honolulu opts to implement a weekly collection program or provides separate containers for mixed recyclables and green wastes, participation rates and recycling quantities may increase.

### Green Wastes

Yard trimmings, leaves, grass clippings and Christmas trees were accepted in the green wastes program. Similar to recyclables, setout rates were obtained from three collection routes within the Program. As shown in Figure 2.4, setout rates fluctuated between approximately 15 and 35 percent; however, the data suggests that setout rates increased gradually as the study continued. The average setout weight per participating household on each collection day was 0.0233 tons or 46 pounds.

Figure 2.4  
Setout Rates for Green Wastes



Thus, using an estimated participation rate of 68 percent and average setout weight of 0.0223 tons per collection, R. W. Beck estimates that approximately 55,200 tons of green wastes would be collected annually island-wide and at least 30 percent of the households would set out their green wastes cart each collection day if collection were provided every other week. This compares to the collection of 12,500 tons under the City's current curbside green waste program. As with mixed recyclables, participation rates and consequently diversion quantities may increase if the collection frequency and/or container distribution is modified from that of the Program.

#### Cart Preference

As mentioned previously, the Program gave the participating households the option of requesting the delivery of a green cart to alternate between the mixed recyclables and green wastes, leaving the gray cart dedicated to refuse collection. Residents also had the option of rotating their existing gray cart and using it for refuse collection and recycling pickup on the appropriate days. Approximately 80 percent of participants chose to use the green cart.

When asked if they would be willing to pay for a green cart in the initial survey conducted, 30.1 percent of households said they would pay \$70 for a green cart, and an additional 17.9 percent would buy at the \$35 level. Another 11.5 percent were undecided.

Over 70 percent of households indicated that the cart was the right size for both green wastes and mixed recyclables, although a few thought that the cart was either too big or too small for their needs. However, based on verbal comments from Program participants and R. W. Beck's experience, a 96-gallon cart for mixed recyclables is most likely unnecessary if the recyclables are collected at least every other week. In

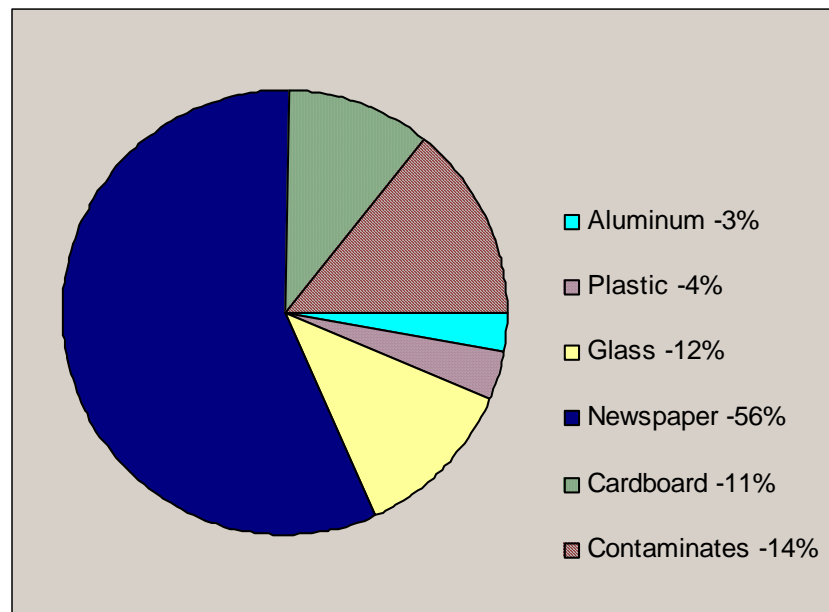
most communities, either a 64-gallon or 48-gallon cart is sufficient. For green wastes, R. W. Beck recommends the continued use of the 96-gallon carts.

