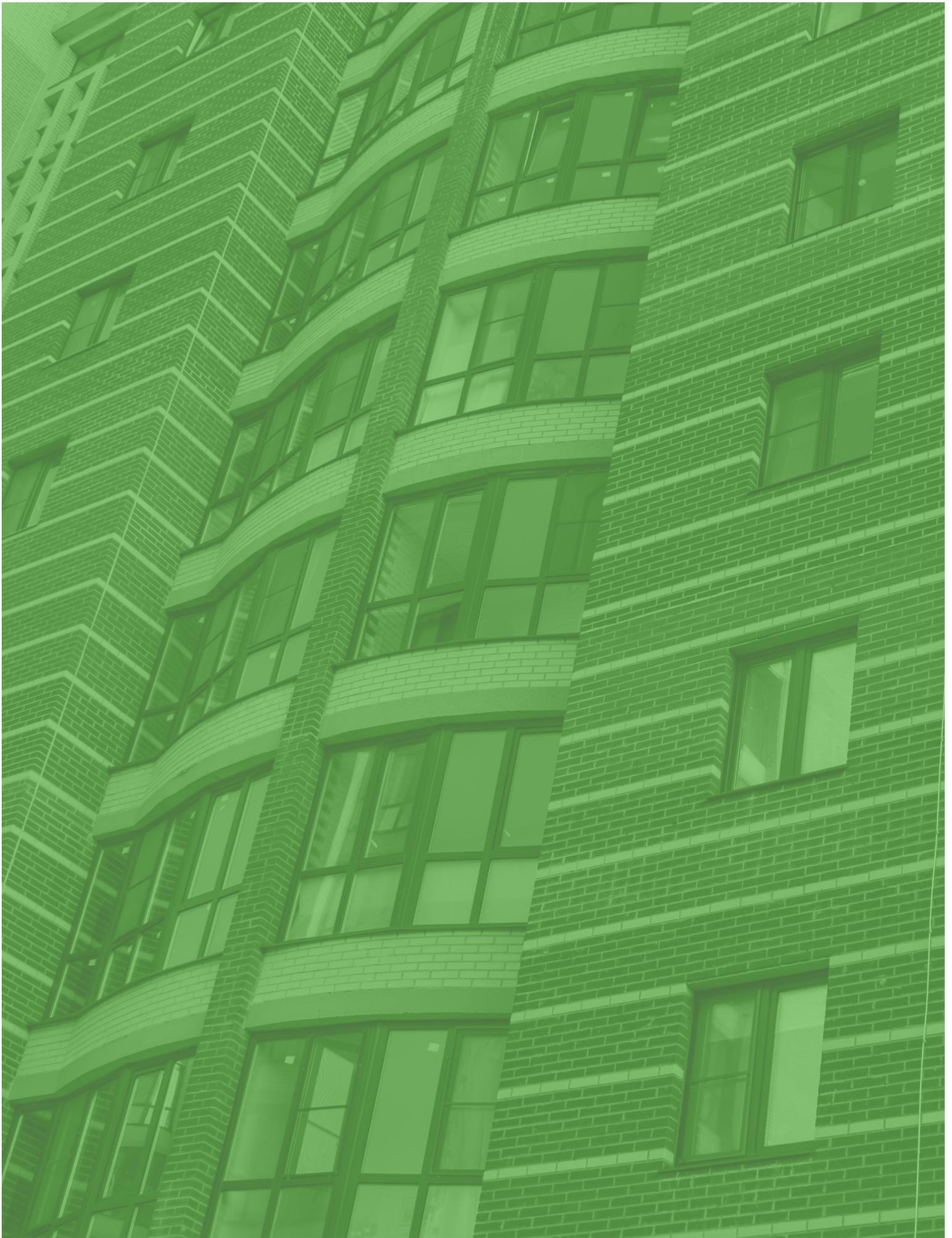




PILOTING FOOD SCRAP DIVERSION IN MULTI-FAMILY BUILDINGS

Raising awareness about food waste prevention and
organic waste diversion programs



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ABSTRACT:

Raising awareness about food waste prevention and organic waste diversion programs among residents of multi-family dwelling units leads to increased participation in organics diversion programs, a decrease in the amount of food waste, and a positive impact on the community. This pilot program examines successful strategies for implementation.

I.

CHAPTER 1

Executive Summary

*(Includes Project Intro, Brief Methodology,
Overview of Results, Recommendations)*



EXECUTIVE SUMMARY

Global Green USA partnered with municipalities, regional waste haulers, and site managers throughout California to pilot organic waste diversion programs for multi-family dwellings (MFDs). The pilot program results will inform the development of an expansion model and recommendations for best practices. Our pilot program recruited 31 representative MFD sites in approximately eight Bay Area cities and three Los Angeles County neighborhoods.

The recruitment criteria included an examination of services currently available and their status regarding adopting organics programs for their local MFDs. A multifaceted recruitment plan was developed and included community event tabling, attendance and participation at Chamber of Commerce meetings, and utilizing Eco-Ambassadors/ resident program ambassadors. Additionally, Global Green signed memorandum of understanding (MOU) documents and agreements with city and regional planning agencies in order to gain high level endorsements. The pilot program evaluated the impact of food waste prevention and food scrap recycling, by measuring the volume diverted from landfills into organics collection carts. The impact of resident education and enhanced outreach on the level of participation in the program was also measured and evaluated.

The identified target sites were contacted to explain the project and its components. When a target site expressed interest in participating, a visit was scheduled in order to collect various data points necessary for successful program implementation. Global Green conducted pre-program audits on the confirmed sites using control groups to gain insight regarding baseline volume of trash and organics, and to evaluate various types of outreach and forms of communication. This data was used to determine the effectiveness of the program.

The participating sites were divided into three sample groups, with surveys distributed to test the variation between messaging during outreach:

- > **Sample A:** received messaging about food waste prevention (FWP) and messaging on food scrap recycling (FSR) simultaneously
- > **Sample B:** received messaging about FSR only
- > **Sample C:** received messaging about FWP during the first survey, and then participated in a subsequent survey about FSR one month later

A pre-waste and post-waste audit was conducted at each site. The baseline format for all audits included a sample from the trash bin and examining all the materials in the organics bins. Waste content was then sorted into trash, recyclables, plant debris, food-soiled paper, avoidable produce, avoidable food waste, unavoidable food waste, and an “other” category for materials such as e-waste and textiles. To serve as controls for the project, pre-waste audits from four sites were selected with the intention of determining how effectively the organics bins were being utilized in the absence of enhanced resident outreach.

