Envisioning a World with Less Plastic: Determining the Feasibility of a Reusable Takeout Container System in Hilo, HI

Interactive Qualifying Project

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Submitted to:

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Abstract

The landfill in Hilo, Hawai`i has closed, leaving all waste generated in the area with nowhere to go, besides Kona's landfill. The majority of the restaurants in the Hilo area have a strong takeout culture. Most restaurants use single-use takeout containers, which contribute largely to the solid waste produced in Hilo. This study was conducted to determine the feasibility of implementing a reusable takeout container system in Hilo. Restaurants in Hilo were interviewed and the public was surveyed through an online form. Using the data that was collected, a business plan for the County and pamphlets for the restaurant owners and public were developed to aid in the start-up of a reusable takeout container system to decrease the amount of plastic waste in landfills.

Executive Summary

Plastic waste disposal is an immense problem our world faces today, and it is a problem which is only growing. With so many plastics being disposed of daily around the globe, the items that do not go to a landfill end up in our oceans, harming the ecosystems and poisoning the wildlife. This issue is especially prevalent on islands like Hawai`i, where the land is surrounded by ample oceans for plastic waste to be deposited, and landfill space is limited due to land size constraints. The goal of this project was to limit the amount of plastic waste that is disposed of on Hawai`i's Big Island by determining the feasibility of a reusable takeout food container system.

In order to achieve this goal, we established a number of objectives. Our first objective was to identify stakeholder concerns surrounding the implementation of a program like this. To complete this objective, we interviewed restaurant owners and managers local to Hilo and surveyed Hilo's public. Additionally, we reached out to experts who have experience with developing reusable container systems and with the laws and regulations that may affect a reusable container system's implementation. Our second objective was to analyze successful reusable container systems in similar sized cities to Hilo, HI. In order to do this, we first characterized Hilo by its population using census data. The reusable container system we found most similar to one which would be implemented in Hilo was Durham GreenToGo, who we contacted for more information regarding the logistics of getting their system up and running. Our third objective was to incorporate information gathered into information for consumers and restaurants and a business plan for the County of Hawai`i that is specific to Hilo, HI. To complete this objective, we created three deliverables, which consisted of a pamphlet for the public, a report for restaurant owners, and a business plan for the County of Hawai`i. The pamphlet highlighted key information about how a reusable container system works, and can be seen in the figure below.

Figure 1. Final deliverable: Pamphlet for the public

The report for restaurant owners detailed how a reusable container system works and what its effects on a restaurant would be. This report can be seen in Appendix L. The business plan laid out our recommended steps to implementing a reusable container system in Hilo and can be seen in Appendix M.

From our data, we learned that restaurant owners and managers had four main concerns for the implementation of a reusable container system. Firstly, they were concerned that the additional costs of the system would be prohibitive to their participation in it. Next, they were concerned that the containers would not be adequately stocked in their restaurants for unexpected large orders. Thirdly, they were concerned that they would be held liable if a container was cleaned improperly and made a customer sick. Finally, they were concerned that the system would not be able to adequately track customers, thus leading to people receiving reusable containers when they are not part of the program. Additionally, in surveying the public, we learned that 74.8% of the 142 respondents would be willing to opt into a reusable container system if one came to Hilo.

In interviewing experts, we learned from Recycle Hawai`i that as a general rule, the public of Hilo is very involved when it comes to green initiatives. From Durham GreenToGo, we learned that a

reusable container system cannot run without a staff to upkeep it. Finally, from the County of Hawai`i Department of Health, we learned about laws and regulations regarding food safety that would affect the implementation of a reusable container system.

These results guided our recommendations for the County of Hawai`i. In our business plan, we recommended that Hilo's reusable container system has a small staff to run it and a third-party washing and sanitizing station somewhere in the city. We also recommended that the system has a mobile application for users to interact with as part of their experience with the reusable container system. Additionally, we recommended that the Hilo reusable container system has container dropoff locations dispersed throughout the city for customer convenience.

After conducting these interviews and surveys and developing these three deliverables, the team concluded that a reusable container system will be feasible in Hilo, HI if stakeholders in the system are educated enough about the system. In order for this system to work, consumers and restaurant owners and managers need to understand what their roles are in a reusable container system. This means there needs to be educational materials provided by reusable container system founders that will enlighten the stakeholders regarding how the reusable container system works.

Additionally, there are many unknowns still present in the implementation of a reusable container system in Hilo. These unknowns are outlined in the business plan, which can be seen in Appendix M.

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1.0 Introduction

It is no question that a growing problem all over the world is our excessive production of waste materials. Plastics and other products that are very slow to biodegrade are sent by tons to landfills daily, polluting our environment and sending many items into our oceans. This problem is especially prevalent on small islands like Hawai`i, where there are only so many places waste can go, meaning much of it ends up in the ocean. Additionally, what does not end up in oceans takes up valuable real estate in massive landfills. The County of Hawai`i is especially interested in this problem because the landfill in Hilo recently closed, leading to a drastic increase in the need for reduced waste on Hawai`i's Big Island (Edmond, 2019). The goal of this project is to determine the feasibility of a reusable takeout food service ware system in Hilo, HI to lessen the amount of plastic waste that is sent to Kona's landfill.

In this chapter, we present background material that is necessary to understand the global waste problem, and the waste problem specific to Hawai`i. We will discuss environmental problems that waste creates and dive deeper into the environmental problems caused specifically by plastic. We will then present information on the reusable container systems that exist today, including the logistics, and the laws and regulations that will affect a reusable container system specifically in Hilo, Hawai`i.

1.1 Waste Problems in the World

The Earth and the people that inhabit it are at a turning point; with every human creating waste, the landfill space required to get rid of it is dwindling. Globally, there are 2.01 billion metric tons of municipal solid waste (MSW) generated per year. *Figure 1* shows the total amount of MSW generated every five years from 1960-2013, which shows a drastic increase (US EPA, 2016).

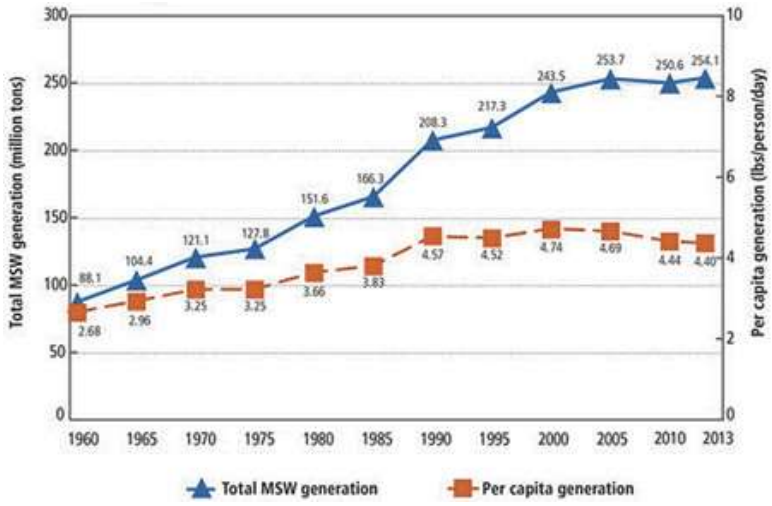


Figure 1. Total MSW Generation vs Per Capita Generation (US EPA, 2016)

On the islands of Hawai`i, the waste problem is amplified when compared to the mainland. The only place waste can be deposited is in the limited landfill space on the island. There are around 220,000 tons of waste processed on the Big Island per year (Hägg, 2019). There are only two landfills on the whole island, which are serviced by 22 transfer stations. One of the landfills is located in Hilo and it has just exceeded current state and federal capacity regulations. In 2019, the County of Hawai`i began the process to cover it with an impermeable plastic layer so it could be sealed off and closed for good. The Hilo landfill covers 40 acres and took 30 years to fill. The landfill on the west side of the island, in Kona, is 100 acres and has been open for 29 years. The amount of waste deposited in the remaining landfill is bound to increase as the Hilo landfill goes through the closure process. It could take 50 years for the west side landfill to fill up (Hägg, 2016).

Since Hawai`i has a considerable amount of landfill space left, a new waste management plan that combines new recycling initiatives with a plan to preserve what is left of the landfill could lead to a successful future of waste disposal.

1.2 The Problems with Plastic Waste

A type of plastic that is especially problematic in ocean ecosystems is expanded polystyrene (EPS). One of the most common applications of EPS is its use as single-use food takeout containers. In September 2017, the county government passed Bill 74 on the Big Island of Hawai`i to ban EPS food service ware. The public officials noted that these containers contributed heavily to local litter, which was negatively impacting the local wildlife. This law,

effective July 19, 2019, applies to all retail food establishments in the County of Hawai`i (County of Hawai‘i Plastic Bag Reduction Ordinance, 2019).

There is some controversy surrounding this bill, in that it still allows other kinds of plastic containers that cannot be recycled, like single-use No. 5 plastic (polypropylene), to be used in restaurants. This continued use of single-use No. 5 plastic containers, combined with the closing of Hilo’s landfill, contributes to the 500-600 tons of waste transported each day to the landfill in Kona (Cook Lauer, 2019).

The main problem with plastics such as polystyrene and polypropylene is that they decompose very slowly, so they last long in the environment and are extremely harmful to the Earth’s ecosystems. Over 50% of plastics produced are for single-use purposes, and less than 25% of those are recycled (Wright, Kirk, Molloy, & Mills, 2018). As shown in *Figure 2*, plastic is very slow to degrade, so when left out in the environment, some can remain there for over 500 years without decomposing.

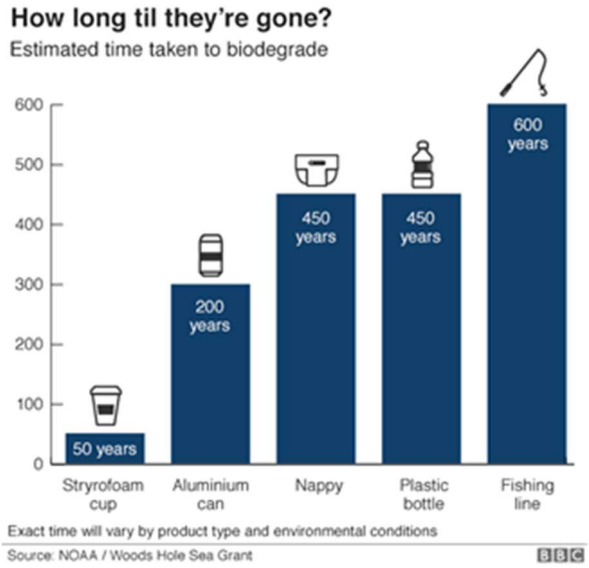


Figure 2. Time to Biodegrade for Different Types of Plastic Waste (NOAA & Woods Hole Sea Grant, 2017)

The ecosystems most affected by plastic pollution are the oceans. Food containers and packaging are the largest component of the solid waste stream and, including plastic bags, make up the largest component of marine debris. Over 100 million tons of plastic waste are in the oceans (Mallos & Leonard, 2019). There, plastics break down to microplastics that pose an even bigger problem, as they are easier for organisms to ingest. After ingestion, these plastics can have harmful physical and chemical effects on organisms (Shim & Thompson, 2015).

Marine plastic pollution has already negatively impacted over 275 species all over the world. The plastic debris injures and sometimes even kills fish, birds, and ocean mammals as a

result of suffocation, ingestion, starvation, drowning, entanglement, and infection (Clean Water Action, 2019).

The fact that Hawai`i is made of islands means that plastic waste in the state is even more of a concern than many other areas of the world. Hawai`i is home to coral reefs, many of which are now heavily contaminated with plastic, which clings to, sickens, and kills them. The chance of disease in coral reefs increases from 4% to 89% as soon as they encounter plastic. Aside from the coral reefs, seabirds and marine and land animals who ingest or are entangled in plastic waste in the ocean are being affected (Lamb, Willis, Fiorenza, et al., 2018).

1.3 Waste Reduction Efforts and the Role of Reusable Containers

Due to the growing waste problem and harmful environmental impacts it is having on the Earth, environmental awareness is on the forefront. In order to address this issue, restaurants have been working with the government on laws like Bill 74 to come up with solutions to the waste problems they contribute to. One solution has manifested in the form of a system that replaces single use plastics with reusable ones (County of Hawai‘i Plastic Bag Reduction Ordinance, 2019).

Reusable containers are hard plastic vessels similar to single use takeout containers in shape. They are reusable and washable, and can be cleaned using commercial restaurant equipment. They have a lifespan of up to thousands of uses, and when it is time to recycle them, they can be remolded into a new container (Peters, 2015).

Reusable containers have the potential to decrease plastic waste from restaurants considerably because they can be used to take food out of restaurants. Restaurants may also provide these containers through a service or program for takeout orders, provided the program meets all relevant food safety regulations. *Figure 3* shows an example of what a standard reusable container looks like (Edmond, 2019).

Figure 3. Reusable Takeout Container

Reusable container systems in restaurants have been implemented in multiple cities already, in which restaurants will have clean, reusable containers ready for takeout or leftovers. Customers pay a one-time or yearly fee to opt into the reusable container system and are then eligible to receive reusable containers at participating restaurants when they order takeout or get leftovers. Once the containers are used, they are either brought back to the restaurant or to a specified dropoff location. The containers are cleaned in the restaurants or at a separate cleaning facility to then be redistributed (Edmond, 2019).

An example of an implemented system is Durham GreenToGo, located in Durham, NC. Around 550 people in Durham are currently using the system. GreenToGo has been receiving positive emails from across the nation. Those emails entail requests to implement their system into new cities or even how to start up a system just like theirs (Bogie, 2019).

The GreenToGo system uses boxes that are reusable and extremely durable, and works similarly to checking out library books; they can be taken out and used, then once finished they must be returned to be cleaned and redistributed. Customers use the GreenToGo app on a mobile device, and can reserve a box at any participating restaurant for either leftovers or takeout meals. Once a customer is done with a container, it can be returned to any participating restaurant in the designated drop box. Upon being returned, the containers are cleaned and sanitized by a commercial sanitizer to ensure that they are fully sanitized. This service is not free, however it is a relatively inexpensive option. At $25 annually, it allows your account to have one container

checked out at a time, but memberships can be upgraded if customers believe there is a need for up to four containers at once (GreenToGo, 2013).

1.4 Laws and Regulations Affecting the Implementation of a System

Regarding the implementation of a reusable container system, there are multiple laws in place by the State of Hawai`i that will affect its operation. As mentioned by our sponsor, Sanne Berrig, the State of Hawai`i adopted all of the federal laws, and built upon them making all others state laws. Per Hawai`i Administrative Rules (HAR) Chapter 50 Food Safety Code section 11-50-45, any material used to create utensils or containers that will come into contact with food may not allow for damaging substances, colors, odors, or tastes to transfer to the food (Amendment and Compilation of Chapter 11-50 Hawaii Administrative Rules, 2017). These utensils or containers must be safe, durable, corrosion-resistant, nonabsorbent, sufficient in weight and thickness to withstand repeated washing, have a smooth finish and easily cleanable surface, and be resistant to pitting, chipping, crazing, scratching, scoring, distortion, and decomposition. Per HAR 11-50-46, any utensils and containers that will come into contact with food must be strong enough to hold their shape under normal use. Any food-contact surfaces should be smooth and have no breaks, open seams, cracks, chips, inclusions, pits, and similar imperfections. They should also lack sharp internal angles, corners, and crevices, and should have smooth welds and joints (Amendment and Compilation of Chapter 11-50 Hawaii Administrative Rules, 2017). These laws regulate the types of containers that can be used in Hilo's reusable container system.

The waste reduction efforts provided above are useful resources to support a future with less waste. It is necessary to understand and abide by the laws and regulations that exist to create a reusable container system that is safe for all consumers.

2.0 Methodology

The goal of this project was to investigate the feasibility of a program that reduces the need for single-use disposable food service ware containers in Hawai`i. In order to achieve this goal, our team has developed the following objectives:

1. Identify stakeholder concerns surrounding the implementation of a program
2. Analyze reusable container systems in similar sized cities to Hilo, HI
3. Incorporate information gathered into information for consumers and restaurants and a business plan for the County of Hawai`i that is specific to Hilo, HI

Our team was sponsored by The County of Hawai`i Solid Waste Division to gather public opinion regarding a reusable container system. We were focused on conducting interviews and surveys within the Hilo community in order to get a robust data set from a diverse range of stakeholders. The following sections detail the methodology that we utilized to achieve the objectives stated above.