## Composition and Contamination

### Mixed Recyclables

Although the composition of the mixed recyclables varied throughout the Program, newspaper was always the most significant portion of the collected materials, at an average of 56 percent by weight. The average composition of the mixed recyclables is provided in Figure 2.5. The next most significant component of the mixed recyclables waste was contaminants, at an average of 14 percent. During the Program, glass, aluminum and plastic accounted for 19 percent of the collected recyclables. In other communities, such as Portland, Oregon and San Francisco, California, that provide curbside recycling and have beverage container deposit systems, approximately 80 percent of the targeted containers are collected at the redemption center. Thus, Honolulu should anticipate a significant reduction in containers collected through the curbside program once Hawaii's deposit law is implemented in January 2005.

Figure 2.5  
Composition of Mixed Recyclables



Through its field observations, R. W. Beck determined that approximately 10 percent of the green carts were contaminated on green wastes collection day, and, on average, 7 percent of the green carts included contaminants on mixed recyclables collection day. By comparison, the contamination rate was approximately 30 percent for the gray carts. It should be noted that field crews were only able to inspect the portion of cart contents that could be viewed from lifting the lid, as they did not conduct a manual sort of the materials.

Although the average contamination rate of materials collected in the green carts was significantly less than that of the gray carts, contamination rates of green cart setouts increased throughout the duration of the Program. The contamination rates for gray cart setouts decreased throughout the Program, as Figures 2.6 and 2.7 illustrate. However, at the end of the Program, the contamination rate for the gray carts was still approximately 20 percent higher than that of the green carts. It should be noted that contamination rates in both the green and gray carts increased significantly during week 9. Week 9 followed the holidays, when no refuse and recycling collections were provided on December 25 and January 1 (Christmas Day and New Year's Day). It could be concluded that additional education would need to be conducted when regular collection schedules are disrupted. Again, if residents had additional carts, it could have alleviated the contamination rate during that time.

Figure 2.6  
Percent of Green Carts with Contaminates

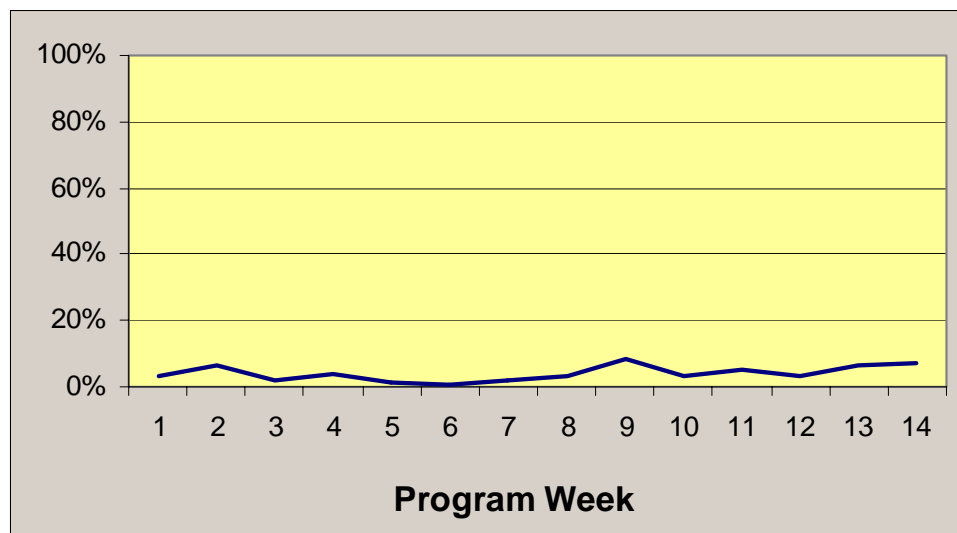
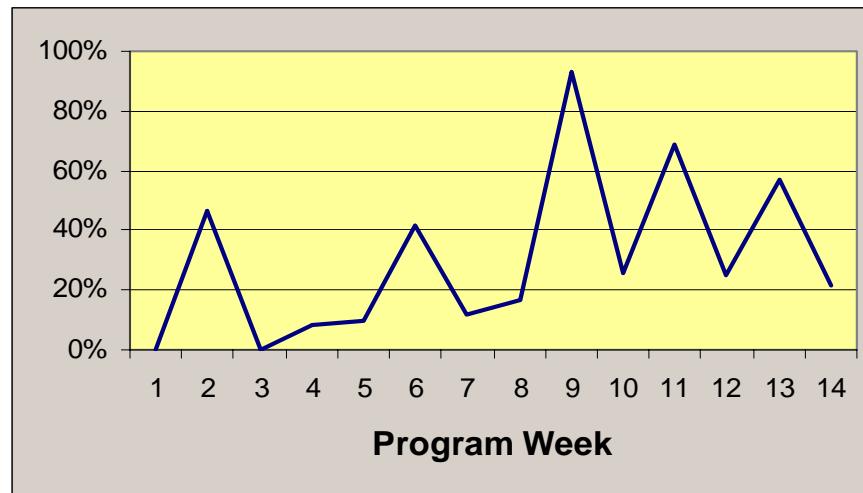