Global Green provided enhanced resident engagement in the form of community meetings and door-to-door (D2D) outreach. Our hypothesis was that by engaging residents directly and establishing a personal connection, both initial participation and sustained participation, would increase. The pre- and post- waste audits at these sites and the control sites were used to determine the change in diversion rates that resulted from different types of engagement to residents.

The findings of this project support the hypothesis, as participation from sites that received enhanced outreach increased by 1.5 lbs of organic material diverted away from landfill per household weekly, leading to over 42 tons or 84,193 lbs diverted from landfill annually. Global Green started at zero percent organics diversion in 26 of the 31 sites. From data collected at 29 sites (only 29 of 31 received a post-waste audit), we have reached a 58% capture rate of organics with a less than 5% contamination rate.

It is also instructive to measure the effectiveness of outreach achieved compared to what might have happened naturally at sites which did not receive enhanced resident engagement. When comparing participation, we found an average of 70 lbs of organic material in the organics bin at project sites



(with enhanced outreach) versus an average of only 9.6 lbs of organic material at the control sites (with no enhanced outreach). Global Green estimates that control sites would have only diverted .25 ton of organic material annually per site, while project sites will divert 1.8 tons, or more than seven times as much material, annually.

Additionally, Global Green saw success with resident champions of the program, known as “Eco-Ambassadors” who were utilized to increase participation and troubleshoot potential issues. Eco-Ambassadors increased the receptivity of residents when conducting D2D outreach, because they were hearing the message from a neighbor instead of from a stranger. Additionally, free kitchen countertop pails for food scrap collection in the unit, paired with outreach and some form of education were critical for program success. We found the results of the FWP component of the project were more disparate without resounding evidence that the use of the FWP toolkits had a significant effect. Lastly, we developed a guide for local governments on how to implement an organics program in their communities.

METHODOLOGY

Global Green enrolled 31 MFDs in various participating cities. The largest sites were Heron Court in Redwood City, with 81 occupied units, and Avalon Santa Monica on Main in Santa Monica with 107 occupied units. The smallest sites were Palm Court in Redwood City with 23 occupied units and 901 Washington St. in Santa Monica with six occupied units. The units varied in terms of size, income, and whether there was previous organics collection service.

A variety of methods were utilized to identify sites. First, Global Green compiled the following characteristics for all municipalities in the San Francisco Bay Area (San Francisco, San Mateo County, Contra Costa County) and in Los Angeles County:

- > Service provider for the area
- > Waste hauling status: franchised, exclusively franchised, or open market
- > The community’s AB-341¹ compliance rate among MFDs
- > Whether organics programs that include food scraps were available to MFDs
 - *If the programs were available, whether these organics programs were voluntary or mandatory*

This information was used in order to identify the most ideal communities for the pilot program.

In the matrix summary, we also noted the date when the municipality began offering a food scrap collection program to MFDs and whether sites were either positively or negatively incentivized to participate. Positive incentives for participation included offering organics collection at a discount over trash collection. Negative enforcements included making the program mandatory and/or assessing fines or sending warning letters for non-compliance. From this analysis, we targeted municipalities with organics collection in MFDs offered on a voluntary subscription basis with some participating sites but many sites still as yet unsubscribed. The goal was to increase our impact by working in communities where organics programs were still emerging and to focus resources on expanding and improving existing programs.

1. In 2011, AB 341 set the policy goal of “not less than 75% of solid waste generated be source reduced, recycled, or composted by the year 2020” in the State of California.

Once we created a list of recommended target areas and municipalities, a variety of approaches were undertaken to recruit sites, including:

- > Tabling at Community Events (i.e. Santa Monica Community Climate Action Summit, Santa Monica Chamber of Commerce Holiday Party) – we tabled at these events, signing up residents interested in bringing organics collection service to their sites and/or wanting to be Eco-Ambassadors.
- > Joining Chamber of Commerce meetings (Santa Monica and Whittier) – Global Green attended monthly meetings of the Environmental Affairs Committee for the City of Santa Monica Chamber of Commerce, as well as the quarterly meeting of the Whittier Chamber of Commerce’s Apartment Owners group. Here, Global Green briefly presented and offered the program to committee members and apartment owners.
- > Signing MOUs and/or Partnership Agreements – MOUs and/or partnership agreements were established with Loyola Marymount University (LMU); Community Corporation of Santa Monica; and Resources for Community Development (RCD). The purpose of these agreements was to obtain high-level or executive endorsement for the project from our partners to help convince local site managers to be involved in the project.
- > Building relationships with large site owners/managers – Global Green utilized our existing networks to recruit sites and familiarize larger site management companies with the project.
- > Engaging in and conducting on-the-ground networking and community engagement activities.
- > Signing up sites through Eco-Ambassador involvement – This occurred at three sites in Northern California, and one site in Southern California.
- > Reviewing site management lists provided by the waste haulers – usually these lists were vetted in some way to identify sites likely to participate, such as sites the hauler had worked with closely to roll out recycling service or regions in which it was easiest for the hauler to collect due to existing organics collection routes.
- > Signing agreements with local Joint Powers Authorities (RecycleSmart in Contra Costa County and Rethink Waste in San Mateo County).