2.1 Objective 1 - Identify Stakeholder Concerns Surrounding the Implementation of a Program

We conducted interviews with local restaurant managers and owners to gain an understanding of their stances on the feasibility of a reusable container system. Our main objectives in these semi-structured interviews was to determine whether a reusable container system is feasible in Hilo, HI and what barriers there are that would hinder the implementation of such a program.

To decide which restaurants to interview, we compiled a list of most restaurants in downtown Hilo. We called each restaurant and requested to speak with an owner or manager to schedule five to ten minute interviews at a time convenient for them. We started each conversation with our original pitch, which can be found in Appendix A. A schedule and timeline of calls and interviews with different restaurants can be seen in Appendix B. Notes from each interview can be seen in Appendices J.1-10.

In the semi-structured interviews, the interviewer asked structured questions that could then be built upon with follow-up questions (Rowley, 2012). We began our interviews with a structured question, then moved into more open ended questions, before finally asking some more structured questions to close out the interview, as can be seen in Appendix C.

We also conducted surveys with the general public to gain insight on whether our sample group would be interested in such a program, and what the obstacles are that would prevent

someone from opting into such a program. We also used this tool to help gauge what type of reusable container system had the broadest appeal among our sample group. We designed the survey to take 2-5 minutes to complete. We posted a link to our survey with a short introduction to our project on Facebook in various groups, noted in Table 4 in Appendix D. Questions used in this survey can also be seen in Appendix D. This survey was shared by viewers to different Facebook groups. These groups were private so we know how many times the post was shared, but cannot see what groups it was shared to.

On January 29, 2020, we walked around town recruiting more survey participants by giving them a QR Code to scan that linked to our online survey. Finally, we posted a pamphlet in the local Hilo Library with our QR Code that links to the online survey (See Appendix E).

2.2 Objective 2 - Analyze Successful Reusable Container Systems in Similar Sized Cities to Hilo, HI

As outlined in the background section 1.3, there are multiple existing reusable food container systems throughout the United States. Many of these programs have been used in large, urban areas. In order to assess the feasibility of implementing a system in Hilo, we first characterized Hilo by its population, utilizing census data and data from the restaurant industry. Then we found a city of similar size that had or currently has a reusable container system. Directly comparing census and population density information allowed us to find cities that are the most similar to Hilo. Using our preliminary research, we identified the Durham GreenToGo system in Durham, NC as the best candidate for analysis due to similarity in scale. While the two cities we compared differ greatly in population, with Hilo having around 50,000 people and Durham having around 200,000 people, they were the closest comparison we could make because Durham was the smallest existing reusable container system in a city. We then contacted experts in Durham and obtained data specific to that system. Those experts were members of the local government, and people in charge of running the system. Finally, we evaluated the data we gathered for positive and negative effects on the community, focusing on restaurants and locals. Two members of our team were present during the interviews with each expert. We asked them questions that are outlined in Appendix F.

Additionally, we broadened our data set by searching for information pertaining to reusable container systems. In contacting Durham GreenToGo, we learned that this company had a wealth of information pertaining to the creation of their system, which they shared through their GreenToGo open-source webinar. A representative at Don't Waste Durham pointed us to this resource after we asked them the questions in Appendix F. Our questions were answered through the webinar so there was no need for further questioning. This system was our main focus because it was the smallest existing system that we could compare to Hilo. The questions that we needed answered are located in Appendix F.

Contacting experts was necessary to gather all of the information needed in creating a successful system that was not found through our contact with existing systems. We interviewed board members Dani Burger and Terri Markovich of Recycle Hawai`i, about the organization. The main goal of this interview was to gauge community engagement in their programs and concerns about environmental issues. Also, we contacted the Hawai`i Department of Health (D.O.H.) to ensure that we would be aware of all of the laws and regulations that would affect implementing and using a reusable container system. A representative from the D.O.H. answered our questions regarding all of the laws in place for food safety and containers in restaurants.

2.3 Objective 3 - Incorporate Information Gathered into Information for Consumers and Restaurants and a Business Plan for the County of Hawai`i That Is Specific to Hilo, HI

We shared the information gathered with consumers, restaurants, and the County in the forms of a pamphlet, report, and business plan respectively. The purpose of these materials was to inform the aforementioned groups of the results of our feasibility study. Our business plan will serve as a starting point for the County as they work to implement a reusable container system.

The first part of this objective was creating a pamphlet for the public. The aim of this was to provide easy-to-interpret information that will inform people about reusable container programs, and serve as a reference that will help them decide whether or not they wish to enroll in such a program. From discussions with our sponsor and our experiences interacting with members of the community, we have determined that the pamphlet should utilize graphics to make it visually appealing while also providing information that will educate the public. In order

to validate this resource, we edited it in conjunction with our sponsor, who has extensive experience engaging the community over matters of sustainability.

The second part of this objective was to create an informational report for restaurants. This document had the main results of our interviews that were conducted with each restaurant, along with information that detailed how a reusable container system would work. This resource contained more information than the consumer pamphlet, but needed to remain easy-to-read and engaging. Our main focus with this document was to organize it so restaurants could find information quickly and easily. This report will serve as a reference for restaurants as the County moves forward with the implementation of the system.

The last part of this deliverable was to create a comprehensive business plan for the County. To identify information necessary for the plan, we used the data from interviews, surveys, and the experts we contacted. To format this data in the way that was the most beneficial for our sponsor, we referenced the structure of a nonprofit business plan on Blue Avocado, a website for nonprofit organizations. We first started with the detailed steps for implementation of a reusable container system. We then determined what questions would need to be answered to complete these steps and created in-depth sections in the plan to address these questions (Masaoka, 2011). These sections were created in a collaborative effort between the team and our sponsor, Sanne Berrig, who provided guidance on what the County specifically required from a business plan. The final product was produced after many stages of drafting and editing.

3.0 Results and Analysis

The following section discusses a summary of the results we obtained with respect to each of our research objectives. More detailed results can be found in the appendices.

3.1 Objective 1 - Identify Stakeholder Concerns Regarding the Implementation of a Program

Our survey of the public yielded 143 responses from respondents on the Big Island of Hawai`i. Of these 143, 77.6% of respondents were between the ages of 25 and 64, 18.2% were 65 or above, and only 4.2% of respondents were under the age of 25.

Our team watched a Durham GreenToGo webinar that was provided by the company for people interested in starting a similar program; our notes from watching can be found in Appendix G. After a marketing team evaluated the company's data and system users, Durham GreenToGo reported that their target audience was highly educated women over the age of 35 (Dreisbach, 2019). Of the 143 respondents that took our survey, 82.5% of respondents were female, while 2.1% preferred not to answer and the remainder were male. Although we did not ask about education level in our survey, our data shows that an overwhelming majority of people who chose to take our online survey, fit the same sex and age range as the group that Durham GreenToGo targets as consumers. From the data collected from the survey and the information provided by Durham GreenToGo, we can conclude that women are generally more concerned with green initiatives. These results could be considered by the founders for the marketing strategy.

As it is necessary to gauge the feasibility of a reusable container system specific to Hilo, it is important that our survey respondents are local to the area. Of the 143 respondents, 45.5% reported living directly in Hilo, while the remaining respondents live mostly in the surrounding towns of Pāhoa (14.0%), Keaau (13.4%), Volcano (7.0%), and Mountain View (4.9%). All other respondents lived elsewhere on the Big Island. The distribution of respondents' locations can be seen in Appendix H. It is possible that people from all of these locations dine in Hilo's bayfront area due to its abundance of restaurants.

In order to gauge the environmental consciousness of our target audience, we asked about respondents' current efforts to reduce the amount of waste they personally produce. From the 142 people who responded to this question, the collected data indicated that large proportions of people who live in Hilo and the surrounding areas claim to prioritize sustainability in their everyday lives and seem willing to accept at least minor inconveniences in order to choose a

more sustainable option. This will be helpful in the implementation of the program because finding the early adopters of the system should not be a problem.

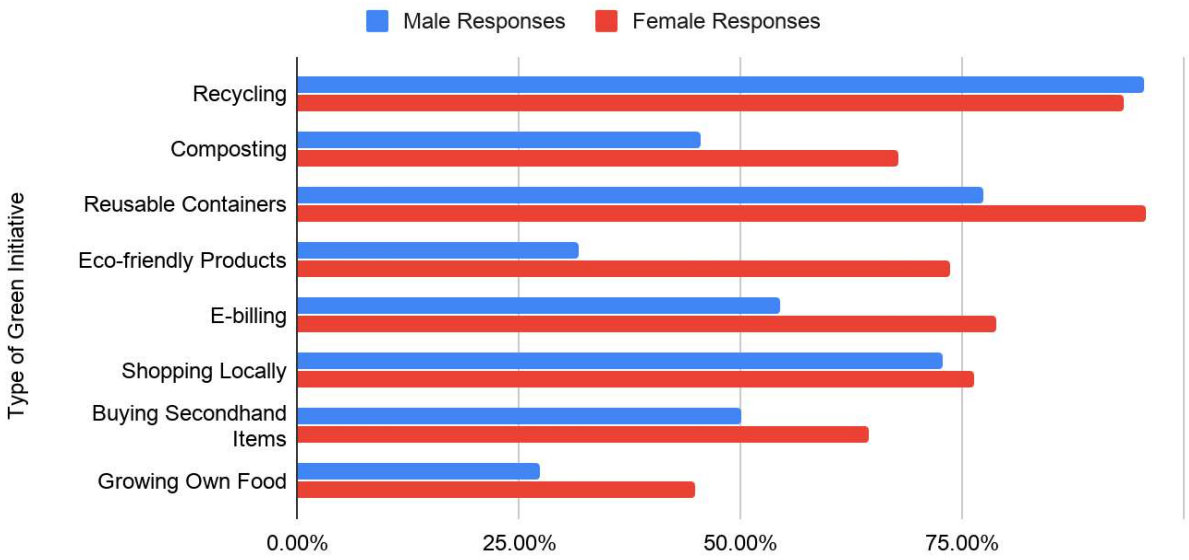


Figure 4. Percentage of Male and Female Respondents that Complete Green Initiatives

According to Mohai, this data could have been expected. Mohai (1992) noted that women are more likely to have environmental concerns in general than men. This conclusion was made over multiple different variables, such as age, education, and career status. However, this conclusion does not extend to environmental activism, as men were found to be more likely to act on their environmental concerns than women (Mohai, 1992).

We also needed to know whether reusable container systems are well-known in the Hilo area. Per our survey of 143 people, 85.3% of respondents are unfamiliar with previously established reusable container systems such as GO Box or Durham GreenToGo. This could pose as a potential barrier in the implementation of a reusable container system because more education and explanation will need to be given to participants. Many people would be more likely to join a program after hearing a lot of the positive outcomes, so strategic marketing and planning would be needed to get consumer participation.

However, we noted that there would likely be significant customer buy-in upon the implementation of a reusable container system. In asking the 143 respondents whether they would opt into a reusable container system, 74.8% said they are willing, while 22.4% might be willing and the remaining 2.8% are unwilling.

Another factor that affects the feasibility of a reusable container system is its ability to financially sustain itself. This financial sustenance is incurred via membership fees that its users pay, whether one time or yearly. We found that 19.6% of respondents are willing to pay more than $10.00 for the system. Additionally, 42.7% of 143 respondents are willing to pay $5.00-10.00 to opt into a reusable container system, 30.1% are willing to pay less than $5.00, and 7.7% are unwilling to pay anything.

In order to determine the feasibility of this system, we needed to know what factors would stop consumers from participating in it. We found that, of the 135 respondents to this question, 70.6% said they might be deterred from participating in a reusable container system if too few restaurants participated in it, while 33.6% of people said the cost of participation would deter them from participating, and 37.1% said a lack of convenience would deter them from participating. All data from online surveys can be found in Appendix I.

In addition to surveying the public, we also needed feedback from restaurant owners and managers. After initially contacting restaurants in Hilo, many said they would return our calls. Some did return our calls, and some scheduled interviews. The full schedule of our call logs can be found in Appendix B. Through our ten interviews with the owners and managers of different kinds of restaurants in Hilo, we found similarities and reoccurring themes in our data. Our data from all of our interviews is located in Appendices J1-10. In our interviews, Tina's Garden Cafe, Liko Lehua and Puka Puka Kitchen all mentioned cost as their primary concern that poses a barrier to joining the system. The owner of Restaurant 1 shared that their business is 35% take-out and they regularly receive thousand-dollar lunch orders in the middle of the day from large offices. In order for the system to work they believed that there would have to be a way to resupply restaurants with clean containers as soon as they run out, so they can continue serving customers. While it poses a logistical challenge to supply restaurants with containers on demand,

it may be a necessary consideration as the reusable container system in Hilo grows to have its own employees and can serve restaurants more effectively.

One of our most important findings in interviewing restaurants is that they do not want to be held liable for the cleanliness of the reusable containers. Restaurant 1, Restaurant 2, Liko Lehua, and L+L Hawai`ian Barbeque cited health and liability concerns as barriers for them using a reusable container system in their restaurant. They wanted to ensure that all containers coming into their restaurants were clean and posed no health concerns for their patrons. They were all concerned about who would be liable if a container that they served food in, but was not cleaned in their facility, caused a person to get sick. It will be important to establish a relationship with the Hawai`i State Department of Health when creating this system to make sure consumers, restaurants, and wash stations are safe. Finally, containers need to be tracked. This is to ensure that each restaurant is adequately supplied and that consumers can be held accountable. When ordering food, restaurants agreed that there must be a way for customers to order and verify their subscription to the system. Otherwise there could be patrons abusing the system and claiming containers when they have not paid for them. This would lead to extra work for restaurants because they would have to re-plate orders, inconveniencing them and slowing down their food service.

From our data collection of asking restaurant owners what percentage of their customers are local versus tourists, we found on average, roughly 60-70% of daily customers are locals. This is important to know when starting a reusable container system because it shows that there is a strong foundation of returning customers to restaurants in Hilo. Returning customers are best suited to participate in a reusable container program because they are more likely to pay the fees associated with it.

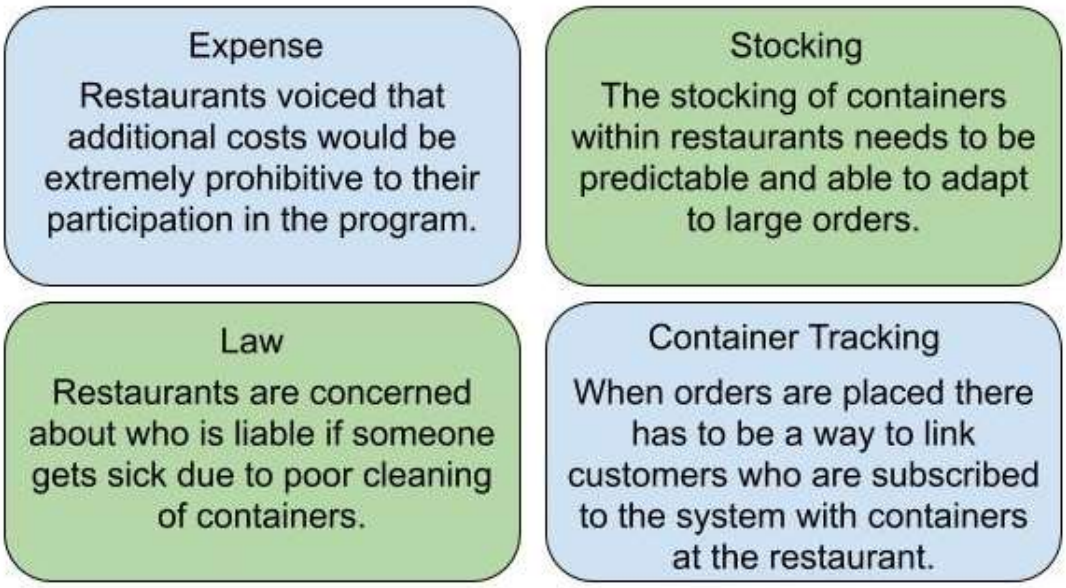


Figure 5. The main results from interviews with restaurant management and owners in Hilo

3.2 Objective 2 - Analyze Reusable Container Systems in Similar Sized Cities to Hilo, HI

Recycle Hawai`i leads solid waste reduction education and innovative reuse programs on the island of Hawai'i. Their main focus is education; they teach people how to recycle correctly, the benefits of reuse, and the tools to create a sustainable environment. In an interview with Recycle Hawai`i board members, the most valuable takeaway was learning about community engagement in sustainability events, projects, programs, and workshops. On average, between 10-30 people attend workshops about different sustainable options. This is a small number of people in the community, however, a group this size is still optimal to first introduce to the reusable container system; initiatives like Recycle Hawai`i would have enough resources to setup the groundwork for a system of this size. The organization partners with the County of Hawai`i so this could be a good place to begin, as well as finding volunteers willing to work to keep the system running.