Figure 2.7  
Percent of Gray Carts with Contaminates



With respect to the type of contaminants in the carts, approximately 44 percent of the contaminated carts on mixed recyclable collection days contained green wastes. Approximately 32 percent of the contaminated carts contained bagged waste, which, when opened at the recycling facility, were shown to primarily contain green wastes. This indicates that residents were likely confused about which week was designated for mixed recyclables and which week was for green wastes, which was aggravated by rotating the same cart between mixed recyclables and green wastes.

In addition, permitting residents to place bagged materials in their carts prevents accurate field inspections. Honolulu should consider prohibiting this practice if the Program is implemented island-wide. The field survey data also indicates that only 24 percent of households bag their recyclables and green wastes, and 75 percent of those would continue participating at the same level if they were not allowed to bag. There was a small number of people who would either choose to not recycle certain items or to stop participating altogether if not allowed to bag recyclable materials. However, many of the households that bag their recyclables and green wastes during the Program did so because one cart was rotated between recyclables and green wastes. Thus, if specific carts for green wastes and recyclables were provided, fewer residents would be deterred from participating if “bagging” materials was prohibited.

### Green Wastes

Although the definition of “green wastes” for the Program included four items (yard trimmings, leaves, grass clippings and Christmas trees), the quantity of each one of these materials was not tracked. As with mixed recyclables, the contamination of green wastes was monitored both at the composting facility and in the field. Based on the results of manually sorting the green wastes at the composting facility, contamination rates averaged approximately 27 percent for incoming loads of green wastes. Similar to mixed recyclables, approximately 10 percent of the carts were considered contaminated, and approximately 60 percent of the carts that were classified as contaminated contained recyclables. In addition, the majority of bags that were opened at the composting facility contained recyclables. These observations



further support the previous conclusion that residents are confused by the alternating collection schedule for mixed recyclables and green wastes, and alternating the same cart for recyclables and green wastes makes it difficult to keep these materials from “cross contaminating” each other.

## Customer Satisfaction

As previously discussed, approximately 68 percent of survey respondents indicated that they participated in the Program. However, over 83 percent of survey respondents think Hawaii should have a curbside recycling program. When respondents were asked to indicate why they would not participate in a curbside recycling program, 31.8 percent of the respondents indicated that the reason they would not participate is “inconvenience.” The other responses, in order of their prevalence, are as follows:

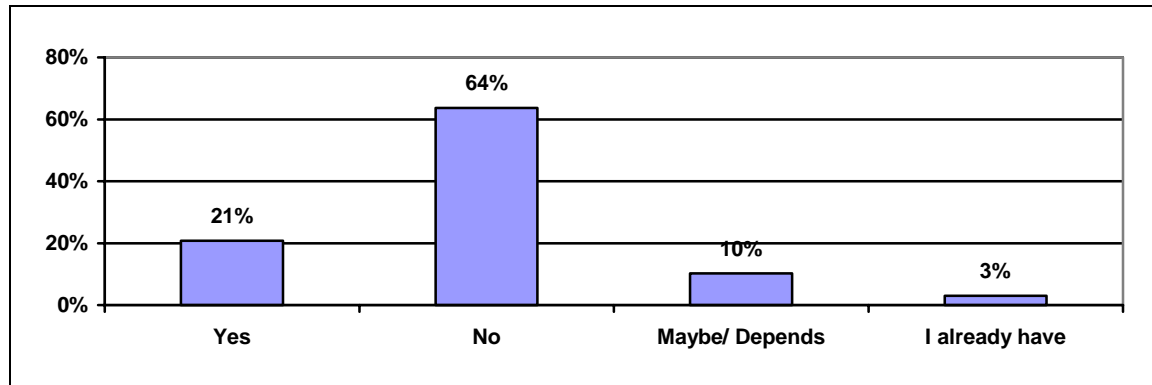
- Prefer to drop off - 15.9%;
- Other - 11.4%;
- Unsanitary, unsanitary - 11.4 %;
- Multi-family unit concerns - 9.1%;
- Don't know, refused - 9.1%;
- Not much trash now - 4.5%;
- Cost, need to pay - 4.5%; and
- Want to be paid - 2.3%.

## Willingness to Reduce Refuse Collection

One of the major issues with curbside recycling is the cost. Running the program either means paying for the extra day of collection each week, or reducing trash collection to one day per week. Mililani residents were asked a series of questions regarding how they felt about one-day refuse collection and added user fees.

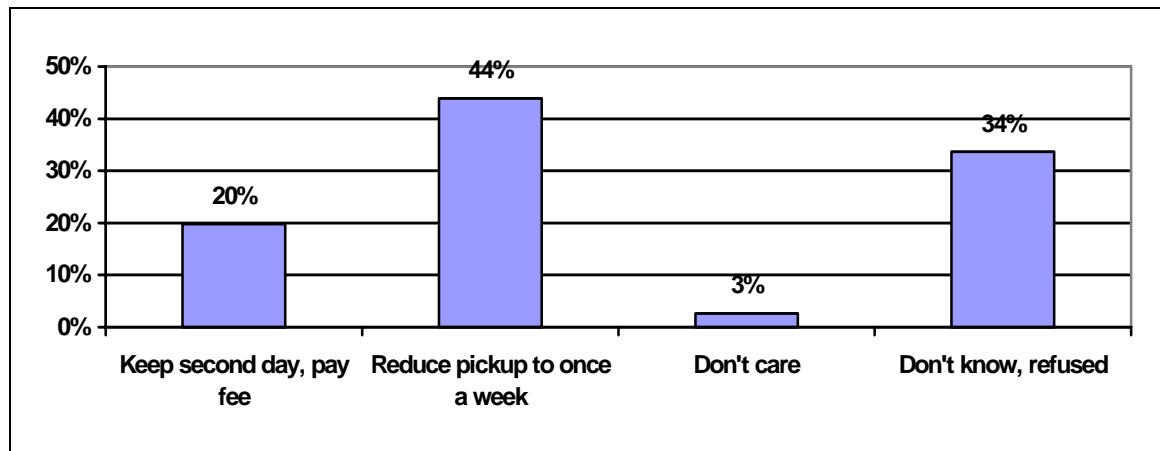
When simply asked if they would be willing to reduce trash pickup to once per week, a total of 21 percent of households said they were willing (3 percent said they already had reduced to one day).

Figure 2.8  
Willingness to Reduce Refuse Collection to Once per Week



Additionally, when asked to choose if the second day of trash pickup meant paying a fee, 44 percent then said they preferred to reduce pickup to once per week. A rather large group of people (34 percent) was not sure which they preferred.