Once recruitment targets were identified either through partners, haulers, or Eco-Ambassadors, outreach was conducted to local site management companies to explain the project and recruit the sites. The benefits of the program were explained to site management:

- > Technical assistance and advice on waste systems
- > Assistance in setting up the new service
- > Education, information, and incentives to residents
- > Compliance tips for a program that may become mandatory
- > Free kitchen pails
- > Increased understanding regarding divertible material by receiving results of audits
- > Insight regarding banned and illegally dumped materials

Once a site expressed interest, the Global Green team scheduled an initial site visit. During these visits, which took place prior to door-to-door outreach, the following data was collected:

- > Number of units
- > Number of floors
- > Number of trash enclosures
- > Presence of a trash chute (if applicable)
- > Whether organics service was new or existing
- > Date service was initiated and what previous outreach had been conducted (if applicable)
- > Presence of signage
- > Resident turnover rate (from site management)
- > Whether the site was subsidized housing
- > Languages spoken by residents, other than English, and whether outreach was conducted in those languages
- > Presence of on-site management

Figure 1: Northern California cities that participated in the project

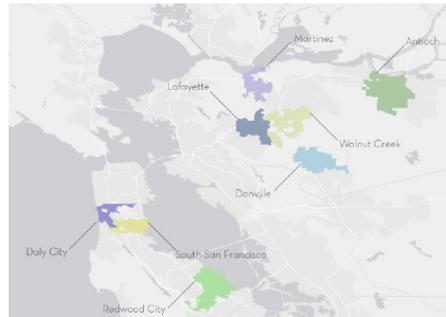


Figure 2: Southern California cities that participated in the project



Figure 3: [On right] California counties that participated in the project



After the initial site visit was conducted and site participation was confirmed, Global Green staff scheduled an appointment to conduct the pre-waste audit and outreach. The date of the pre-waste audit took into account the site's waste collection service days in an effort to maximize the amount of materials present during the audit.

WASTE AUDITS

A pre- and post-waste audit was conducted at each site (excluding LMU, where post-waste audits were not completed)². For the 14 Bay Area sites, up to ten 30-gallon bags were pulled from the trash

² Post-waste audits were unable to be completed at LMU sites due to a miscommunication with waste management staff at the University. Since post-waste audits were not completed, audit data from these sites is not included in the study.

dumpster for the trash audit, while all of the materials in the organics bins were audited. A “lid flip” was conducted for recyclable materials and the presence of recycling bins, their size, and the relative percentage of contamination was noted. The collected trash and organic materials were separated into the following categories: trash, recycling, plant debris, food-soiled paper/compostable paper, avoidable food waste, avoidable produce, unavoidable food scraps, and an “other” category for materials such as household hazardous waste (HHW), batteries, e-waste, and textiles, which did not belong in the trash, recycling, or organics bin.



Figure 4: Organics cart, Heron Court 12/14/16



Figure 5: Organics separated by category at post-waste audit, Sycamore Place 11/17/16

A slightly more detailed waste audit approach was applied for sites in Southern California due to requests for comprehensive data to share with the City of Santa Monica, and our partner waste hauler Athens Services. For the 12 sites in Santa Monica, up to ten 30-gallon bags were pulled from both the landfill trash and recycling containers at larger sites that utilized 2-yard containers. For smaller sites that utilized 300-gallon trash and recycling containers, all materials in each container were pulled and characterized. Materials collected were separated into the following categories: miscellaneous trash, paper and corrugated cardboard, plastics 1-5 & 7, other recyclables such as glass, tin, and aluminum, plant debris, food-soiled paper, avoidable food waste, avoidable produce, unavoidable food scraps, and an “other” category for HHW, e- waste, and textiles.

For the three sites launched in collaboration with Athens Services, all materials from the landfill trash and recycling containers (or in some cases, mixed waste containers) were audited. Materials were characterized into the following list of categories: organics (food scraps & food- soiled paper products, plant debris, wood, compostable serving-ware, compostable liners), paper products (magazines, mixed paper and newspaper, mixed tissue paper, corrugated containers), plastics (bulky rigid plastic, colored HDPE plastic, natural HDPE plastic, mixed plastics 3-7, PET plastic, plastic film), other recyclables (aluminum cans, aluminum scrap, aluminum foil scrap, aseptic poly carton, amber glass cullet, clear

glass cullet, green glass cullet, mixed glass cullet, scrap metal, tin cans), destined for landfill (cement and other inerts, coffee cups, construction waste, diapers, drywall, foam, insulation, pet waste, receipts, textiles, miscellaneous), and other (electronics and ink cartridges, hazardous or medical waste).

Additionally, the two sites at LMU were audited using a combination of both the Santa Monica and Athens Services waste characterization strategies. All materials from the landfill trash, recycling containers, and the existing organics container were audited. Materials collected were separated into the following categories: miscellaneous trash, paper and corrugated cardboard, plastics 1-5 & 7, other recyclables such as glass, tin, and aluminum, plant debris, food-soiled paper, avoidable food waste, avoidable produce, unavoidable food scraps, and an “other” category for HHW, e-waste, and textiles. (Note: The post-waste audit was unable to be completed for these sites as miscommunication amongst LMU Recycling staff resulted in the accidental sorting and disposal of the bin contents before the audit’s scheduled date. The post-waste audit could not be re-scheduled for a later date as it was scheduled for the week following student move out.)

For each audit, the materials pulled from the organics cart in the post-waste audits were separated into the same categories as the preceding pre-waste audit. The waste audit forms utilized are included as attachments.³ Results were collated and analyzed to determine whether messaging was effective in changing behavior. Lastly, for all Northern and Southern California sites, the trash and organics were easily grouped for analysis, because the categories incorporated for trash and organics were the same. The audit techniques only varied for recyclable materials, which were not specifically part of this project.

CONTROL METHOD

To serve as controls for the project, the pre-waste audits from four sites were selected. The residents of these sites either had existing organics service or were informed of their organics collection service via email or informational door hangers approximately four weeks before Global Green conducted pre-waste audits. The control sites were utilized to see how effectively the organics bins were used in the absence of enhanced resident outreach (e.g. door-to-door or community meetings).

Choosing to utilize the pre-waste audits from participating sites as our “control” audits enabled for the control of what and when information was communicated to the residents prior to the audit, and then for an accurate measurement of the increased participation that occurred after the D2D or other enhanced outreach. The post-waste audit validated the use of the controls to determine whether the outreach was responsible for increased participation levels.



Figure 6: Blue houses represent control sites (4) as sample of total sites (31)

3. Belev, Anastas. “Global Green’s Food Waste Prevention and Recycling Outreach Materials.” Global Green. Global Green USA, 30 May 2017. Web.

SAMPLE GROUPS

The targeted sites were divided into three sample groups to test the variation between messaging during outreach.