From the webinar offered by GreenToGo, mentioned previously, we learned about the obstacles that may arise when implementing a reusable container system. To start their program, Durham GreenToGo had to front $5,000.00 for containers alone, on top of more costs associated

with the transportation vehicle and collection sites for the containers. Having insurance is also necessary to keep the business running, which resulted in an increase in the startup funding. We also learned that there is a high need for communication with the local health department in order to get the reusable container system approved. Additionally, GreenToGo has a three-person, part-time staff that is in charge of collecting, cleaning, and redistributing used containers.

Durham GreenToGo is partnered with a local nonprofit facility to wash their containers in a National Sanitation Foundation (NSF) certified location. Due to the fact that many restaurants in Hilo have expressed that they cannot clean the reusable containers in their own kitchen, the reusable container system in Hilo would be dependent on a system similar to that in Durham, in which the system is in partnership with another organization that provides a washing facility.

We also learned that a strong marketing plan is crucial to the success of a reusable container system. This includes branding, messaging, and targeting specific demographics. This marketing plan must also appeal to the participating restaurants; restaurant owners are more likely to participate in a reusable container system if it benefits their company in the public eye.

In contact with the Hawai`i State Department of Health in the Food Safety Branch, we gained insight on the laws and regulations regarding food safety that would affect a reusable container system that we did not find in our preliminary findings.

After contacting a representative from Food Services at the University of Hawai`i at Maui we learned about how they are setting up a reusable container system on campus. They helped us by sharing the state regulations that they are specifically following. Those regulations are HAR 11-50-32(p)(2)(B) which requires that take-home food containers are to be initially provided by the food establishment. Also essential is HAR 11-50-53(e)(1)(C), which states that restaurants are required to store clean equipment and utensils, which would include reusable takeout containers, at least 6 inches off the floor. Under HAR 11-50-45(a) reusable containers must be inspected and approved by the Hawai`i State Department of Health and must be sanitized by the restaurants or another permitted and inspected establishment in order to be considered appropriately sanitized. This information gained from the Hawai`i State DOH and an

existing reusable container system at the University of Hawai`i at Maui show the laws that will be followed in the instrumentation of a system in Hilo.

3.3 Objective 3 - Incorporate Information Gathered into Information for Consumers and Restaurants and a Business Plan for the County of Hawai`i That Is Specific to Hilo, HI

The first produced deliverable is a pamphlet for consumers. Our results from surveys conducted with the public showed that the public has little knowledge of reusable container systems. Furthermore, as a part of the survey results, it was clear that the public needed more information before they could commit to using a reusable container system. This pamphlet also explains how to use the mobile application to find participating restaurants, check out a container, and find the closest drop off location. The necessity for the inclusion of this information came from our interviews with restaurant owners. Multiple owners expressed that there needs to be a way to validate memberships to ensure the accountability of the public, so only people with memberships are able to order using the reusable container system. This pamphlet provides consumers with basic information about reusable container systems and how they can reduce plastic waste. This resource can be found below in Figure 6. More information on this pamphlet can be found in Appendix K.

Figure 6. Pamphlet Created for Distribution to the Public

The second deliverable we created for this objective is a report for restaurant owners that explains all of the logistics about running a reusable container system in their restaurant. It is an easy to follow guide about how implementing the system will affect their business. Additionally, there is information about all of the laws and regulations in place in the state of Hawai`i that will affect containers being used by restaurants. It has costs, benefits of using the system, and potential setbacks caused by the system explained. This information was included based on our results from Objective 1, the interviews with restaurant owners. This report goes further into depth on the points stated in Section 3.1. Information for restaurant owners who need to learn more about the reusable container system can be found in a brief paper, titled "Reusable Food Service Ware Takeout Container System: A Restaurant's Role," in Appendix L.

The last deliverable is a business plan for our sponsor. The plan contains all of the information given to the restaurant owners and consumers as well as specific details about exactly how the system will run. It is an in-depth report explaining possible ways to implement the system and explains each factor of the functionality of the system, as well as the next steps

for the people implementing the system. The conclusions made within this document are taken from the results of Objectives 1 and 2. The most important insight we obtained from all of our research is that partnering with a third-party wash station that already has the washing infrastructure will greatly reduce start-up costs. Additionally this partnership will allow the system to ensure cleanliness standards across the system when compared to a system where containers are washed at individual restaurants. Our recommendations for how these steps should be executed are outlined in a business plan, which can be seen in Appendix M. Due to the variability in this kind of system, there is unknown information that would be helpful to include in the business plan. It is stated in the business plan when there are unknown factors that should be considered.

4.0 Discussion

Through our surveys of the public we determined that there is a large population in the Hilo area that is passionate about sustainability. However, this same population did not have extensive knowledge of reusable container systems. In order to ensure the system's success, it will be necessary to educate the public about reusable container systems. Our first deliverable, which is a pamphlet for the public, serves to increase consumer knowledge of reusable container systems. Buy-in from restaurants was another key component in determining the feasibility of the reusable container system. Through our interviews, we were able to address the concerns of restaurant owners in our proposed system. Furthermore, we provided our sponsor with an educational resource directed at restaurant owners and managers, which gives them the information they need to decide whether to participate in a reusable container system. Finally, we created a business plan for the County that describes the steps for implementation of the system. It also includes an estimated budget that can be used as a template when it comes to planning the system. All of our deliverables serve as tools that make a reusable takeout container system feasible in Hilo.

Based on our results, we have decided that the best course of action for the County of Hawai`i to take to get a reusable container system up and running is to find a group of founders who will be willing and committed to taking charge of the system and a third-party who can

provide the washing and sanitation stations. To do this, the founders will first need to establish a workforce, paid or unpaid, who is willing to transport, wash, and sanitize the containers. It will be necessary to create a mobile application for customers to utilize with the reusable container system so they can be held accountable for lost containers or taking out more containers than their membership allows.

The creation of a circular economy in the form of a reusable take-out container system will limit the amount of landfill space and recycling resources that are wasted in the disposal of single-use plastics. Though our work had a wide reach, we were not able to determine the exact amount of waste that a reusable container system could eliminate in Hilo. This figure will be useful in achieving buy-in from restaurants and receiving support from the local government.

A reusable container system in Hilo will have both benefits and drawbacks. The biggest benefit that can come from this system is the positive environmental impact it will have on Hawai`i. However, as stated in section 3.1, some restaurants in Hilo have reported financial instability and will therefore struggle to pay the fees associated with participating in a reusable container system.

Our business plan outlines the steps we feel are necessary to implement a reusable container system in Hilo, however it does leave some decision making to the County. At this time, it is still unclear whether or not the County will have to purchase its own wash station and commercial sanitizer upon the implementation of the system. Additionally, there is still uncertainty regarding the possible cost per year for both consumers and restaurants to participate in the reusable container system. This additional cost is especially apparent regarding the creation of the mobile application. These figures will be determined once the amount of participating restaurants and seed funding is known. Another drawback of our business plan is that it assumes there will be immediate restaurant participation; many restaurants we interviewed stated that they would be willing to participate in the system once it has been tested in other restaurants first. Therefore, there is potential for challenge getting restaurants to participate in the reusable container system in its earliest stages.

With so much plastic pollution affecting the world and its inhabitants everyday, a vision for a world with less plastic is extremely important. After our research and data collection over the past four months, we have come to the conclusion that implementing our project's findings and recommendations is not only feasible, but imperative to helping create this vision.

References

Amendment and compilation of chapter 11-50 Hawaii administrative rules, (2017). Retrieved from https://health.hawaii.gov/san/files/2017/09/HAR-11-50-amended-9.1.2017.pdf

Bogie, A. C. (2019, April 19). Taking the trash out of takeout: How the founder of GreenToGo is forging a local circular economy. Retrieved from https://www.greenbiz.com/article/taking-trash-out-takeout-how-founder-greentogo-forging-local-circular-economy

Clean Water Action. The problem of marine plastic pollution. (2019). Retrieved from https://www.cleanwater.org/problem-marine-plastic-pollution

Cook Lauer, N. (2019). Council allows non-recyclable plastics as polystyrene alternative. *West Hawaii Today (Kailua-Kona, HI)* Retrieved from https://www.westhawaiitoday.com/2019/06/20/hawaii-news/council-allows-non-recyclable-plastics-as-polystyrene-alternative/

County of Hawai‘i plastic bag reduction ordinance. (2019). Retrieved from https://www.hawaiizerowaste.org/reuse-2/county-of-hawaii-plastic-bag-reduction-ordinance/

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.) SAGE Publications, Inc.

Durham Green To Go. (2019). Retrieved from https://durhamgreentogo.com/faq/

Dreisbach, C. (2019). *GreenToGo FREE webinar https://greentogo.thinkific.com/courses/take/greentogo-startup/lessons/5725178-learn bout-greentogo-in-45-minutes*

Edmond, C. (2019, May 16). This is what the world's waste does to people in poorer countries. Retrieved from https://www.weforum.org/agenda/2019/05/this-is-what-the-world-s-waste-does-to-people-in-poorer-countries/.

Hägg, S. (2019, May 12). Hilo landfill has reached capacity. Retrieved from https://bigislandnow.com/2019/05/12/hilo-landfill-has-reached-capacity/.

Lamb, J.B., Willis, B.L., Fiorenza, E.A., Couch, C.S., Howard, R., Rader, D.N., True, J.D., Kelly, L.A., Ahmad, A., Jompa, J. and Harvell, C.D., 2018. Plastic waste associated with disease on coral reefs. *Science*, *359*(6374), pp.460-462

Mallos, N., & Leonard, G. (2019). The problem with plastics. Retrieved from https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/

Masaoka, J. (2011). Alternatives to strategic planning. Retrieved from https://blueavocado.org/fundraising/alternatives-to-strategic-planning/?highlight=business%20plan

Mohai, P. (1992). Men, women, and the environment: An examination of the gender gap in environmental concern and activism. *Society & Natural Resources, 5*(1), 1-19. doiReferences

Peters, A. (1/12/15). A reusable takeout container to replace the hundreds you toss away. Retrieved from https://www.fastcompany.com/3037143/a-reusable-takeout-container-to-replace-the-hndreds-you-toss-away

Rowley, J. (2012). Conducting research interviews: MRN MRN. *Management Research Review, 35*(3), 260-271. doi:http://dx.doi.org/10.1108/01409171211210154

Shim, W. J., & Thompson, R. C. (2015). Microplastics in the ocean. *Archives of environmental contamination and toxicology, 69(3), pp.265-268.* Retrieved from https://link.springer.com/article/10.1007/s00244-015-0216-x#Bib1

United States Environmental Protection Agency. Municipal solid waste. (2016). Retrieved from https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/

Wright, M., Kirk, A., Molloy, M., & Mills, E. (2018). The stark truth about how long your plastic footprint will last on the planet. *The Telegraph,* Retrieved from https://www.telegraph.co.uk/news/2018/01/10/stark-truth-long-plastic-footprint-will-last-planet/

Appendix A

Below is our scripted phone call pitch, which we used when calling restaurants to set up interviews.

Aloha,

My name is _____ and I am working with a team of college students along with the county of Hawai`i to investigate the feasibility of implementing a reusable container system in the Hilo community. This system would limit the amount of take-out containers that are used once and then thrown out. In order to make a system like this possible we want to know what you would or wouldn't want out of a program like this. If you have any time, would it be possible for us to come in and ask you a couple questions, maybe 5-10 mins.

Appendix B

Schedule of Restaurant Interviews

Restaurant	Phone Number	Address	Date Called	Date Interviewed	Notes
Anonymous			1/14	1/20	
Moon and Turtle	(808) 961-0599	51 Kalakaua St	1/16	1/17	
New Chiang Mai Thai Cuisine	(808) 969-3777	2870, 110 Kalakaua St	1/14	N/A	No Call Back
Anonymous			1/17	1/23	
Poke Market, LLC	(808) 961-5915	41 Waianuenue Ave	1/15	N/A	No Call Back
Tina's Garden Cafe	(808) 935-1166	168 Kamehameha Ave	1/14	1/16	
Makani's Magic Pineapple Shack	(808) 935-8454	54 Waianuenue Ave	1/21	N/A	Manager Was Not Present
Puka Puka Kitchen	(808) 933-2121	270 Kamehameha Ave	1/27	1/27	
Ocean Sushi	(808) 961-6625	235 Keawe St	1/20	N/A	No Answer
Pineapples Restaurant	(808) 238-5324	332 Keawe St	1/21	N/A	No Call Back
Cafe Pesto - Hilo	(808) 969-6640	308 Kamehameha Ave #101	1/21	N/A	No Answer
Naung Mai Thai Kitchen	(808) 934-7540	86 Kilauea Ave	1/23	N/A	No Call Back
Yen's Cafe	(808) 933-2808	235 Waianuenue Ave # 101	1/21	1/23	
Dragon Kitchen Sushi	(808) 386-9153	330 Kamehameha Ave	1/17	N/A	Busy
Ebisuya Sushi	(808) 961-6840	179 Kilauea Ave	1/17	N/A	No Answer

Paul's Place	(808) 280-8646	132 Punahoa St	1/18	N/A	No Call Back
Bears' Coffee & Deli	(808) 935-0708	106 Keawe St	1/22	N/A	Call Manager Back
Lucy's Taqueria	(808) 315-8246	194 Kilauea Ave	1/15	N/A	Busy
Somsamai Styles Restaurant	(808) 895-3722	18 Furneaux Ln	1/20	N/A	No Answer
KANPAI - Sushi, Noodle, & Sake Bar	(808) 969-1000	190 Keawe St #10th	1/21	N/A	Busy
Hilo Town Tavern	(808) 935-2171	168 Keawe St	1/23	N/A	Bar, Not Enough Food
Akmal's Indian Kitchen	(808) 769-3944	174 Kamehameha Ave	1/21	N/A	No Answer
Hilo Siam Thai Restaurant	(808) 238-5068	70 Mamo St	1/23	N/A	No Answer
Jimmy's Drive Inn	(808) 935-5571	362 Kinoole St	1/18	N/A	Stood Up at Door
L&L Hawaiian Barbecue	(808) 934-0888	348 Kinoole St	1/15	1/17	
Wilson's by the Bay	(808) 969-9191	141 Mamo St	1/20	N/A	Manager Not In
Lam's Garden	(808) 933-3388	172 Kilauea Ave	1/20	N/A	No Call Back
Nori's Saimin and Snacks	(808) 935-9133	688 Kinoole St	1/22	N/A	No Call Back
Liko Lehua at Pauahi	(808) 315-8484	80 Pauahi St	1/21	1/23	
Kenichi Restaurant	(808) 969-1776	684 Kilauea Ave	1/17	N/A	No Call Back

Hilo Burger Joint	(808) 935-8880	776 Kilauea Ave	1/18	N/A	No Call Back
Cafe Concerto	(808) 934-0312	808 Kilauea Ave	1/21	N/A	Phone Disconnected
K's Drive In	(808) 935-5573	194 Hualalai St	Walk-in	1/23	
Anonymous			Walk-in	1/29	

Appendix C

Interviews with Restaurant Owners/Managers

We are a team of students from Worcester Polytechnic Institute in Massachusetts. We are conducting interviews with restaurant owners and managers in Hilo, HI to learn more about their interest in a reusable container system. This is a collaborative project with the County of Hawai`i. Our goal is to gather a better understanding of what kind of reusable container system is feasible to implement in Hilo based on locals' sustainability efforts and practices. Your participation in this interview is voluntary and you may opt out at any time. If you would like, we would be happy to include your comments as anonymous. If interested, a copy of our results can be provided at the conclusion of the study.

Questions we will ask restaurant owners and managers include:

1. On a scale of 1-5, how easy or difficult was the transition with takeout containers?
2. What have you done to switch from styrofoam?
3. What have been the downsides and benefits to the ban?
4. Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)
5. Roughly, how many takeout customers do you see on a daily basis?
6. Roughly, what percentage of your customers are locals versus tourists?
7. Would you be able to wash a container like this in your restaurant?
8. What are the barriers, if any, that might keep you from participating in a reusable container program?
9. What do you need to know from us before you would consider participating in a program like this?
10. On a scale of 1-10, how likely would you be to participate in a reusable container system?
11. Is there anything else we have not asked that you would like us to know about?

Appendix D

Interviews with the Public

We are a team of students from Worcester Polytechnic Institute in Massachusetts. We are conducting surveys with the general public of Hilo, HI to learn more about their interest in a reusable container system. This is a collaborative project with the County of Hawai`i. Our goal is to gather a better understanding of what kind of reusable container system is feasible to implement in Hilo. Your participation in this survey is voluntary and you may opt out at any time. If you would like, we would be happy to include your comments as anonymous. If interested, a copy of our results can be provided at the conclusion of the study.