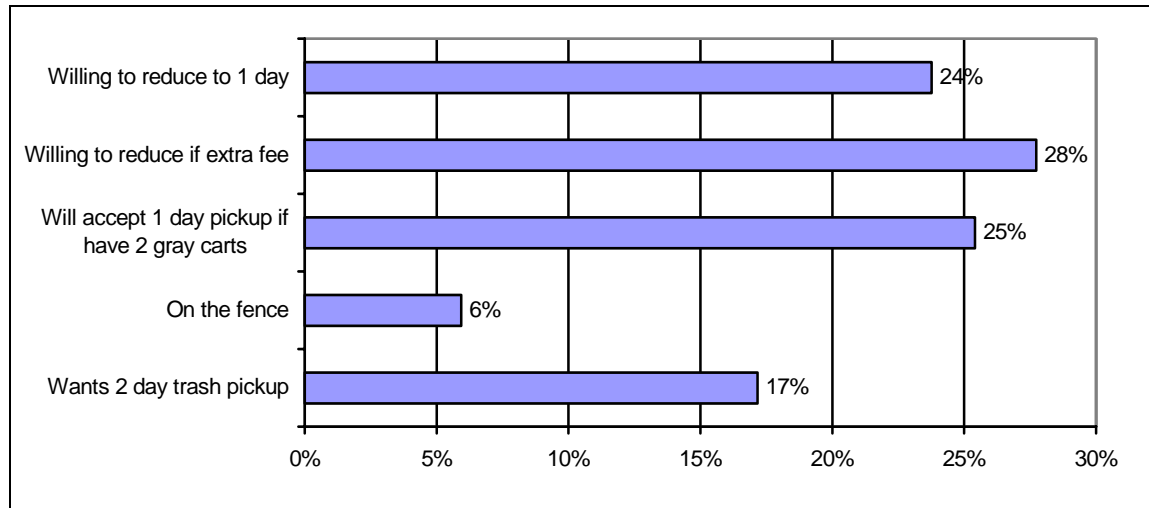
Figure 2.9  
Willingness to Pay a Fee for Second Day Trash Pickup



Further, households were asked if it would be acceptable to them if trash pick occurred once per week but they could have two gray carts to handle their weekly trash. Almost 58 percent of households said yes to that.

A summary analysis of willingness to accept once a week trash pickup is presented in Figure 2.10. The analysis shows that although only 24% of households were willing to reduce to one day if asked to, another 53% were willing if they either had to pay a fee for the extra day or they were given 2 gray carts to handle their weekly trash. Only 17% of people were unwilling to reduce to one day and willing to pay an extra fee for the extra day of trash pickup.

Figure 2.10  
Summary Analysis of Willingness to Accept One Day Trash Pickup



## Section 3 CONCLUSIONS

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- **Increasing the convenience of the curbside recycling program may yield higher participation rates.** The Program had a small effect on the number of households that recycle, increasing from about 63 percent to some 68 percent. However, 75 percent of the survey respondents to the initial survey said they would participate in a curbside recycling program; and 31.8 percent of the respondents indicated that the reason they did not participate in the Program was because it was inconvenient. The survey did not ask the respondent to define convenient, however, anecdotal evidence supports defining “inconvenience” as using the same cart for more than one material combined with alternating collection schedules and three separate collection days each week.
- **Participation and recovery rates may be increased by assessing some type of fee for refuse collection or mandating recycling.** Solid waste management systems that include an economic or regulatory incentive to recycle, such as a Pay-As-You-Throw program or strongly enforced mandatory recycling, incur participation rates that are 5 to 15 percent higher than in communities where there is no charge for refuse collection.
- **Overall, up to 77 percent of Mililani households are willing to reduce refuse collection to once per week, depending on the options made available to them.** For many, acceptance of once-per-week refuse collection schedule is dependent on households being given the option of using two gray carts for trash collection.
- **Approximately 80 percent of participants chose to use the green cart.** When asked if they would be willing to pay for a green cart in the first survey, 48 percent were willing to pay some level of fee for the cart. Another 11.5 percent were undecided. This further supports the conclusion that convenience is a stronger factor in determining willingness to participate than implementation of a reasonable cost for households that choose to recycle. The Program gave participating households the option of requesting the delivery of a green cart to alternate between the mixed recyclables and green wastes, leaving the gray cart dedicated to refuse collection. Residents could also rotate their existing gray cart and use it for refuse collection and recycling/green wastes collection on the appropriate days.
- **Based on Mililani participation and setout rates, an island-wide recycling program could capture 24,700 tons of mixed recyclables.** However, it should

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<sup>4</sup> *Variable-Rate or “Pay-As-You-Throw” Waste Management: Answers to Frequently Asked Questions.*  
Lisa A. Skumatz, Ph.D.