Sample Group A received messaging about food waste prevention (FWP), followed immediately by messaging on food scrap recycling (FSR). Toolkits with information on food waste prevention strategies and benefits (i.e. dollar savings and reduced waste) were provided to each participating household, along with educational guides on proper food storage, food prep, grocery shopping, etc. Information on the environmental benefits (such as reduced waste to landfill, reductions in greenhouse gases, and ability to capture and reintroduce biological and chemical nutrients into the soil cycle) were included verbally in the survey messaging administered via D2D outreach and/or through community meetings. During the same survey, participants were then asked questions about their feelings and behaviors regarding FSR. As part of this outreach, information, brochures, and kitchen pails were distributed. Survey responses were collated, tallied, and recorded in a Google spreadsheet.

Sample Group B received a message that focused exclusively on FSR only and involved the distribution of information, brochures, and kitchen pails.

Sample Group C received messaging about FWP and utilized the same information from the Sample A toolkits. Sample C sites either had no access to FSR, or FSR was to be rolled out four weeks thereafter, but it was communicated to the participating residents that a focus on FWP would be a good first step. The purpose of Sample C is to evaluate the role of food waste prevention education as a first step in the overall process that can be replicable, as it can be integrated with the broader organics rollout. Additionally, we anticipated that separating the FWP and FSR messages would result in higher comprehension and absorption of the messages than occurred when we combined them. The sites in Sample C were divided into two sub-sections:

- 1) **“Sample C”** were those without access to FSR. For these sites, only FWP messaging was deployed. Upon dissemination of FWP toolkits via community meeting and/or D2D outreach, resident contact information was collected with language preference, and we asked that they make a commitment to one of the FWP strategies over the following four weeks. A post-survey was administered either via email, phone, or D2D to ask if the resident remembered which of the strategies they had committed to and what they had gained from the experience.
- 2) **“Sample C Plus”** were those with access to FSR. For these sites, FWP messaging was deployed first, followed by the launch of FSR four weeks later. Sample C pre- and post-surveys were administered for the FWP phase (the first four weeks of the program prior to FSR), and Sample B pre- and post-surveys were utilized for the FSR phase (the final four weeks of the program after launch of FSR).

SAMPLE GROUP OVERVIEW

All groups received toolkits and/or educational materials during one or two outreach events, and 58% received FWP messaging.

	SAN FRANCISCO (SF)/BAY AREA	LOS ANGELES/SANTA MONICA	TOTAL
Sample A: FSR and FWP (simultaneous deployment)	2	7	9
Sample B: FSR Only	8	5	13
Sample C: FWP only, or FWP followed later by FSR	4	5	9

Table 1:
Depiction of the number of sites per sample group in each geographic area

The highest percentage of residents was reached by D2D outreach, either alone or paired with kick-off tabling events held in the sites' courtyard, community room, or shared space. Six sites utilized a community meeting only approach (based on site management preference). Nine sites utilized the community meeting format, followed up by D2D outreach.

Results from a survey completed by residents were catalogued and collated to identify patterns in responses. For all sites, a post-outreach survey was administered about four weeks after the initial outreach to identify attitude and behavior changes, and to confirm continued participation in the FWP, FSR, and FWP/FSR combined programs (with the exception of the three sites launched in collaboration with Athens Services, as the post-outreach surveys were conducted after 10 or more weeks). A longer pilot period of 10 or more weeks for a few sites was to accommodate the preference of collaborating partners, and also to allow more time for the joint efforts of partners to create and finalize materials and outreach scripts. For sites in Northern California, the post-outreach survey and waste audit were conducted around four weeks after the pre-outreach survey at all sites except for three. Reasons for delays in the post-waste audit were caused by one of the following reasons: timing (i.e. wanting to avoid holiday waste, which would potentially skew waste audit results), the number of survey respondents, or service issues that needed to be resolved prior to the post-waste audit. At three sites, the hauler was not consistent with servicing the organics cart weekly; to prevent the auditing of multiple weeks worth of materials, we had to ensure the service issues were addressed. The survey gave residents a chance to share perceived barriers to, and benefits of, FSR and FWP, and to generally share their feelings about the utility of the outreach. The post-outreach survey was administered either via D2D outreach or by email; D2D surveys were completed at a higher rate. All pre- and post-outreach surveys utilized are included as attachments.

The post-waste audit occurred in the same week as the post-outreach survey (with the exception of one site in Southern California, which was delayed due to scheduling conflicts with the Athens Materials Recovery Facility, as the audits for this site were completed by Athens Services staff). It is important to note that residents were never informed of our waste audits prior to our visits, so as to not affect the audit results. In the San Francisco Bay Area, seven sites received post-outreach surveys that were conducted in person, and seven sites received surveys via email/phone. All post-outreach surveys were conducted via email for sites in Los Angeles County.

All sites received, and/or had access to, outreach in the form of informational brochures, flyers, signage, and in-unit kitchen food scrap pails. In five of the Northern California sites and 13 of the Southern California sites, posters were hung in the trash enclosures or at other locations around the site. Materials were created by Global Green and/or partner agencies for Global Green to distribute. This ensured the information provided to residents was city-specific and correct for local collection programs. For Samples A & C, participants were given a FWP toolkit adapted from Global Green's pilot project in Alameda County and based on the EPA's Food Too Good to Waste resources, the contents of which will be discussed further later in the report.

For both the initial outreach and the follow-up surveys, residents were informed of our visit and of our intention to conduct surveys. Letters were distributed to the residents letting them know to expect us and informing them of a financial incentive for participation. Though the incentive varied depending on the site and sample, the following incentives were incorporated into the project:

- > Raffle for a gift basket of FWP tools (a \$75 value - used in Samples A & C). Included in the gift baskets were several of the following (specific items dependent on geographic location):

Tupperware sets, BluApples, green produce storage bags, cotton bulk grocery bags, reusable fabric grocery bag, bamboo cutlery sets, and eco-friendly cleaning products

- > Raffle for a \$75 Visa gift card (Samples A, B, & C)
- > \$10 Starbucks gift cards for residents who listened to our FWP messaging and committed to taking an action (Sample C - Daly City only and provided by the hauler)
- > \$100 Target gift card for Raffle Winner (Sample C - Daly City only and provided by the hauler)
- > \$25 gift card for food waste prevention challenge participants
- > \$25 gift card for Eco-Ambassadors who assisted in program roll-out at their site