Questions we will ask consumers include:

1. How old are you?
2. What is your gender?
3. What is your zip code?
4. How long have you lived in Hilo?
5. Are you familiar with the recent polystyrene (Styrofoam) ban in Hawai`i?
6. Are you aware that Hilo's landfill has recently been closed?
7. What efforts do you make, if any, to reduce the amount of waste you generate?
8. Are you familiar with reusable container programs like GO Box or GreenToGo?
9. Would you be willing to opt into a reusable container program?
10. How much would you be willing to pay (as a one-time fee) to participate in a reusable container program?
11. What are the things that would stop you from opting into a reusable container program?

Table 4. Facebook Groups Where Our Public Survey was Posted.

Facebook Group	Description of Facebook Group	Date of First Post	Date of Second Post	Date Closed
Hilo Happenings	A group for the community of Hilo to share information about local happenings in town	January 20	January 27	February 6
Hawaii Tracker	Lava, storm, and news updates for the Big Island of Hawaii	January 20	January 27	February 6
Zero Waste Big Island	A group to discuss ways to live sustainably on the Big Island	January 20	January 21	February 6

Appendix E

This is the flyer we posted at the Hilo Public Library for members of the public to take our survey. The information listed was meant to get survey takers interested in our project and intrigued by our survey. The QR code took survey takers to a link that opened our survey.

Appendix F

Interviews with Experts

We are a team of students from Worcester Polytechnic Institute in Massachusetts. We are conducting Interviews with the members of the reusable container industry to learn more about potential barriers and requirements for setting up a reusable container system in Hilo, HI. These companies are located in the mainland U.S. and will be conducted with video conferencing technology. This is a collaborative project with the County of Hawai`i. Our goal is to gather a better understanding of what kind of reusable container system is feasible to implement in Hilo. Your participation in this survey is voluntary and you may opt out at any time. If you would like, we would be happy to include your comments as anonymous. If interested, a copy of our results can be provided at the conclusion of the study.

Questions we will ask experts include:

1. What Barriers did you face when implementing your program?
2. What took the most time in the implementation of your program?
3. What benefits are the benefits of your container system?
4. What is required to keep a system running?
5. How do you interface with the local government?
6. What information did you include in your plan, and what did your final plan look like?
7. What recommendations do you have for our team?
8. What information did you include in your plan, and what did your final plan look like?
9. What recommendations do you have for our team?

Appendix G

Notes from Durham GreenToGo Webinar

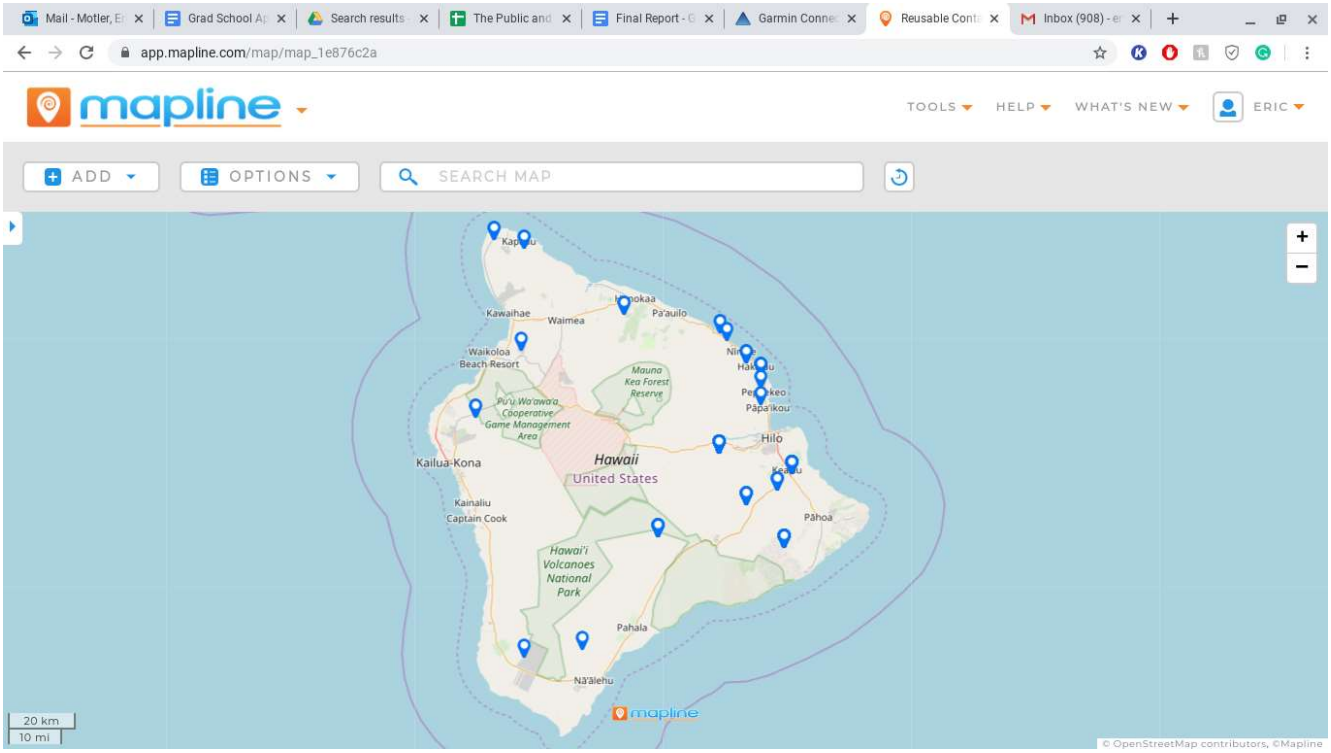
- Circular Economy
    - Linear Economy- straight to trash
    - Recycling Economy- reuse, but struggling greatly, prolonged life until landfill
    - Circular Economy- reuse, reuse, reuse, i.e. scrap exchange, refill products
- Durham Specific
    - A “Library Card” system
    - Green ways of transport
        - Bikes
        - ELF car
    - G.E.T. Enterprises Containers #5 “Eco-Takeouts”
        - Local Restaurant Supplier to get started, G.E.T. will not sell small quantities
    - 3 Compartment boxes are the most popular
    - Financials
        - To start, 28 restaurants, 996 in circulation, $5k one color logo and delivery fees
        - Experienced 30-35 breakages in a year
            - 300+ uses average per box
        - User Memberships
            - $25/year for one box, $40/year for 4 boxes
        - Restaurants have to pay $500/year
        - 3 part time employees $15/hour, 20 hours total/week
            - Restocks restaurants
    - Buy-in from local health department VERY IMPORTANT
        - Possibilities
        - Washing & Sanitizing
        - Permitted/Credibility
    - Wash Facility

        - Make or Break Piece of System
        - Need the space (Asked churches, old people home, homeless shelter)
        - Ended up working with NPO
            - Rehab facility
                - Uses dish pit after hour
                - Dont Charge $
                - Need space for drying
                - After hours
- Commitment from Restaurants
    - People they knew
    - Need a foundation to start
- Web Application
    - Log in account
    - Find Restaurant
    - Track containers
    - Drop off locations
- Strong Marketing Plan
    - Branding
    - Messaging
    - Target Demographics
    - Partner with Universities (Outsourced Research to students)
    - Highly Educated Women over 35
- Extras
    - Insurance
    - Workers Comp
    - Bookkeeper

NSF Certified EVERYTHING that touches clean containers

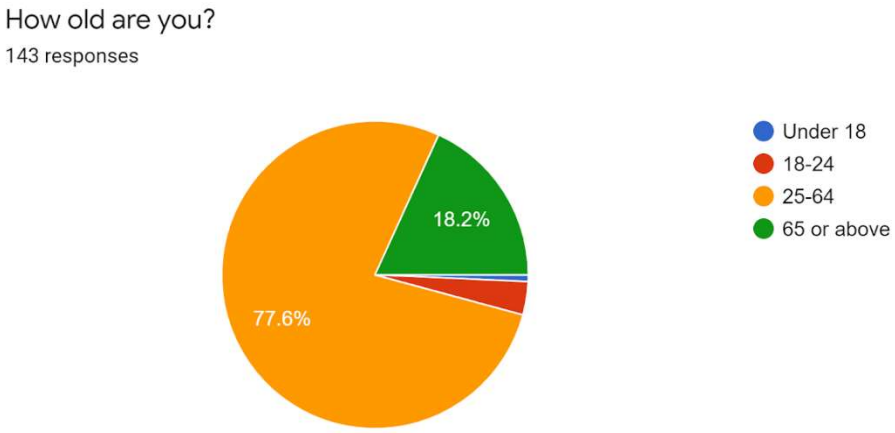
Appendix H

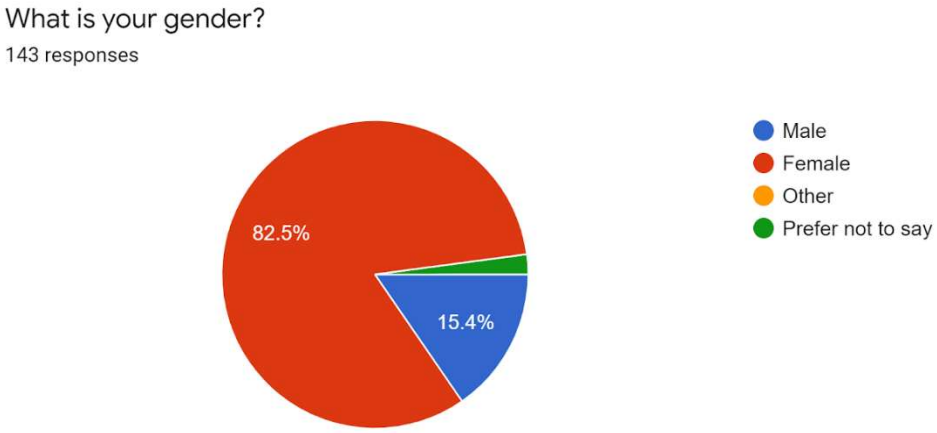
The Distribution of the Postal Codes Represented by the Surveyed Public



Appendix I

The figures below show the raw data collected in our public surveys.

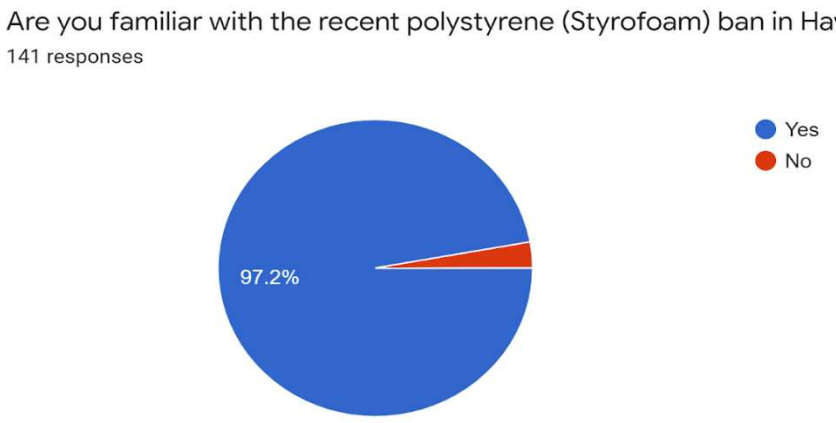


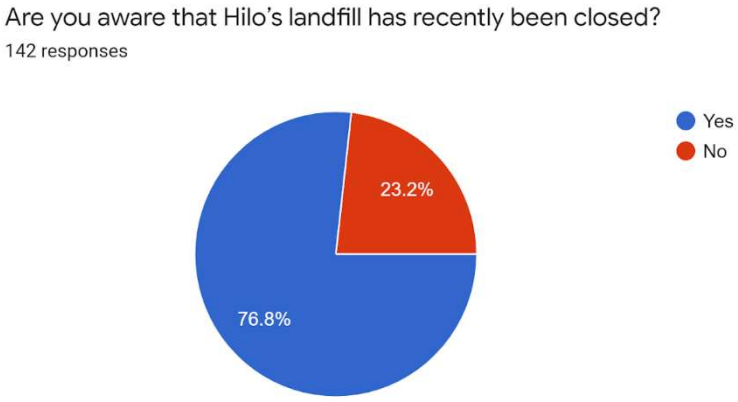


How Long Have you lived in Hilo? (143 Responses)

- Less than 1 yr (7)
- 1-5 yr (18)
- 6-10 yr (11)
- 11-15 yr (7)
- 16-20 yr (15)
- 21-25 yr (13)
- 26-30 yr (7)

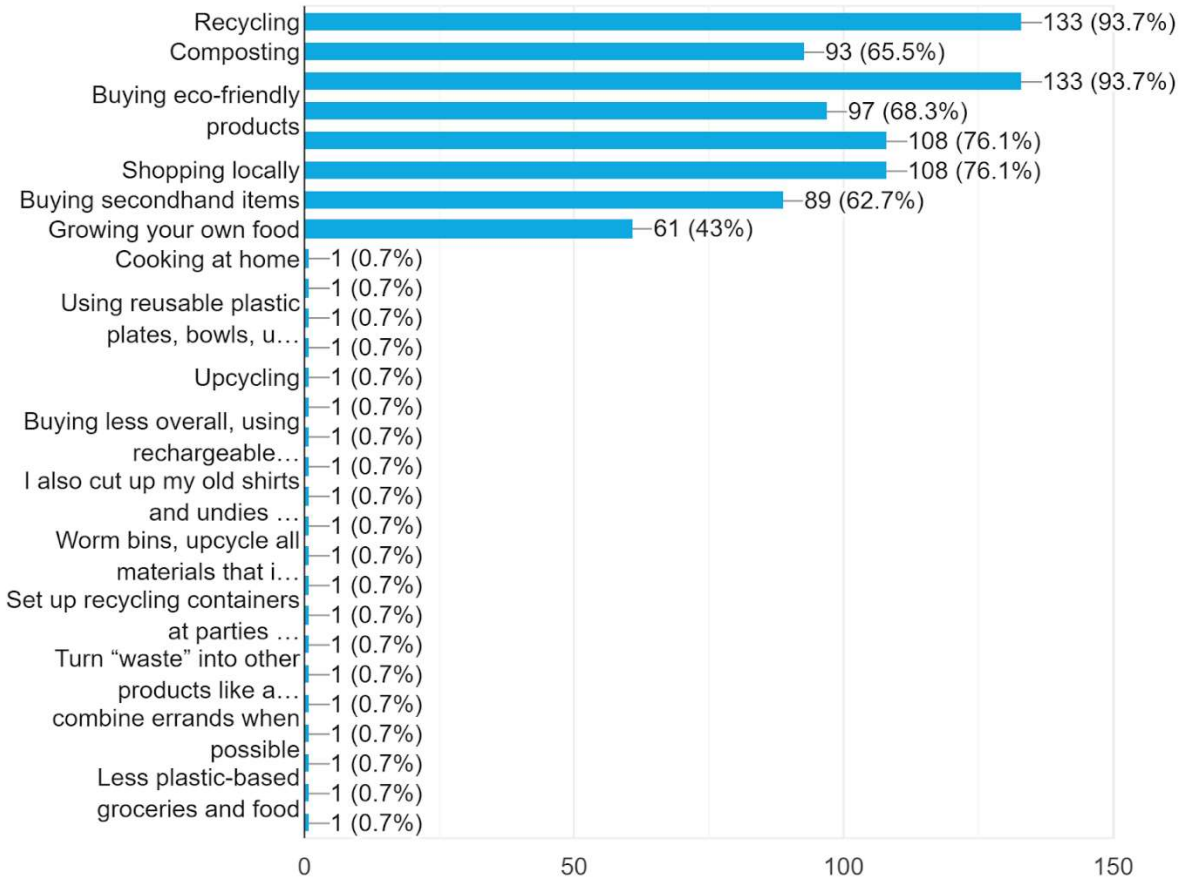
- 31-35 yr (9)
- 36-40 yr (6)
- Over 40 yr (21)
- Whole Life (10)
- Does not live in Hilo (19)





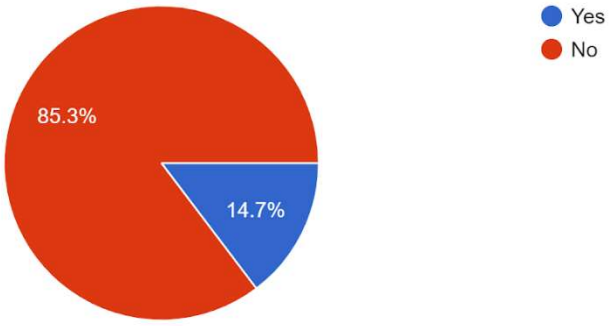
What efforts do you make, if any, to reduce the amount of waste you generate?