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be noted that the four drop-off sites serving Mililani experienced a 50 percent decrease in recyclables collected during the Program. In areas of the island that have a higher number of multi-family households, the drop-off sites may not experience this level of reduction.

- **The added convenience of curbside collection increased recycling activity amongst householders who already recycle.** The quantity of material that was diverted from the Mililani drop-off program accounted for 28 percent of the recyclables collected in the curbside program. Thus, while the curbside program will only slightly impact converting non-recyclers to recyclers, curbside collection will measurably increase the quantity of recyclables that active recyclers set out for collection
- **Hawaii's beverage container deposit program may impact curbside collection by decreasing the quantity of containers that are set out for curbside collection, as well as providing additional revenue from their deposit value.** In other communities, such as Portland, Oregon and San Francisco, California, that provide curbside recycling and have beverage container deposits, approximately 80 percent of the targeted containers are collected at the redemption center. Thus, Honolulu should anticipate a significant reduction of the containers that are collected through the curbside program once Hawaii's beverage container deposit law is implemented in January 2005. On the other hand, Portland estimates that 8% of deposit containers are collected through curbside, while San Francisco collects 14%. If Honolulu were to capture 10% of the Hawaii deposit containers through curbside, the ENV estimates that the additional deposit value of five cents per container could potentially contribute \$2 million to off-set processing costs.
- R. W. Beck estimates 55,200 tons of green wastes would be collected annually island-wide.
- **Field observations indicate that residents were confused about which week was designated for mixed recyclables and which week was for green wastes.** An average of 7 percent of the green carts included contaminants versus approximately 30 percent of the gray carts. With respect to the type of contaminants in the carts, approximately 44 percent of the contaminated carts contained green wastes. Approximately 32 percent of the contaminated carts contained bagged waste, which, when opened at the recycling facility, were shown to primarily contain green wastes. The recycling processor reported that 14 percent of the collected recyclables were contaminants, the second largest component of the recyclables stream by weight. Based on other communities that have implemented single-stream contamination rates could be reduced to 5 to 10 percent.

Based on the results of manually sorting the green wastes at the composting facility, contamination rates averaged approximately 27 percent for incoming loads of green wastes. Similar to mixed recyclables, approximately 10 percent of the carts were considered contaminated, and approximately 60 percent of the carts that were classified as contaminated contained recyclables. In addition, the

majority of bags that were opened at the composting facility contained recyclables. These observations further support the previous conclusion that residents are confused by the alternating collection schedule for mixed recyclables and green wastes, and the rotating of carts for containing both recyclables and green wastes. These findings also suggest that the practice of bagging materials should be prohibited.

Addressing the contamination of green wastes should be of particular concern since the tipping fee for contaminated green wastes is twice as much as the tipping fee for “clean” green wastes.

## Section 4 RECOMMENDATIONS

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If Honolulu implements an island-wide curbside collection program for recyclables and green wastes, R. W. Beck recommends that the system that was offered in the Mililani pilot program be modified to cost-effectively address:

- Convenience;
- Contamination and,
- An economic and/or regulatory incentive to recycle.

Therefore, we propose the following four scenarios, in addition to the existing system, for consideration:

**Status Quo** – Householders are provided with twice-per-week refuse collection. Householders can set out bagged green wastes twice per month. All householders have access to drop-off recycling. There are approximately eighty drop-off recycling sites throughout Oahu.

**Scenario 1** –Householders would be provided with once-per-week refuse collection, but no second-day refuse collection. Householders could set out recyclables and green wastes that would be collected on their “second collection day” every week. All householders would be provided with a gray cart for refuse, a green cart for green wastes and a blue cart for recyclables. Island-wide drop-off recycling would be retained, but evaluated to determine the number of sites that would be required.