ECO-AMBASSADORS

From our early research conducted regarding successful resident engagement strategies for MFDs and/or urban waste management systems, the idea and actualized examples of the “Eco-Ambassador” were discovered from programs such as the Friends of Recycling and Composting (FORC) program in Seattle, Washington and the 3R Ambassador program in Toronto, Ontario. In this project, Eco-Ambassadors were responsible for:

- > Facilitating the addition of a recycling and/or compost bin and collection service for their site
- > Being informed on the proper diversion practices for materials in the waste stream through training
- > Talking to new neighbors so that they are made aware of the recycling/ composting practices offered at their site
- > In some cases, routinely checking their site’s waste bins for contamination

Global Green launched the Eco-Ambassador program in several cities including the City of Santa Monica, South San Francisco, Antioch, Martinez, and San Francisco. Eco-Ambassadors were recruited through a variety of approaches, such as:

- > Posting a flyer in city agency newsletters (Sustainable Santa Monica and Santa Monica Chamber of Commerce)
- > Posting a flyer and/or call to action on the Global Green website and social media
- > Tabling at community events (Santa Monica Community Climate Action Summit and Santa Monica Chamber of Commerce Holiday Party)
- > Hosting an evening happy hour at the Global Green Santa Monica office, and hosting coffee events in both the Global Green Santa Monica office and Muddy Waters Cafe in San Francisco
- > Presenting to the Chamber of Commerce (Santa Monica)
- > Posting geographic-specific volunteer requests on volunteermatch.com for Santa Monica and the Bay Area
- > Partnering with city agencies to co-sponsor an Eco-Ambassador recruitment event and posting the event on Facebook and NextDoor to SF Bay area residents
- > Hosting a Lunch & Learn information session at HBO office in Santa Monica

In Southern California, a region with very little access to food scrap collection programs for MFDs, the response of residents wanting to enroll their sites in organics collection programs was very high. In

Santa Monica, 42 individuals were recruited to serve as Eco-Ambassadors, which resulted in five sites rolling out food scrap collection programs with their assistance: 1432 9th St, 960 10th St, 1532 9th St, 201 Bicknell Ave, and Santa Monica Avalon on Main. Eco-Ambassadors were identified through one of the following strategies: 1) through recommendation of the site management company (960 10th St), 2) self-identification by reaching out to Global Green after hearing about the program either through local events or media (1432 9th St and 1532 9th St), or 3) combining both #1 and #2, one Eco-Ambassador self-identified and works for the site management company (Santa Monica Avalon on Main and 201 Bicknell).

At 1432 9th St, the Eco-Ambassador helped to facilitate an introductory meeting with her site manager, assisted with the pre-waste audit and community meeting held in her site's courtyard, delivered pails and toolkits to neighbors unable to speak with us during outreach, and has since worked with Global Green and her site's waste hauler to identify solutions to program issues along the way. A similar role was taken by the Eco-Ambassador at 960 10th St with the exception that the ambassador refrained from assisting with any waste audits. At 1532 9th St, the Eco-Ambassador convened her HOA to approve of program implementation, and organized organics bin delivery to her site. After these steps were taken, she reached out to Global Green in order to receive program materials, as well as to carry out waste audits and outreach. The ambassador went D2D after our community meeting in order to educate and distribute materials to her neighbors who were unable to attend the meeting. All three of the ambassadors described were recruited through the events either attended or hosted by Global Green, resulting in the recruitment of their sites to the overall pilot program. Finally, the same ambassador is shared between 201 Bicknell and Santa Monica Avalon on Main, and she promotes the program within both sites by keeping program materials to distribute to new tenants as they move in. She also assisted during D2D outreach by communicating reminders and program updates with tenants via email. The ambassador for these sites is the community consultant for the site management company there, and was self-identified after these sites had been chosen as ideal targets.



Figure 7: Eco-Ambassador, Claudia Borgna diverting her food scraps



Figure 8: Eco-Ambassador, Claudia Borgna explaining benefits of compost to a neighbor

In Northern California, the Eco-Ambassador program developed in a slightly different manner. The Eco-Ambassadors were not utilized to recruit participating sites as this was managed primarily through the waste hauler, the joint powers authority, or the site management company. Eco-Ambassadors were typically identified either through the recommendation of the on-site management company (Grand Oak) or through the residents self-identifying they wanted to get involved at a community meeting (Berrellesa and Pinecrest).

The Eco-Ambassadors in Northern California performed activities similar to those performed by those in Southern California in that they assisted with D2D outreach and community meetings, helped identify and recommend service level adjustments, helped report to off-site management issues of illegal dumping or overflowing bins, etc. Eco-Ambassadors were utilized in three sites in Northern California: Grand Oak Apartments in South San Francisco, Berrellesa in Martinez, and Pinecrest in Antioch. At Grand Oak, the ambassador accompanied us during D2D outreach and assisted site management with subsequent community meetings to get the word out to other residents who were not reached during the D2D outreach. At Berrellesa, where there was only a community meeting scheduled, the Eco-Ambassadors agreed to reach out to the other residents not able to attend the meeting in order to help spread the word about the organics program. Lastly, at Pinecrest the Eco-ambassador helped with two D2D outreach efforts and even helped to ensure the organics cart got pulled to the curb for servicing after a long absence of the on-site management due to illness.

RESULTS

Enhanced outreach for this project increased the likelihood of resident participation. Participation increased the amount of organic material diverted away from landfill per household by 1.5 lbs per week. Aggregated across all 31 sites, this would result in approximately 42 tons or 84,193 lbs diverted from landfill annually.

While these numbers are significant, it is also important to measure how effective our outreach was in comparison to what might have happened naturally if the organics carts had been introduced to sites without any enhanced resident engagement. In order to measure this, Global Green included four control sites that received little to no outreach about the organics program yet had access to an organics cart. When comparing participation, we found an average of 70 lbs of organic material in the organics bin at project sites versus only an average of 9.6 lbs of organic material at the control sites. Extrapolated for annual diversion, we estimate control sites will only divert 0.25 ton of organic material annually per site, while project sites will divert 1.8 tons, or more than seven times as much material annually. Additionally, we calculated the contamination rate, the organics capture rate, and the good in garbage rate as defined below.