142 responses



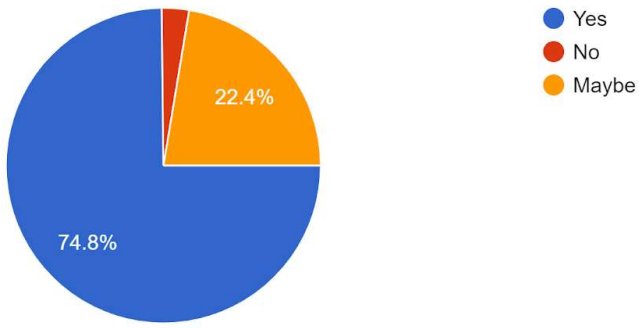
Are you familiar with reusable container programs like GO Box or Durham GreenToGo?

143 responses



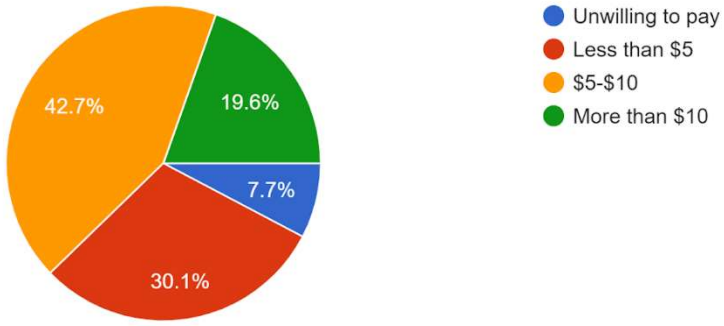
Would you be willing to opt into a reusable container program?

143 responses



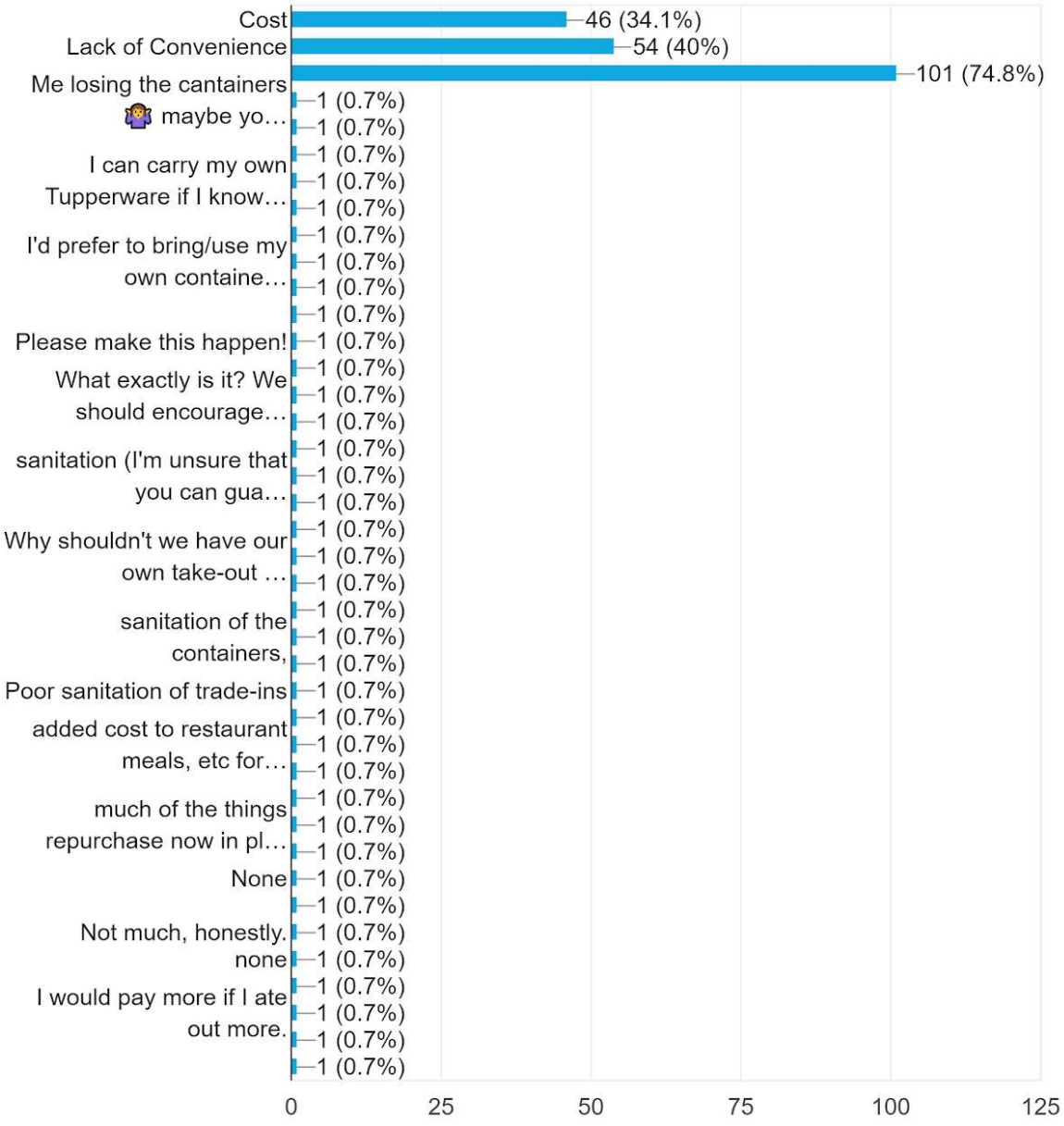
How much would you be willing to pay (as a one-time fee) to participate in a reusable container program?

143 responses



What are the things that would stop you from participating in a reusable container program?

135 responses



Appendix J.1

All of the J Appendices are the notes from Restaurant Interviews. They are labeled as Appendix J.1-10 for each Restaurant. In some cases, all interviewees did not answer; in this scenario, there is an N/A in the 'Answer' column.

Restaurant 1

Questions	Answers
Interviewee	N/A
Consent for name usage	No
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	5 - very hard to change due to cost
What have you done to switch from styrofoam?	Very expensive to switch and there were not a lot of options when the ban came out
What have been the downsides and benefits to the ban?	New sustainability initiatives are not good for food taste and service - laws and regulations are challenging
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	No- only in the food service industry
Roughly, how many takeout customers do you see on a daily basis?	35% of business is takeout
Roughly, what percentage of your customers are locals versus tourists?	40% local, 60% tourists
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	When people call in orders how do you know if they are subscribed for the system

What do you need to know from us before you would consider participating in a program like this?	How will containers be resupplied to restaurants- how do they fit different types of food (pizza) - Are they hot or cold - how are they inspected by the health inspector
On a scale of 1-10, how likely would you be to participate in a reusable container system?	1 - messes up current system that is established
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.2

Yen's Cafe

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	3- There were limited choices when switching
What have you done to switch from styrofoam?	Compostable plastic (owner was not sure if they were really compostable because they are so sturdy)
What have been the downsides and benefits to the ban?	Had to pass price difference to customer
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	Customers bring in their own containers to reuse but is hard to plate take-out orders like that
Roughly, how many takeout customers do you see on a daily basis?	50-50 split
Roughly, what percentage of your customers are locals versus tourists?	95% local
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	Space in the kitchen is limited
What do you need to know from us before you would consider participating in a program like this?	How do they stack and fit together in kitchen?

On a scale of 1-10, how likely would you be to participate in a reusable container system?	6 - As long as the new system does not interfere with current setup
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.3

Tina's Garden Cafe

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	1, easy, Never used it
What have you done to switch from styrofoam?	N/A
What have been the downsides and benefits to the ban?	Better for the environment
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	Customers already bring their own containers
Roughly, how many takeout customers do you see on a daily basis?	8-10 per day
Roughly, what percentage of your customers are locals versus tourists?	70% locals
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	Customers may forget to bring their containers back
What do you need to know from us before you would consider participating in a program like this?	Cost of system before participating
On a scale of 1-10, how likely would you be to participate in a reusable container system?	5/10
Is there anything else we have not asked that you would like us to know about?	Must be big enough to hold their larger meals

Appendix J.4

L + L Hawaiian BBQ

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	5 Hard
What have you done to switch from styrofoam?	Preorder plastic containers a month prior to ban
What have been the downsides and benefits to the ban?	Cardboard doesn't close, leaks, plastics warps under heat, hot to touch-pro environment
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	No
Roughly, how many takeout customers do you see on a daily basis?	250 per day
Roughly, what percentage of your customers are locals versus tourists?	70% local, 30% Tourist
Would you be able to wash a container like this in your restaurant?	Containers that are too dirty going into the building
What are the barriers, if any, that might keep you from participating in a reusable container program?	Test run elsewhere, if it works, will consider
What do you need to know from us before you would consider participating in a program like this?	Cost

On a scale of 1-10, how likely would you be to participate in a reusable container system?	8/10
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.5

Moon and Turtle

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	1 Easy, didn't use styrofoam
What have you done to switch from styrofoam?	N/A
What have been the downsides and benefits to the ban?	No downsides, very eco friendly
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	No
Roughly, how many takeout customers do you see on a daily basis?	N/A
Roughly, what percentage of your customers are locals versus tourists?	50%/50% - Season Dependent
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	Dirty Containers coming into restaurant
What do you need to know from us before you would consider participating in a program like this?	Restaurant Protection for dirty containers coming into the building
On a scale of 1-10, how likely would you be to participate in a reusable container system?	10/10
Is there anything else we have not asked that you would like us to know about?	Knowing general parameters for both the business and customer side

Appendix J.6

Restaurant 2

Questions	Answers
Interviewee	
Consent for name usage	No (as of now)
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	1
What have you done to switch from styrofoam?	Biodegradable containers
What have been the downsides and benefits to the ban?	No downsides
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	Have seen one guest bring in their own container
Roughly, how many takeout customers do you see on a daily basis?	10-20% Takeout/leftovers
Roughly, what percentage of your customers are locals versus tourists?	N/A
Would you be able to wash a container like this in your restaurant?	Dishwasher is too hot (Will melt containers)
What are the barriers, if any, that might keep you from participating in a reusable container program?	Liability of customer using their own container and being unsafe
What do you need to know from us before you would consider participating in a program like this?	How container is made/Where the container is from
On a scale of 1-10, how likely would you be to participate in a reusable container system?	4/10
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.7

Liko Lehua

Questions	Answers
Interviewee	Dawn
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	1 Easy
What have you done to switch from styrofoam?	Used the last of them they had in stock, switched to biodegradable containers
What have been the downsides and benefits to the ban?	More expensive after ban/Larger hauling cost/Worse for environment because no one recycles
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	Yes- Old restaurant give discounts if a customer brought in their own containers
Roughly, how many takeout customers do you see on a daily basis?	15% Takeout
Roughly, what percentage of your customers are locals versus tourists?	75% Locals
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	Who will maintain long term/liability (Cleanliness/Storage)
What do you need to know from us before you would consider participating in a program like this?	Cost, Timeline, Health concerns, Container construction, Guaranteed Public Participation

On a scale of 1-10, how likely would you be to participate in a reusable container system?	7/10
Is there anything else we have not asked that you would like us to know about?	User accountability is very important

Appendix J.8

K's Drive In

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	2
What have you done to switch from styrofoam?	Plastic Products, currently looking into biodegradable products
What have been the downsides and benefits to the ban?	No downsides
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	No
Roughly, how many takeout customers do you see on a daily basis?	300 takeout per day
Roughly, what percentage of your customers are locals versus tourists?	90% locals
Would you be able to wash a container like this in your restaurant?	No, they serve using all disposable products
What are the barriers, if any, that might keep you from participating in a reusable container program?	First time seeing this, needs a lot more information before participating
What do you need to know from us before you would consider participating in a program like this?	Everything
On a scale of 1-10, how likely would you be to participate in a reusable container system?	5/10 - believes it will save money
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.9

Puka Puka

Questions	Answers
Interviewee	
Consent for name usage	Yes
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	1, same sizes/dimensions, Easy
What have you done to switch from styrofoam?	Begas - Pressed cane leaf products
What have been the downsides and benefits to the ban?	Less waste, no benefits
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	Has seen people bring in their own containers
Roughly, how many takeout customers do you see on a daily basis?	30-40 takeout per day
Roughly, what percentage of your customers are locals versus tourists?	40% Locals
Would you be able to wash a container like this in your restaurant?	Yes
What are the barriers, if any, that might keep you from participating in a reusable container program?	Cost
What do you need to know from us before you would consider participating in a program like this?	All good
On a scale of 1-10, how likely would you be to participate in a reusable container system?	N/A
Is there anything else we have not asked that you would like us to know about?	No

Appendix J.10

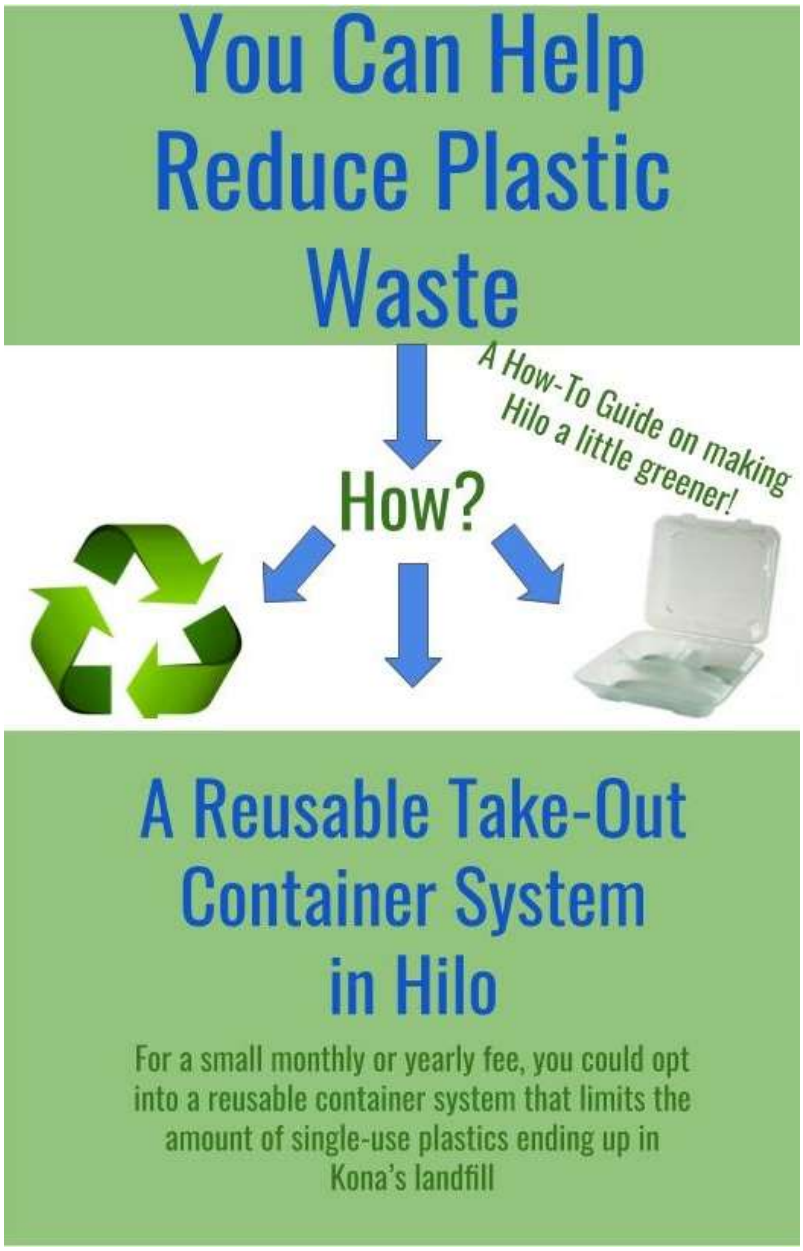
Restaurant 3

Questions	Answers
Interviewee	
Consent for name usage	No
On a scale of 1-5, how easy or difficult was the transition with takeout containers?	5 Hard
What have you done to switch from styrofoam?	Use compostable
What have been the downsides and benefits to the ban?	N/A
Have you seen or used a reusable container system? (e.g. GO Box or GreenToGo)	No
Roughly, how many takeout customers do you see on a daily basis?	Not sure
Roughly, what percentage of your customers are locals versus tourists?	40% locals
Would you be able to wash a container like this in your restaurant?	N/A
What are the barriers, if any, that might keep you from participating in a reusable container program?	Cost
What do you need to know from us before you would consider participating in a program like this?	Customer Accountability
On a scale of 1-10, how likely would you be to participate in a reusable container system?	N/A
Is there anything else we have not asked that you would like us to know about?	No

Appendix K

Below is the pamphlet that is meant to inform customers about how a reusable container system works In order to create this resource we used the data we obtained through the completion of objectives one and two. Specifically, we drew upon the information gained from our surveys of the public. Through that survey we learned that only a small proportion of people had ever heard of a reusable container system. This prompted us to include this resource into our deliverables.