**Scenario 2** –Householders would be provided with twice-per-week refuse collection. Householders could set out recyclables once every other week and green wastes the alternating week. All householders would be provided with a gray cart for refuse, a green cart for green wastes and a blue cart for recyclables. Island-wide drop-off recycling would be retained, but evaluated to determine the number of sites that would be required.

**Scenario 3** –Householders would be provided with twice-per-week refuse collection. Householders would set out green wastes on their second collection day, every other week. All householders would be provided with a gray cart for refuse and a green cart for green wastes. There would be no curbside collection of recyclables. Island-wide drop-off recycling would be retained.

**Scenario 4** –Householders would be provided with twice-per-week refuse collection. Householders would set out green wastes on a third day. All householders would be provided with a gray cart for refuse and a green cart for green wastes. There would be

no curbside collection of recyclables. Island-wide, drop-off recycling would be retained. For each of the four scenarios, participation

Table 4.1 provides a financial and diversion impact analysis of these scenarios.

**Table 4.1  
Financial and Diversion Impact Analysis**

Scenario	Total Annual Program Costs <sup>1</sup>	Cost Per Household Per Month	Mixed Recyclables Collected Via Drop-Off (TPY)	Mixed Recyclables Collected Via Curbside (TPY)	Green Wastes Collected Via Curbside (TPY)	Diversion Rate for Residential Waste <sup>2</sup>
Status Quo	\$37,934,415	\$22.58	12,000	0	12,500	8.42%
Scenario 1	\$42,184,102	\$25.11	6,000	33,248	61,000	35.67%
Scenario 2	\$42,910,071	\$25.54	6,000	29,248	56,000	31.01%
Scenario 3	\$38,737,041	\$23.06	12,000	0	56,000	23.36%
Scenario 4	\$38,664,671	\$23.01	12,000	0	46,000	19.59%

<sup>1</sup> These cost estimates do not include debt service or direct assessments to the solid waste fund

<sup>2</sup> With the exception of Status Quo, all diversion rates assume mandatory participation

As shown in Table 4.1, Scenario 1 yields the highest diversion rate but Scenario 2 is the most expensive to implement. This is due to the elimination of a second refuse collection day under Scenario 1. A summary of the financial and performance analysis is provided in Attachment A.

## Evaluation Criteria

To assist Honolulu determine which Scenario is the most appropriate to implement on an island-wide basis, Table 4.2 summarizes the strengths and weaknesses of each scenario based on the following evaluation criteria:

- Cost;
- Diversion;
- Convenience to the customers; and
- Lack of material contamination.

<sup>6</sup> These cost estimates do not include debt service and direct assessments to the solid waste fund.



**Table 4.2  
Evaluation Criteria Analysis**

Scenario	Scenario Summary	Strengths	Weaknesses
Scenario 1	Once weekly refuse Weekly recycling Weekly green wastes Three carts Drop-off recycling	<ul style="list-style-type: none"> <li>▪ As shown in Table 4.1, Scenario 1 would yield the highest diversion rate.</li> <li>▪ Householders would be provided with separate containers for mixed recyclables, green wastes and refuse, and have weekly collection of these materials. This system should substantially reduce contamination due to weekly collection and dedicated carts.</li> <li>▪ With weekly curbside collection, this would be the most convenient scenario.</li> </ul>	<ul style="list-style-type: none"> <li>▪ In Scenario 1, householders would only receive once-per-week refuse collection.</li> <li>▪ This reduction in refuse collection could increase contamination rates.</li> <li>▪ Scenario 1 is the second most expensive scenario.</li> <li>▪ Some householders may not have space for three carts.</li> <li>▪ Scenario 1 will require the conversion of private recyclables processing facilities, which could take six months.</li> </ul>
Scenario 2	Twice weekly refuse Every other week recycling & green wastes Three carts Drop-off recycling	<ul style="list-style-type: none"> <li>▪ As shown in Table 4.1, Scenario 2 would divert over 30 percent of the residential waste stream, the second highest rate.</li> <li>▪ Householders would be provided with separate containers for mixed recyclables, green wastes and refuse. This system should reduce contamination due to dedicated carts for each type of material.</li> <li>▪ Householders will continue to receive twice-per-week refuse collection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Scenario 2 is the most expensive scenario due to retention of twice weekly refuse collection and increased costs to process recyclables.</li> <li>▪ With alternating collection weeks for mixed recyclables and green wastes, collection schedule confusion will continue to exist especially following weeks when their collection service is interrupted.</li> <li>▪ Some householders may not have space for three carts.</li> <li>▪ Scenario 2 will require the conversion of private recyclables processing facilities, which could take six months.</li> </ul>
Scenario 3	Twice weekly refuse Every other week green wastes (on second	<ul style="list-style-type: none"> <li>▪ As shown in Table 4.1, Scenario 3 would only require approximately \$800,000 to implement</li> </ul>	<ul style="list-style-type: none"> <li>▪ Scenario 3 will not include the curbside collection of mixed recyclables, so diversion rates are lower than they are in</li> </ul>