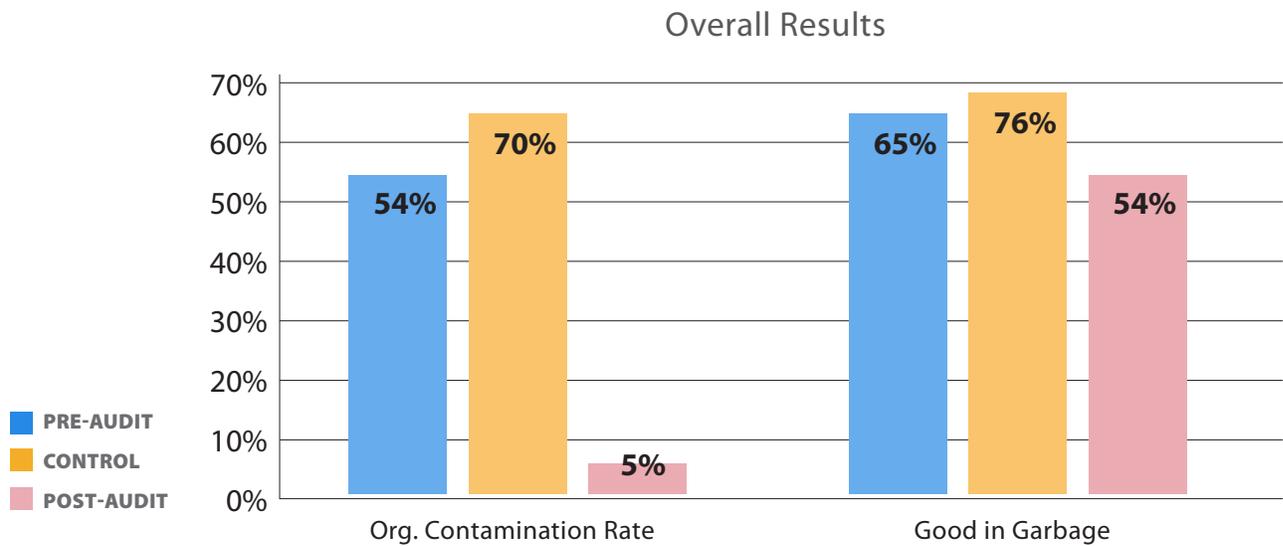


Figure 9: Overall audit results comparing the “Contamination Rate” of the organics bins and the “Good in Garbage” rate of the landfill bins

The contamination rate is defined as how much of the material sent to a sorting or composting facility is inappropriate to that facility. Example: A 5% contamination rate in an organics cart is favorable by many Materials Recovery Facilities (MRFs) in California as it means that 95% of the cart volume is compostable.



$$\text{CONTAMINATION RATE} = \frac{\text{(AMOUNT OF TRASH + RECYCLING + OTHER NON-ORGANIC IN ORG CART)}}{\text{(TOTAL AMOUNT IN ORG CART)}}$$

The **capture rate** is defined as how much of the total compostables are being sent to the appropriate facility. Example: a 10% capture rate for organics is not favorable as it means that 90% of the potentially compostable organics have ended up in the trash or recycling bins.



$$\text{ORGANICS CAPTURE RATE} = \frac{\text{(AMOUNT OF ORGANIC MATERIAL FOUND IN ORG CART)}}{\text{(TOTAL ORGANIC MATERIAL AMOUNT FOUND IN ORG CART + GARBAGE CART)}}$$

The **“good in garbage” rate** is defined by how much of what we find in the garbage could have been otherwise recycled or composted. Example: a 60% “good in garbage” rate would be disappointing as 60% of the contents of the garbage bin could be diverted to a recycling or composting facility.



$$\text{“GOOD IN GARBAGE” RATE} = \frac{\text{(AMOUNT OF ORGANICS + RECYCLING IN GARBAGE CART)}}{\text{(TOTAL AMOUNT IN CART)}}$$

COMPARISON OF RESULTS: CONTROL VERSUS PROJECT SITES	CONTROL	PROJECT SITES
Organic material in organic cart (lbs/site) <i>Increase preferred</i>	9.6	70
Organics capture rate <i>Increase preferred</i>	38%	58%
Contamination rate in organics cart <i>Decrease preferred</i>	70%	5%
Good in garbage <i>Decrease preferred</i>	76%	54%

Table 2:
Comparison of control sites vs. project sites results

The contamination rate is measured by the amount of inappropriate material (i.e. trash, recycling, and/or other contaminants) found in the organics cart. Because the project is centered on spreading awareness and education, we hypothesized that the contamination rate would be lower in project sites than control sites. The contamination rate was high for the control sites (70%), indicating the organics cart was being misused. For sites that received enhanced outreach, the contamination rate was only 5%.

The organics capture rate measures what percentage of all organic material was found in the organics cart versus in the trash cart. It is indicative of the impact of the enhanced resident engagement if the capture rate is higher. Residents at the project sites had a 58% capture rate in the post-waste audit versus the 38% capture rate at control sites.