Front:



Back:

Upon membership, you will be eligible to receive takeout or restaurant leftovers in a reusable, microwave and dishwasher safe container, rather than a single-use, disposable one.

An app will be used to verify your membership when you order, then you'll be able to pick up your order in a reusable takeout container.

Containers can be conveniently dropped off at one of many locations around Hilo, to then be cleaned and sanitized at the wash station.

Appendix L

Below is the report that is meant to inform restaurant owners and management of how a reusable container system works and how it will affect their business. In order to create this resource we used the data we obtained through the completion of objectives one and two. Specifically, we drew upon the information gained from our interviews with restaurant owners. Through our interviews we learned that only a small proportion of owners had ever heard of a reusable container system. Additionally as mentioned in section 3.2 restaurants had further concerns about money and liability. These factors prompted us to include this resource into our deliverables, it will serve as a reference for businesses as a system is implemented in the future.

REUSABLE FOOD SERVICE WARE TAKE-OUT CONTAINER SYSTEM

A RESTAURANT'S ROLE

—

The logistics of a reusable container system in Hilo, HI

 [1]

[1] https://www.cbc.ca/news/technology/zero-waste-takeout-1.4867042

WHAT IS A REUSABLE TAKE-OUT CONTAINER SYSTEM?

A reusable container system enables customers to receive takeout or leftovers from restaurants in a durable, reusable plastic container that can be taken home and used again and again. Once the container is used, it can be dropped off at any of the various dropoff locations around Hilo to be collected for cleaning and sanitizing. Once the containers are cleaned and sanitized, they will be redistributed to restaurants who can then hand them out to customers.

A reusable container system does not run without funding. There will be customer buy-in, whether via a one-time fee or a monthly or yearly membership fee to sustain the system. Additionally, restaurants who wish to participate in the reusable container system must pay a yearly fee to partake in the program. This fee offsets the marketing that will be done to attract customers to the participating restaurants, and will potentially be offset by the money restaurants will save on single-use takeout containers.

WHAT IS A REUSABLE CONTAINER?

[2]

Reusable containers are typically 9” x 9” x 2.75” and made of a sturdy No. 5 plastic (polypropylene).

[2] https://www.restaurantsupply.com/get-enterprises-ec-01-1-ja-jade-green-9-x-9-x-3-1-2-customizable-3-compartment-reusable-polypropylene-eco-takeouts-to-go-food-container-with-tab-closure

WHY DO WE NEED A REUSABLE CONTAINER SYSTEM?[3]

Hilo's landfill recently closed, causing a further need to decrease the amount of waste produced on the Big Island. The County of Hawai`i has put efforts in to start this effort, banning single-use polystyrene takeout containers. Common alternatives that restaurants have been turning to are compostable paper containers or single-use, No. 5 plastic - polypropylene (PP) plastic containers, both of which come with downsides. Restaurant owners have noted that the compostable containers tend to leak, absorb too much liquid, and do not always stay closed. Additionally, No. 5 plastic is not recycled in Hawai`i, so any single-use, PP plastic containers will end up landfilled the same as a single-use polystyrene container would.

THE MAIN CONCERNS FOR RESTAURANT OWNERS

Expense

Restaurants voiced that additional costs would be extremely prohibitive to their participation in the program.

Stocking

The stocking of containers within restaurants needs to be predictable and able to adapt to large orders.

Law

Restaurants are concerned about who is liable if someone gets sick due to poor cleaning of containers.

Container Tracking

When orders are placed there has to be a way to link customers who are subscribed to the system with containers at the restaurant.

[3] https://iwradio.co.uk/2017/11/18/chancellor-to-announce-plans-in-budget-for-tax-on-takeaway-containers/

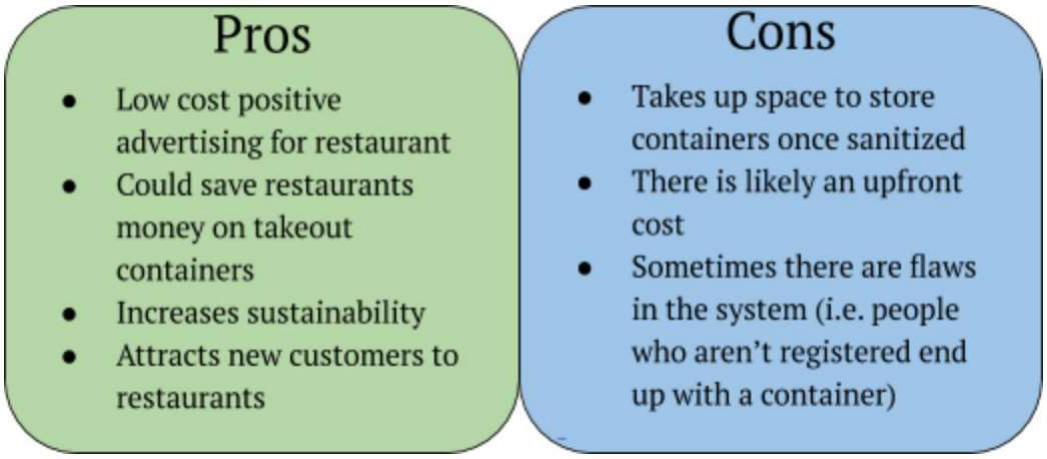
WHAT WOULD THE UPFRONT COSTS OF A REUSABLE CONTAINER SYSTEM BE TO MY RESTAURANT?

There are no upfront costs to the restaurants to participate in the reusable container system during the start-up stage of the program. However, once the reusable container system is up and running, there will be a yearly fee to participate in the program, in exchange for the positive marketing provided by the reusable container system.

WHAT ARE THE LAWS AND REGULATIONS THAT MIGHT AFFECT MY BUSINESS?

Many restaurant owners are concerned about a reusable container system exposing them to liabilities if a customer becomes ill due to use of a reusable foodservice ware. However, this does not pose a problem because under HAR 11-50-45(a) reusable containers must be inspected and approved by the Hawai`i State Department of Health and must be sanitized by the restaurants or another permitted and inspected establishment in order to be considered appropriately sanitized. The wash station for this system will be permitted and inspected as a restaurant, assuring a high health standard. No customer is permitted to bring their own, potentially unclean container to the establishment to pick up their food; the container must be distributed by the restaurant, which will ensure the container's cleanliness.

WHAT ARE THE PROS AND CONS OF PARTICIPATING IN A REUSABLE CONTAINER SYSTEM?



HOW WILL THE CONTAINERS BE WASHED?

All facilities that come into contact with the clean containers must be National Sanitation Foundation (NSF) certified. This means that any drying racks used to store the containers and vehicles used to transport the containers must be NSF certified.

A third party will be used to wash the containers, they will be transported from the third party to the restaurants in an NSF certified container in a vehicle or bicycle. The dirty containers will be dropped off at a centralized drop off location in Hilo (potentially one of many) and picked up daily to be brought to the third party for cleaning and sanitizing. The third party will then deliver the containers to restaurants as needed. Containers will be hand washed and then sanitized using a commercial sanitizer. The wash station for this system will be permitted and inspected as a restaurant, ensuring a high health standard throughout the network of restaurants.

HAS A REUSABLE CONTAINER SYSTEM EVER BEEN DONE BEFORE?

Durham GreenToGo is a reusable container system in Durham, North Carolina that has been in operation since 2017. This organization started off with 28 restaurants, and 996 containers in circulation. On average, one to three restaurants, which pay a $500 yearly membership, join Durham GreenToGo per month.

They paid roughly $5,000.00 for the containers with a one color logo and delivery fees included. Out of all of the containers 30-35 broke in a year, and they averaged 300+ uses per unit.

Users pay $25/year for one-box membership, or $40/year for a four-box membership.

Durham GreenToGo employs three part-time employees, each paid at $15/hour and collectively working for a total of 20 hours per week.

Durham GreenToGo is partnered with a local nonprofit organization which allows them to use its commercial dishwasher in the evenings to clean and sanitize the used containers before redistribution in the following days. The containers are then transported via ELF Solar and Pedal Powered Electric Vehicle from drop off location, to cleaning and sanitizing, and back to restaurants for redistribution. [4]

Durham GreenToGo uses an app to run their system. To use the system, customers scan a unique QR code at the restaurant to check their container out when they pick up their food. Then, when at the dropoff location to return their used container, they scan another QR code located

[4] https://m.apkpure.com/qr-code-scanner/com.moonlight.qrcodescanner

on the container receptacle to alert the company that their container has been returned. There is a large marketing potential for restaurants when they participate in Durham GreenToGo. Customers see that restaurants are taking steps in the eco-friendly direction, where they will tend to spend their money before they would spend money at restaurants that are not taking those initiatives.[5]

Another system that has been implemented in the US is GO BOX, which is active in Portland, OR and San Francisco, CA. Started in 2011, this was the first reusable container system to reach North America. Today, this organization serves over 4,000 customers and reaches more than 140 food vendors throughout Portland and San Francisco.

EXISTING REUSABLE CONTAINER SYSTEMS

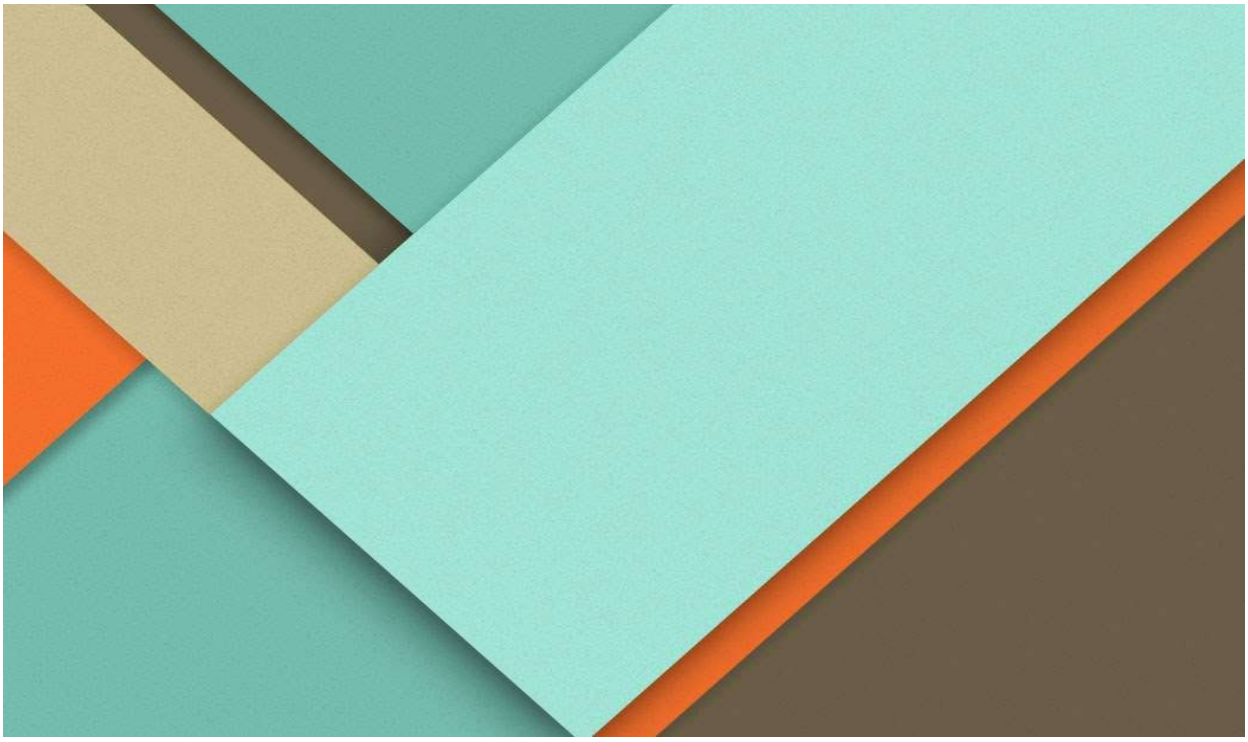
GO BOX - https://www.goboxpdx.com/

Durham GreenToGo - https://durhamgreentogo.com/

[5] https://www.wunc.org/post/sustainability-activists-raise-money-green-restaurant-take-out-system

Appendix M

Below is the business plan that is meant to inform the County of Hawai`i of all of the steps towards implementation that we considered when determining the feasibility. In order to create this resource we used the data we obtained through the completion of objectives one and two. Specifically, we drew upon the information gained from our interviews with restaurant owners and our results from surveys with the public. Through those two sources and background research provided us with the results necessary to determine the optimal system configuration for Hilo. This resource gives the County a plan to follow when they lead the implementation of the system.



Reusable Takeout Food Container System - Hilo, HI

Brian Corcoran, Lindsey Giorgi, Jacqueline Kral, Eric Motler

Team Recycle

Worcester Polytechnic Institute

100 Institute Rd.

Worcester, MA 01609

Executive Summary

A reusable takeout food container system (RTCS) in Hilo, Hawai`i would eliminate some of the single-use plastic waste that gets sent to the landfill every day. An RTCS is a system in which customers can buy into a membership to be eligible to receive a reusable takeout container when picking food up from a restaurant. They then return the container when they please at one of the system's dropoff locations. This system is separate from the restaurant establishment. Per law HAR 11-50-32(p)(2)(B) it is required that take-home food containers are to be initially provided by the food establishment; customers are not allowed to bring their own containers from home to be filled at a restaurant if the container needs to be brought into the kitchen. Customers are, however, allowed to bring their own containers for leftovers they can plate themselves after they have eaten at the restaurant. With an RTCS, these containers can be taken home with takeout food in them, then when the customer finishes, it can be returned to a designated dropoff location. From there, the containers will be brought to a wash station, sanitized, and then redistributed among the participating restaurants. This system would help the environment while also providing participating restaurants a positive community presence. Participating customers will be drawn to restaurants that participate in the program, thus increasing their revenues, while helping the environment.

Figure 1. An Example of a Reusable Container

The target market of this RTCS is anyone who frequents restaurants for take out meals in the Hilo area. There are upwards of fifty restaurants in Hilo, and there is a large takeout culture in the area as well. Anyone who gets takeout meals or frequently brings leftovers home with them from restaurants in Hilo makes up the target market for the RTCS.

There are numerous things to account for while budgeting for a system like this. Not only do you have to budget for the tangible items such as the containers and the equipment required to sanitize them, but also for the fact that there are other costs such as permits and inspections. A system like this will require a larger upfront cost, while requiring smaller investments to sustain the program. Depending upon which model of the system is utilized, we estimate that the time it will take to break even will range from six months to about two years.

RTCSs similar to this have been implemented in multiple cities in the US. In order to get a new RTCS up and running, its founders would need to first acquire funding for the RTCS. This funding can come from places such as crowdfunding or grants. Following the establishment of funding for the RTCS, RTCS founders must find restaurants and customers who are willing to participate in the RTCS in its earliest stages. The number of customers and participating restaurants should continue to increase over time. Then, RTCS founders must establish a workforce that will run the system. Following these steps, founders would need to establish a wash station, where all cleaning and sanitizing of the containers as required by state law would be done. This creation of a wash station could be done via a partnership with a third party, or by purchasing a dish washing station and commercial sanitizer specifically for the new program. It is important that a third party relationship is established, or that the RTCS founders purchase their own wash station and commercial sanitizer because many restaurants we interviewed stated that their facilities lacked the space to clean and sanitize the reusable takeout containers in-house. In the case that a partnership is established with a third party, the RTCS founders would simply acquire a restaurant permit under risk category three (the lowest risk category) - meaning it would be permitted as a restaurant that is sanitizing containers but not serving food - in order to operate at this third party location. In the case that no third party partnership is created, the reusable container system must acquire a wash station and commercial sanitizer that would be inspected by the County of Hawai`i Department of Health and get the proper permitting to operate at this location. Then, they must create a mobile application and determine dropoff

locations and a mode of transportation for the containers. Upon the completion of these steps, the RTCS can be implemented.

Main Objectives

1. Reduce the amount of single-use plastics in Hilo
2. Provide the County of Hawai`i with information and steps of implementing an RTCS

Mission Statement

The mission is to help stakeholders in Hilo understand how a RTCS works and the course of action needed to implement such a system. The RTCS will utilize restaurant and public participation to reduce the amount of plastic waste that ends up in landfills.