## Recommendations

Scenario	Scenario Summary	Strengths	Weaknesses
	<p>wastes (on Second trash day) Two carts Drop-off recycling</p>	<p>over the Status Quo.</p> <ul style="list-style-type: none"> <li>▪ Scenario 3 will increase the quantity of green wastes that are diverted from disposal by approximately 44,000 tons per year.</li> <li>▪ Householders would be provided with separate cart for green wastes, and with no recyclables collection to cause confusion, this system will be convenient and should reduce contamination due dedicated carts for refuse and green wastes.</li> <li>▪ A private processor currently has the ability to accept and compost the increased quantity of green wastes.</li> <li>▪ Householders will continue to receive twice-per-week refuse collection.</li> </ul>	<p>Scenarios 1 and 2.</p> <ul style="list-style-type: none"> <li>▪ Residents that wish to recycle will have to take their recyclable materials to a drop-off center, which is less convenient than curbside collection.</li> <li>▪ With every other- week -collection, recovery rates may be lower than a weekly collection system.</li> </ul>
Scenario 4	<p>Twice weekly refuse Every other week green wastes (not on trash day) Two carts Drop-off recycling</p>	<ul style="list-style-type: none"> <li>▪ As shown in Table 4.1, Scenario 4 is the least expensive to implement.</li> <li>▪ A private processor currently has the ability to accept and compost the increased quantity of green wastes.</li> <li>▪ Householders will continue to receive twice-per-week refuse collection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Scenario 4 yields the lowest diversion rate.</li> <li>▪ Scenario 4 would require residents to set out their green wastes on a third collection day every other week, which is less convenient than “same day” collection.</li> <li>▪ Residents who wish to recycle will have to take their recyclables to a drop-off center, which is less convenient than curbside collection.</li> </ul>

Based on this analysis, R. W. Beck believes that Honolulu should, at this time, implement Scenario 3, which would provide residents with twice-per-week refuse collection and separate green wastes collection on their second refuse day. Under this scenario, all householders would be provided with a gray cart for refuse and a green cart for green wastes. By providing this service for green wastes, R. W. Beck estimates that Honolulu will increase the quantity of green wastes collected from 12,500 to 56,000 tons per year. In addition, a processing facility that could compost this quantity of green wastes is already operational, which means Scenario 3 could be successfully implemented during 2004.

The cost-effectiveness of curbside collection of recyclables is not as strong as it is for the curbside collection of green wastes. If Honolulu is to move forward with this component of a curbside program, it must be based on the desire to further increase diversion by providing convenience to recycle and strong public support. In addition, the timetable for rolling out the program must allow sufficient time for existing recyclables processing facilities to complete modifications to adequately process the recyclables collected curbside. Based on R. W. Beck's experience, such facility modifications could require at least six months to complete before recyclables collected island-wide could be accepted and cost-effectively processed.