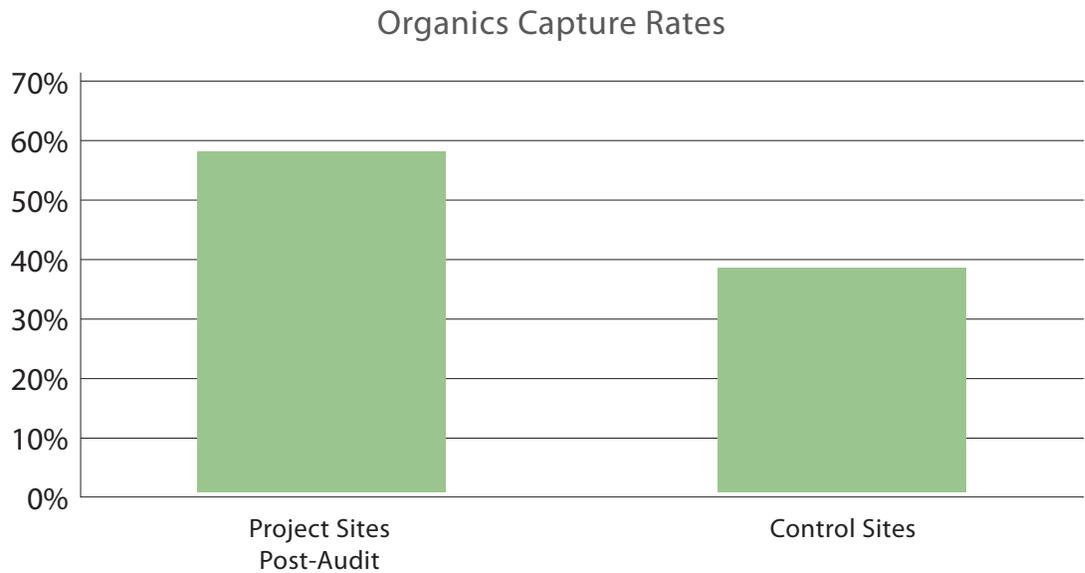


Figure 10: Organics capture rates at post-waste audit for project vs. control sites

The figure below (on left) depicts the waste stream at the time of post-waste audits. Of the entire waste stream across all sites⁴, 33% was organic material. The figure pictured below (on right) depicts the percentage of that organics stream that was sent to landfill, “Not Captured”, and that which was successfully diverted and sent to compost, “Captured”.

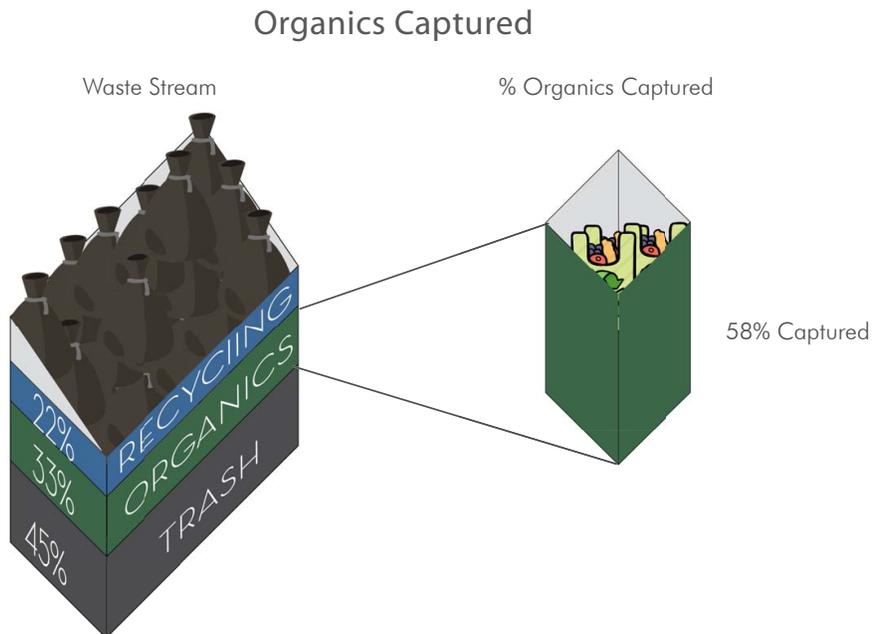


Figure 11: Organics made up 33% of the total waste stream in the post-waste audits, and of that amount, 58% of organics were successfully captured in the organics bin⁵

4. “All sites” here refers to 29 total sites, as the remaining 2 sites (at LMU) did not receive a post-waste audit, and are therefore not included in the waste audit data analyzed in this report.

5. Waste Stream data retrieved from landfill and organics bins only.

II.

CHAPTER 2

Benefits of Enhanced Outreach

(Insights & Findings)



BENEFITS OF ENHANCED OUTREACH

The outcomes of the pilot demonstrate that there are numerous advantages of enhanced resident outreach in MFDs. These benefits include increased resident participation with the organics program, increased diversion of organics, reduced contamination, as well as improved program administration and on-site management through the use of resident ambassadors.

Providing enhanced resident engagement and outreach in addition to educating and giving access to organics carts resulted in an increase of organic waste diversion. For sites that received enhanced resident outreach, an average of 58% of the material diverted into the organics bin was organic material, also referred to as the organics capture rate. This is compared to 38% capture rate for the control sites.

An estimated 84,193 lbs of material will be diverted annually away from landfill. This is the equivalent of 319,940 lbs of greenhouse gas (GHG) emissions reduced from the atmosphere or 15 cars taken off the road annually.^{6,7}

6. Quested, Tom, and Andrew Parry. "New estimates for household food and drink waste in the UK." *Wrap Material Change for a Better Environment 1.1* (2011): 1-18. Web.

7. "Greenhouse Gases Equivalencies Calculator - Calculations and References." EPA. Environmental Protection Agency, 07 July 2017. Web. 20 July 2017.

Residents who received enhanced resident engagement were more likely to participate. In the post-survey, 94% of residents reported they were participating by putting their food scraps in the organics cart, and 96% reported the enhanced outreach provided by Global Green was helpful in their increased participation. Though it cannot be certain that all residents who reported they were participating by putting their food scraps in the organics cart were actually doing so, the positive response to the project gives us confidence that the outreach made an impact on the behavior of the residents.

Engaging residents through ambassador-style programs can rapidly expand implementation, increase the receptivity of residents when conducting D2D outreach, and improve diversion rates. Engaging residents, particularly in MFDs, requires continual reinforcement, which is resource-intensive for site owners and managers. To address this challenge, we engaged one-on-one with residents and property managers who were eager to get involved in helping implement a successful organics program, to serve as Eco-Ambassadors. During the project, we found identifying Eco-Ambassadors was not only relatively easy to do, but also utilizing Eco-Ambassadors resulted in high rates of engagement among the other residents. For example, in three of the Southern California sites with active Eco-Ambassadors, 88%-100% of residents participated in the program. In the remaining Southern California sites without Eco-Ambassadors, resident engagement ranged between 46%-71%.