Other Existing Systems

University Campuses

Hundreds of universities all over the United States have already implemented different kinds of RTCSs. The University of Michigan implemented a RTCS and found that half of the University's Café 60 daily takeout customers were using reusable containers after only one week. After only nine months, 5,000 plastic containers were diverted from going to landfills.[6] As the RTCSs grow on campuses, students will learn more about reuse programs. When they graduate and move to different areas all over the world, they will have existing knowledge of RTCSs. Although analyzing college RTCSs is a good place to start, a RTCS is easier to implement on campuses because it is a centralized location and all of the kitchens are already equipped to wash dishes and are permitted. More information on how campus RTCS are started can be found by following the link below.
https://www.shareable.net/how-to-start-a-reusable-takeout-container-program-at-your-college/

[6] Meyer, R. (2013). How to start a reusable takeout container program at your college. Retrieved from https://www.shareable.net/how-to-start-a-reusable-takeout-container-program-at-your-college/

GO Box

The mission of GO Box is to "inspire the world to reuse."[7] It is a RTCS set up in Portland, OR and San Francisco, CA. Go Box has become the largest reusable service in the US working to eliminate single use disposables. It uses a centralized washing location along with a multitude of dropoff locations to run its RTCS. More information on GO Box can be found by following the link below.

https://www.goboxpdx.com/

Durham GreenToGo

GreenToGo is an RTCS that aims to reduce the amount of trash that goes into the landfills in Durhman, NC. It uses a system similar to checking out a library book and returning when you have finished. It is one of the smallest RTCSs in existence outside of university campuses, making it a good comparison for Hilo. They have created Durham GreenToGo Open-Source[8], which is a set of resources for others who are trying to start their own RTCS. These resources share some of the successes and challenges they have faced thus far in a hope of helping others develop successful systems. They are trying to replace the need for the single-use disposable containers. More information on GreenToGo can be found by following the link below.

https://durhamgreentogo.com/

[7] GO box. (2020). Retrieved from https://www.goboxpdx.com/mission/

[8] https://greentogo.thinkific.com/

Figure 2. Student Using a Reusable Container for Food

Keys to Success - Steps of Implementation

1. Secure Funding for the RTCS

Creating a budget is the first thing that needs to be completed when planning to implement an RTCS. Before a workforce can be hired or a wash station can be secured, the founders of the system need to have money to start with. The exact amount of funds required to launch the system is dependent on how the system is to be set up. The different ways the RTCS could be run are outlined in the section to follow. An example of a starting budget for potential founders of a program is further explained in "Starting Budget" below.

a. Crowdfunding is an extremely useful way to gather seed funding for this system. On sites like Kickstarter, donors receive gifts for their donations with the value of said gifts increasing as donations do. This is a great way for people who are

excited about the system to get involved early. Pre-release memberships can be sold through this site at the same time funds are being raised for the organization. As donation values increase, there are more opportunities to partner with businesses. Through the crowd funding site it is important to offer businesses the option to sponsor the program in return for low-cost public relation benefits. Durham GreenToGo successfully utilized the site Kickstarter to launch their RTCS, yielding promise for the use of this tool in Hilo.

b. Grant funding will be another essential way to raise the necessary funds to launch the RTCS. The County of Hawai`i Research and Development Department offers annual innovation grants. The reusable container system could be extremely competitive in the grant's sustainable development category. Winning or obtaining one of these grants could jumpstart the RTCS. Applications for this grant are due in May of each
year.

   In addition to providing grants of their own, the County of Hawai`i Research and Development Department provides recommended grant writing resources to help with applications. These resources include free online classes and informational resources pertaining to both grant writing and crowdfunding. More information about grants and application resources can be found by following the links below.

   County of Hawai`i Department of R&D Innovation Grant:
   https://www.rd.hawaiicounty.gov/funding-grant-resources/r-d-innovation-grants

   County of Hawai`i Department of R&D Grant Training and Nonprofit Resources:
   https://www.rd.hawaiicounty.gov/funding-grant-resources/grant-training-and-nonprofit-resources

c. The County of Hawai`i Finance Department also provides non-profit grants during each fiscal year. These grants could be useful in securing the start up funds for the RTCS. Applications for this grant are due in January of each year.

Instructions and resources to assist in applying for this grant can be found by following the link below.

County of Hawai`i Non-Profit Grant Forms:
https://www.hawaiicounty.gov/departments/finance/budget/nonprofit-grant-forms

2. Find Restaurants Willing to Adopt the RTCS in its Early Stages

To get the RTCS up and running, participation from restaurants who are willing to work with the founders of the program in its beginning stages will be essential.

a. The goal is to start the RTCS with five to ten restaurants in participation. This estimate comes from our data, in which ten restaurant owners allowed us to interview them and about half said they would be willing to participate in the reusable container system. As the program gets up and running, participating restaurants will be required to pay an annual fee. This fee will cover the marketing expenses the RTCS will cover. In return restaurants receive additional marketing through the promotion of the system.
b. These willing restaurants can be determined via surveys and interviews to gauge interest in the system. We found that many restaurant owners in the Hilo area had strong opinions, whether for or against, the RTCS. Consulting them and asking for their participation in the RTCS will be an effective way to get participants in its early stages. Free participation during the first year of implementation will serve as an incentive for restaurants to join early.

3. Begin Advertising the RTCS to Hilo and Surrounding Communities

To get the system's first customers and spread the word to restaurants to participate, the founders of the system will need to advertise. Marketing aims to increase community engagement.

a. To advertise the system, founders will post about its launch in local Facebook groups and request a press release from its founders, possibly by the County of Hawai`i.

Engaging multiple forms of media will get the word out about the RTCS and aid in its launch.

b. Additionally, founders can hang flyers at local businesses and other public locations that see a lot of foot traffic. In addition, making connections with nonprofit organizations such as Recycle Hawai`i and Zero Waste Big Island will be helpful in getting the word out about the system. Each of the aforementioned organizations have large memberships that are passionate about sustainability. Many of the system's starting members could come from these or similar organizations.
c. Participating restaurants can post signs on or within their establishments in order to familiarize their customers with the system both before it is launched and when it is up and running.

4. Find Workforce to Run the RTCS

In order to run a functioning RTCS, a group of employees or volunteers who will be responsible for transporting, cleaning, and sanitizing all containers needs to be established. These employees are separate from restaurant employees; the RTCS is run as a third party outside of the restaurants participating in it. Due to the fact that the RTCS will not have a large starting budget, it would be best if the workforce could be volunteer based.

a. This group of employees or volunteers could be established by the workforce reentry population in the Hilo area. Citizens like parolees, halfway house residents, and members of welfare to work programs are likely candidates for these positions. Partnering with a local organization that offers a work reentry program would add an aspect of social sustainability to the system. The budget may not allow workers to be paid much in the beginning, so this employment could serve as experience for people looking to reenter the workforce.
b. Additionally, a small group of people needs to oversee and run the RTCS. This system can be run as a for-profit business or as a non-profit organization. A benefit of implementing the RTCS as a for-profit business is that the RTCS founders would have complete control over how the revenue is spent. However, unlike a non-profit organization, a for-profit business is not exempt from certain taxes. So, running the

RTCS as a for-profit business would give founders more freedom with the money they earn, but would cost them more in taxes in the long run. Additionally, there are more grant opportunities available for non-profit organizations than there are for for-profit businesses. Given the amount of time it will take to break even on the RTCS, we recommend that it is implemented as a non-profit organization. The RTCS will not require a large workforce and will not generate much revenue.

c. As with any hired staff, the staff of the RTCS will need to be insured to account for any potential liabilities. These insurances are outlined in "Accounting for Unknowns" below.

5. Establish Partnership with Third Party to Ensure Container Washability at their Site

It would be best to establish a partnership with a third party that has the ability to wash and store containers and is already permitted to do so. Although the third party's permit would not apply to the RTCS, in order to have received a permit, its facilities must be up to code and able to pass inspection under the system's permit. The RTCS will need its own permit to operate at the third party's location. The RTCS workforce would hopefully be able to use the wash station after normal hours of operations of the third party in order to not interfere with their normally scheduled activities. In the event that this third party partnership cannot be established, see section 5A below.

a. For the RTCS to utilize the sanitation services of a third party, the third party must have a wash station, commercial sanitizer, and drying station that is up to code and will pass the DOH inspection of the RTCS. Used containers will be washed and then be put through a commercial dishwasher. The system will need its own permit from the State of Hawai`i Department of Health Food Safety Branch. This operation will be permitted as a restaurant in the lowest risk category (Risk Category 3). It will be assigned the lowest risk category because the RTCS will not be serving food. The partnership established with the RTCS will provide the third party with a positive community presence.

b. It is important that this partnership is established between the RTCS and a third party due to the concern expressed by many restaurant owners that they lacked the space to

clean all of the reusable containers in their own facilities. Additionally, a central wash location ensures that a cleanliness standard is maintained across the whole system.

c. The workforce will need to transport the used containers to the wash station and then transport the clean containers to the restaurants for redistribution. This can be done by bicycles, which offer a sustainable solution to container transportation. The logistics for transportation is included below in the "Startup Budget" section.
d. Other considerations that must be taken into account when budgeting are potential maintenance costs of the wash station and sanitizer and of the building, in the case that there is damage caused by the washing process.

5A. If a Third Party Relationship Cannot be Formed- Establish a Wash Station

If a partnership with a third party cannot be established, then the founders of the RTCS need to find somewhere else to establish a wash station.

a. In this case, the founders and workforce must find a space to rent to place a wash station. This will cause more expenses to the start up budget such as rent, the cost of a commercial sanitizer, and wash station, sanitizer, and building maintenance. The estimated cost difference is located in the "Startup Budget" section.
b. This rented space would need to be zoned commercially by the County of Hawaii Planning Department and permitted as a restaurant to hold and wash these containers by the Department of Health.
c. It is ideal to form a partnership with a third party that has the proper facilities and equipment where the dishes can be washed. Other reusable container systems in the US have partnered with the Salvation Army, soup kitchens, or local rehabilitation centers. Partnering with a third party reduces the cost of the startup budget.

6. Create Mobile Application to Assist with RTCS

The creation of a mobile application is very important to the functionality of the RTCS. It will keep track of containers and help customers use and join the program. A customer will order takeout food either online or over the phone where they will indicate that they

are a member of the RTCS. When they go to pick up food, they will have to scan the pickup QR code at the restaurant.

a. Each user has their own account with a connected credit or debit card. This will allow customers to join with a yearly subscription that will charge their card each year. This will include a container deposit charge that can be refunded if membership is cancelled.
b. Users can change membership status at any point. This can be changing between types of membership (1 container or up to 4 containers checked out at one time) or cancelling membership.
c. There will be QR codes at every participating restaurant and at all specified dropoff locations. Each user will have to scan a QR code at a restaurant or at a dropoff location to set their account status to either having a container in their possession or available to pick one or more up. The scan screen will come up when a restaurant or dropoff location is chosen.
d. This app will collect the system metrics such as how many restaurants are participating in the system, how many boxes are in circulation, and how many boxes need to be cleaned. These metrics can be reported to consumers and the organization for marketing use and to increase efficiency.
e. A mobile application will cost money to design and develop. Either a freelance developer or a contracted developer can be hired to make the app. The costs for any kind of app development and maintenance are always variable. More of the mobile application costs can be found in “Accounting for Unknowns.”
f. The following pictures are an example of a possible mobile application. This app is not functional; it is an example of what an app for a RTCS could look like.

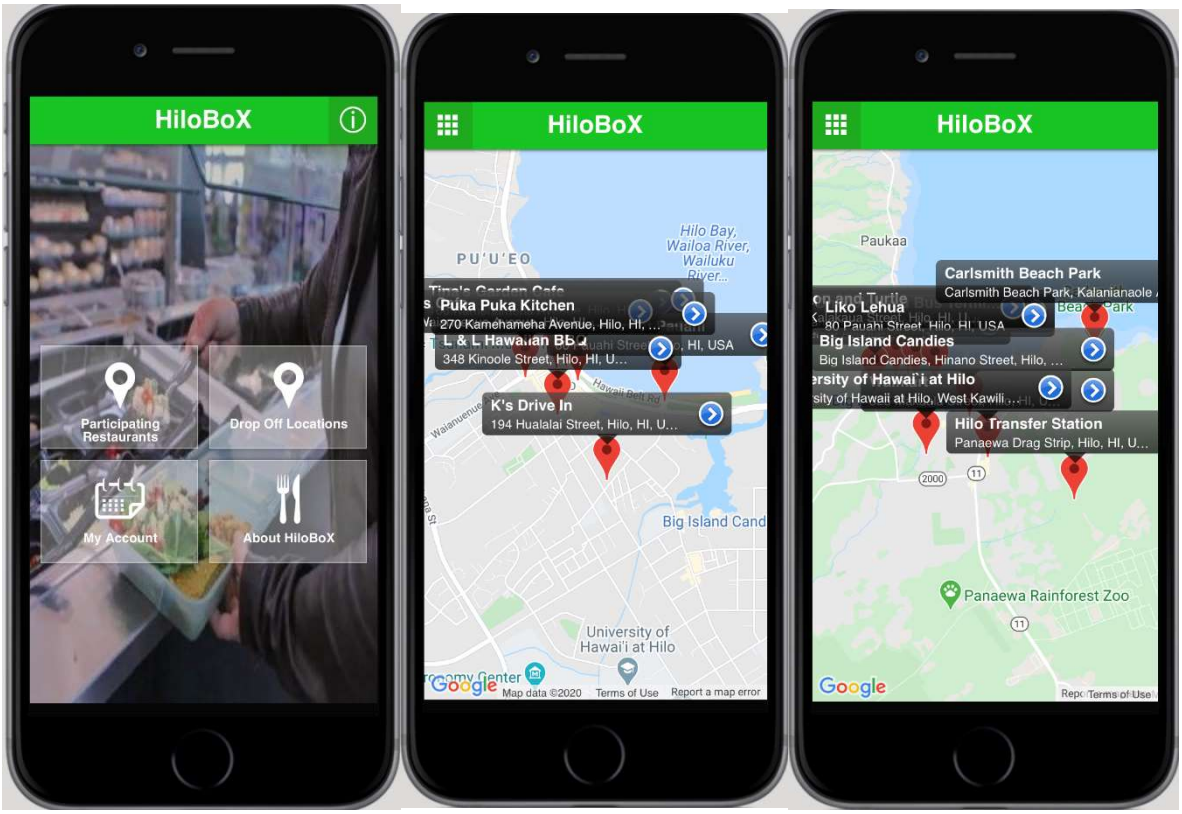


Figure 3. Mobile Application Example (Swiftic, 2020)

Above, on the screen shown to the left is the layout of the home screen, which allows users to select between information about the system, a list of the restaurants that are participating, dropoff locations for the used containers, and the customer's account information. On the participating restaurant page, once a location is selected, the camera will open to scan a QR code. The middle screen is a layout on the map of the participating restaurants. The screen shown to the right is a layout on the map of all the available dropoff locations for the container.

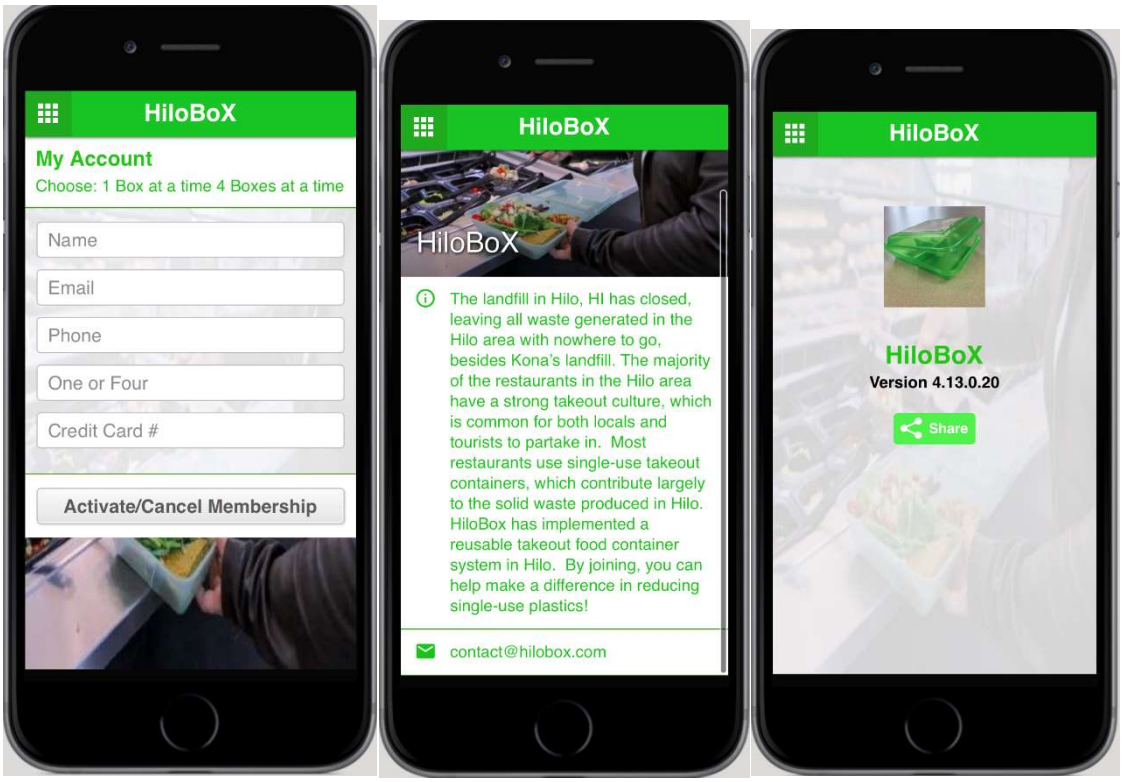


Figure 4. Mobile Application Example 2 (Swiftic, 2020)

Above, shown to the left, is the My Account screen. Here, the user can edit their account information, including the credit or debit card they would like on file, or the membership option they prefer. The middle screen is the About HiloBox page, where information regarding the system can be found, along with contact information in the case that a user is in need of support. Shown on the right screen is the specific information regarding the app. A share button is also present if the user would like to share the app with others.

7. Acquire Dropoff Receptacle and Vehicle to Transport Containers

This system requires dropoff receptacles around the city where customers can drop off their used containers. The used containers will be picked up by the workforce from these predetermined locations.

a. Dropoff receptacles must be secure and clear as to what they are (i.e. they cannot look like trash receptacles). They will have QR codes posted on them for users to scan upon dropping their used containers off. They will have a small slot that is

easy only for the containers to fit through to try to minimize the amount of trash people put in.

b. As the RTCS is a project under the scope of the County of Hawai`i, the dropoff receptacles will likely be placed on city property throughout Hilo. The City of Hilo will need to approve the locations before they are placed. If restaurants are willing to have a dropoff outside their restaurant, it may still also need city approval because sidewalks are city property.

c. After the container has been used, the customer will use the mobile application to find the nearest dropoff location. The customer will then scan the QR code on the dropoff receptacle and place the container through the slot.

d. As a way to support the RTCS, local businesses could pay to advertise on the sides of the dropoff receptacles.

8. Go Online

On the date and time of the founders' discretion, the online app will become active for the public to use. Members will be able to check out and return the used containers from the restaurants or to the dropoff locations.

a. Within a few days prior to the release date of this system, the dropoff receptacles must be placed in their predetermined locations. They must be installed in such a way that they pose no public safety concerns and are not interfering with any normal, everyday activities.

b. Prior to the app going live, the QR codes must be placed in the restaurants for the customers to be able to scan. The locations of these QR codes will be determined by the type of restaurant that is participating. For example, if a restaurant has both sit-in and take-out options, the QR code will have to be placed where take-out orders are taken and at the tables where customers will be sitting, in the case that they want to sign up for the program during their meal.

c. Another aspect that will be implemented on the launch date is having the participating restaurants display the reusable container system logo on the windows of their establishments. Not only will this help advertise the system, but it will help the restaurant by showing how they made advancements in plastic waste reduction, which will attract customers.

Startup Budget

This budget serves as a general estimate of the start up costs that need to be accounted for to start an RTCS. Due to the variable nature of the startup process, the costs are general estimates that are presented to show the scope of financial commitment required to start a system. The uncertainty of this budget is due to the unknown washing configuration of the system. Once the startup process is underway, the budget can be used as a template and edited to fulfil the needs of the RTCS.

Dropoff Receptacles

The dropoff receptacles needed for this system need to be secure, stand alone units that do not look like trash receptacles. There are existing products that could accomplish this goal such as library and mail drop boxes. The founders of the RTCS could choose to purchase one of these existing units and modify it to suit their needs. These modifications would have to include a point to secure the drop box to the ground, and an NSF certified bin to collect the containers once they are deposited in the box. There is a large price difference between these two dropoff receptacle options. The mail drop box is included in the budget because it meets the requirements of a dropoff receptacle and is the most cost effective option.

Figure 5. Mail Drop Box[9]

Price: $500

Figure 6. Library Drop Box[10]

Price: $2800

[9] QualARC Black Freestanding Locking Mail/Parcel Drop Box https://www.homedepot.com/p/QualArc-Black-Freestanding-Locking-Mail-Parcel-Drop-Box-ALX-800-REAR-BK/207155021

[10] American Book Returns M810 With Depressible FloorS http://bookdrops.com/m810-with-depressible-floor-for-150-books/

Containers

For the RTCS, the best containers to use are the GET EC-12 9” x 9” x 2 ¾” containers with internal dividers, which are similar to disposable containers currently used for most takeout meals. They can be purchased directly from GET in large quantities, or through dealers in smaller quantities. As listed in the cost analysis below, 200 boxes can be purchased through a website called Webstaurantstore.com to start the system. They are sold in cartons of 12. On the site there is also an option to add a logo to each container, which could be useful for the system’s marketing. If the system is small enough, there could be a map of dropoff locations in the city or instructions on the return process next to the logo. Another option is stainless steel reusable containers which, by themselves, are more durable than plastic ones. However, this type of container comes with many challenges. They are about triple the cost of their plastic counterparts. Additionally, there is no data to refer to when it comes to their use in other RTCSs, making their lifecycle unknown. They are also heavier than plastic containers, making shipping to the island and transporting around Hilo more difficult.

Per Hawaii Administrative Rules (HAR) Chapter 50 Food Safety Code section 11-50-45, any material used to create utensils or containers that will come into contact with food may not allow for damaging substances, colors, odors, or tastes to transfer to the food (Amendment and Compilation of Chapter 11-50 Hawaii Administrative Rules). These utensils or containers must be safe, durable, corrosion-resistant, nonabsorbent, sufficient in weight and thickness to withstand repeated washing, have a smooth finish and easily cleanable surface, and be resistant to pitting, chipping, crazing, scratching, scoring, distortion, and decomposition. Per HAR 11-50-46, any utensils and containers that will come into contact with food must be strong enough to hold their shape under normal use. Any food-contact surfaces should be smooth and have no breaks, open seams, cracks, chips, inclusions, pits, and similar imperfections. They should also lack sharp internal angles, corners, and crevices, and should have smooth welds and joints (Amendment and Compilation of Chapter 11-50 Hawaii Administrative Rules).

Consumables

The price to wash the containers as the system grows is outlined in the budget below. The budget accounts for the cost of sanitation chemicals, commercial dish soap, and utilities. Commercial dish soap is used for either hand or machine washing before they can be sanitized using the

commercial sanitizer and sanitation chemicals. The figures used in the budget are all general estimates based on figures from the restaurant industry and research on reusable container systems. It is unknown what washing equipment the system will utilize so it is nearly impossible to estimate the exact usage of the utilities, chemicals and soap listed. The quantities used in the budget are rough estimates that will allow those starting the system to estimate their start up costs. This budget will require modification once all of the parameters described in this plan are set (wash station, permits, equipment). While we can project the growth of the system in the case that it grows much slower or faster than previously thought, the amount of consumables will be subject to change.

Permits

The RTCS's wash station will be permitted by the Department of Health (D.O.H.) as a restaurant permit under risk category three, which means it would be permitted as a restaurant that is sanitizing containers but not serving food. This permit is separate from any permits the participating restaurants have at their own locations. The permit will need to be renewed every two years and it will have to be inspected twice per year by a D.O.H. inspector. These inspections cost between $50-250, with the exact price of inspection being determined by the D.O.H. inspector based on facility size.

There are regulations that affect the cleaning and storage of the reusable containers in this permitted wash station. Essential is law HAR 11-50-53(e)(1)(C), which states that restaurants or in this case, the wash station, are required to store clean equipment and utensils, which would include reusable takeout containers, at least 6 inches off the floor. Under HAR 11-50-45(a) reusable containers must be inspected and approved by the Hawai`i State Department of Health and must be sanitized by the restaurants or another permitted and inspected establishment in order to be considered appropriately sanitized.

Container Transport

As the RTCS is launched there will be a need to efficiently transport containers from dropoff receptacles, to the wash station, and back to restaurants. Since Hilo's restaurants are located in such close proximity to each other it makes the most sense in terms of sustainability and economics to use a bike and trailer combination to transport containers throughout the city. Durham GreenToGo uses retrofitted bicycle trailers that were originally meant to carry children

to carry their containers. The trailer needs to be lined with National Sanitation Foundation (NSF) certified material and must be cleaned after transporting dirty containers. This can be accomplished by purchasing a NSF certified box that will fit within the trailer. This box must store the containers and keep clean and dirty containers separate. The D.O.H. required that the containers are transported in a clean environment and do not come into contact with dirty containers once they have been cleaned. The budget reflects an estimated price of a bike and trailer combination with a NSF certified carrying compartment, which can all be purchased at a local bike shop and online.

Employee Considerations

The budget created for the RTCS does not include provisions for the wages or insurance coverage needed to employ part-time workers. The RTCS is most feasible if it can be started and run by volunteers, until it can financially support their wages. If the founders of the system decide to hire employees they will need to account for their wages and the proper insurance for liabilities in the budget. These insurances are outlined in "Accounting for Unknowns" below.

Budget

Start Up Budget for an RTCS in Hilo, HI							
Containers	Quantity	Source	Price ($)	Shipping ($)	Total ($)	Wash Station Purchase Totals ($)	No Wash Station Purchase ($)
GET EC-12 9" x 9" x 2 3/4" Jade Green Customizable logo 3-Compartment Reusable - 12/Case	204 containers	Webstaurant Store	1,536.97	394.85	1,931.82	1,931.82	1,931.82
Sanitizer							
25"Lx30"Wx76"H comercial sanitizer and Booster combo	1 Sanitizer	Hobart	4,000	0	4,000	4,000	
Consumables							

Commercial Dish Soap 5 gallons	2 Units	Webstaurant Store (can be purchased locally)	70	0	70	70	70
Sanitation chemicals 5 gals	1 Unit	Webstaurant Store (can be purchased locally)	22	0	22	22	44
Possible facility rent	12 months		6000	0	6000	6000	
Utilities Estimate Gas+Electricity+Water (Assuming 300 sqft) using 1/2 or avg restaurant useage	12 Months		912.5	0	912.5	912.5	912.5
Permits and Inspections							
Restaurant Permit (Every Two Years) (Risk Category 3)	1 Permit	D.O.H.	100	0	100	100	100
Restaurant Inspection (ranges from 50-250 dollars based on size)	2 per year	D.O.H.	250	0	250	250	250
Drop Off Receptacles And Container Transport							
Drop Off Receptacles	3 units	The Home Depot	1500	0	1500	1500	1500
Bicycle + Trailer	1 unit	Bike Shop or Online	600	0	600	600	600
Unknown Costs			5000	0			
...					5000	**5000**	**5000**
						Grand Total With	**Grand Total**

						Wash Station Purchase ($)	Without Wash Station Purchase ($)
						20,386.32	10,386.32

Budget Details

The budget above accounts for two separate scenarios, one where a community partner provides the system's wash station, and another where the system purchases its own sanitizer and pays for the building that houses it. These two options are differentiated as "Wash Station Purchase Totals" and "No Wash Station Purchase". In the event that a third party is utilized, there will still be expenses, such as covering the costs of consumables, utilities, and machine maintenance. If there is a partnership formed with a third party organization that has the facilities to wash containers, The RTCS and third party must determine what financial responsibilities are assigned to which organization. The budget above accounts for estimated running costs of the washing operation. However, it is possible that some of those financial commitments will fall upon the third party instead of the RTCS. The budget is entirely editable and adding new items or changing the price of an item will update each of the totals, allowing the budget to adapt as the system develops.

Breaking Even

This calculator is an example of how to calculate the number of months it will take to break even after starting the system. It is calculated by first setting the input parameters to the desired values. Next the amount of seed funding and the revenue from the starting subscribers are subtracted from the grand total of the budget. That number is then divided by the amount of revenue gained from the new members that are added each month. The budget for the RTCS can be edited to account for new expenses as they arise. When the new budget total is updated, so will the break even calculator since each grand total is linked to its respective section in the

calculator. This tool is extremely useful in determining the amount of fundraising that needs to occur before the system can be started.

Breaking Even

INPUT 1		
# Of New Restaurants Per Month		
2		
INPUT 2		
Restaurant Subscription Cost Per Year ($)		
500		
INPUT 3		
Consumer Subscription Cost Per Year ($)		
25		
INPUT 4		
# Of Starting Members		
25		
INPUT 5	OUTPUT 2	
# Of New Members per Month	**Breakeven Months Without Wash Station Purchase**	**Breakeven Years Without Wash Station Purchase**
10	6.35	0.53
INPUT 6	OUTPUT 3	
Seed Funding ($)	**Breakeven Months With Wash Station Purchase**	**Breakeven years With Wash Station Purchase**
5000	19.68	1.64

Accounting For Unknowns

In terms of budgeting for the RTCS, there are multiple unknowns that cannot be determined until the RTCS is actually in its start-up phases. One major cost that will have to be determined is the development and maintenance of the mobile application. There are fees from both Android and iOS platforms that are required to have an app on the Google Play or App Stores. Regarding the development of the mobile application, there is a large range that it could cost to be completed. Costs could vary depending on the servers/cloud servers that are chosen, or if it is decided to be run on a host server. Some freelancers can complete the application alone, however, it is ideal to have a group of freelancers work on it to ensure that it is being done correctly. These freelancers, for the majority of circumstances, charge hourly for their work. These rates vary depending on experience, success of past work, and the details associated with the application. Aside from actually finishing the development of the application, there has to be a team in charge of updating servers with new locations, services, or any other changes needed over time. Usually, this is a set price per year, but due to growth in the system that will inevitably happen, costs can rise based on the amount of users and activity on the application.

Regarding protection for the RTCS, there are different types of insurances that are needed before any operations begin. Liability claims can happen to any business, and can be especially hard for smaller ones to cover in the case of an accident. Thus, it is necessary to have premium level liability insurance. This option will not only cover any injuries or property damages that occur on the premises, but will cover any claims against errors or workplace negligence. For example, if there is a claim that a container was not properly sanitized, resulting in a customer falling ill, this will be covered under insurance. Outside of these insurance options, part of the RTCS's operation is transportation of the clean and dirty containers. There is a possibility that this will require a member of the workforce to use their own vehicle, which is why Commercial Auto Insurance should also be budgeted for. All insurances can vary upon their provider, the exact plan the founders choose to have, and the size of the workforce.

There are also costs associated with maintenance of the facilities, including the wash station and building costs. Eventually, some parts of the sanitizer and booster will need maintenance, as well as some other parts of the washstation, but it is almost impossible to know when and to what extent. Building costs are also unknown until the RTCS is up and running. The amount of usage of certain utilities such as water, electricity, and gas vary upon the size of the workspace, the

amount of time the workspace is in use, and what type of deal is made with the third party (if a third party partnership is present).

Opportunities

There is much opportunity for the RTCS to grow throughout the entire city of Hilo, and potentially expand to an island-wide service. If the system begins to grow and more restaurants begin to participate in it, the public buy-in may grow which would cause a need for more container system locations. The system may eventually need multiple wash stations covering more of the island, and more container drop-off locations throughout the towns. As long as creating new stations does not increase the customer price of membership, then growing the program will only help decrease more single-use plastic across the island.

In the future, the RTCS will break even on its projected budget due to offsets from public buy-in and restaurant participation fees. If the founders want to adapt the plan and choose to invest in developments for the RTCS that is not included in the budget plan, the organization will need outside funding from more sources.

Next Steps

As the reusable container system begins to grow and become more popular among the public in the Hilo area, there will have to be changes in the organization. As more restaurants begin to participate in the system, this will create an increase in advertisement, which could indirectly cause an increase in the number of participants. As this occurs, more reusable containers must be ordered and stocked in restaurants to accommodate the increase in usage of these containers. Eventually, with the increase in participants and container usage, the wash station will be used more frequently. This could cause the wash station to fall behind on washing the number of containers needed at a certain time. Although not likely to happen within the startup period, those in charge should begin to look into finding alternate solutions to help this issue, such as a second commercial sanitizer or more staff hired to wash. If the RTCS becomes successful and the business grows, the workforce will have to be increased, as well.