Ambassador-style programs have also been shown to improve diversion rates. At three of the five Southern California sites with Eco-Ambassadors present, we observed organics diversion rates above 90% at the time of the post-waste audit, and at the three Northern California sites with Eco-Ambassadors, this ranged from 81% to 100%. For sites without Eco-Ambassadors, diversion rates ranged from 77% to 98% across sites from both geographic regions. These trends are supported by a report prepared by Cascadia Consulting Group which describes the City of Toronto's 3R's Ambassador Program, claiming the City's buildings with 3R's Ambassadors have saved 15 percent, on average, on garbage bills, which are correlated with waste diversion.^{8,9}

Free kitchen pails in partnership with outreach are critical for program success. Our strategy has involved handing out free kitchen pails as well as information to residents through enhanced resident outreach to encourage higher participation. A project conducted in the fall of 2014 by Marin Sanitary Service (MSS) supports this finding. There were four treatments in this project conducted at MFD sites: 1) those that received pails and education, 2) those that received pails only, 3) those that received no outreach or pails, and 4) those that received brochures and posters only. The group that had the highest level of participation was the group that received the pails and education, followed by received education but no pails, and then groups that did not receive direct education. The project found the most successful group by far was the group receiving education as well as an individual kitchen pail.¹⁰

8. Cascadia Consulting Group. *Multifamily Recycling: Case Studies on Innovative Practices from Around the World*. Nov 2012. Web.

9. Toronto's volume-based waste collection pricing structure incentivizes recycling and organics collection. Therefore, an average savings of 15 percent on garbage bills observed by buildings with 3R's Ambassadors can be correlated with increased diversion.

10. In the MSS study, the most successful group was that which was receiving education as well as an individual kitchen pail (91% had some material in the bin or 10 out of 11 sites). The group that received education without the kitchen pail was participating, but performing far below those that received the pail (56% or 5 out of 9 sites). The sites that received no direct education or pails were only participating at 50%, and contamination was over twice what they found at sites that received direct education (9.8% versus 4.5%).

Educational materials and program tools such as kitchen pails, brochures, door hangers and/or bill inserts significantly decrease the amount of food scraps found in the trash. In our project, we found the amount of food scraps in the trash reduced from 33.6% to 22.9% (or over a 10% reduction). StopWaste reported a similar finding in a project conducted by Action Research in a report dated November 2016. In this study, there were four different outreach materials tested to measure effectiveness¹¹. The outreach materials included were brochures with kitchen pails, hangtags left on kitchen pails, a compost report mailed to residents letting them know how much they were diverting (Southern California only), and a control group that received no direct outreach. While some forms of outreach were found to be more successful at reducing food scraps, and the sample was for single-family residents, not MFDs, the overall finding of the project was that the amount of food scraps in all sites was significantly reduced with messaging (over 33% average for all 3 outreach materials). During the same time period, the amount of food scraps found in the trash in the control group increased 23%.

10. Action Research. *Pilot Program: StopWaste City of Fremont Residential Food Scrap Recycling. Rep. StopWaste, Nov. 2016. Web 1 Aug. 2017.*

III.

CHAPTER 3

Impacts on Food Waste Prevention



IMPACTS ON FOOD WASTE PREVENTION

According to the EPA's food waste recovery hierarchy (pictured below), preventing food from entering the waste stream is of highest priority. Therefore, as a component of the project, Global Green administered messaging specifically regarding FWP in addition to FSR. This section outlines our FWP tactics and results.

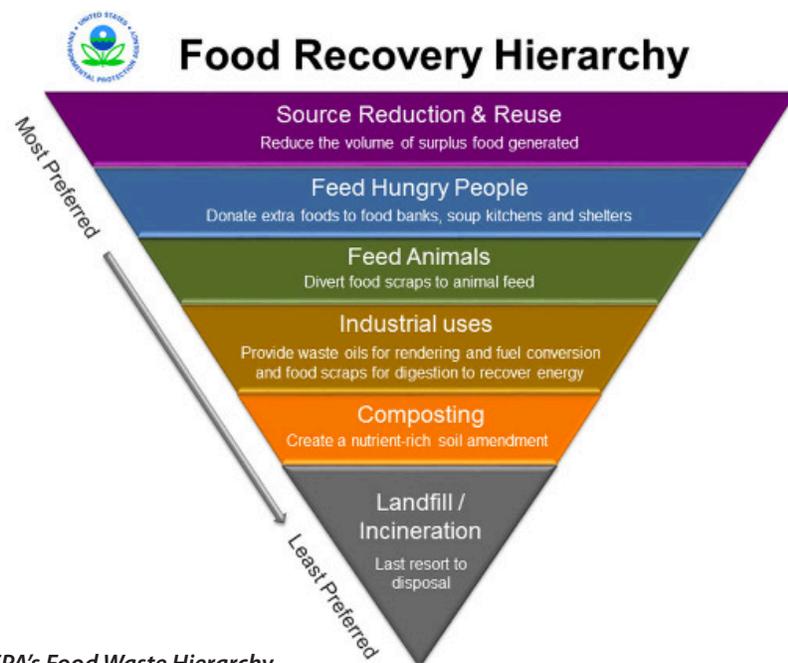


Figure 12: EPA's Food Waste Hierarchy

In order to measure food waste, it is important to distinguish between avoidable and unavoidable food waste. “Avoidable food waste” is defined as food that could have been eaten, but wasn’t. For example, moldy pizza, rotten vegetables, and sour milk are considered avoidable food waste. Whereas, banana peels, egg shells, and chicken bones are considered unavoidable food waste. The FWP messaging targeted only food waste that could have been avoided. FWP messaging was utilized in 18 of the project sites and involved asking residents survey questions about their attitudes and behaviors regarding grocery shopping, food storage, and FWP. We also distributed a FWP toolkit modeled after the EPA’s Food Too Good to Waste toolkit that included:

- > A mock shopping list that assists with meal planning.
- > An “EAT ME FIRST” sign to identify an area of the refrigerator where food that needs to be eaten first is stored and highly visible. This was later re-designed to be a magnet.
- > A fruit and veggie storage guide with how-to information to maximize shelf life.
- > A 10-Minute Fridge Reality Check that teaches residents to determine when and what types of food they are throwing out so that they can take actions to reduce wasted food. This came with two compostable bags to help measure out how much food waste was being generated during each week of the challenge (used in some locations).
- > The Get Smart Challenge – very similar to the 10-Minute Fridge Reality Check, that challenged residents to measure their waste and record how much was thrown out each week (used in some locations).

There were several lessons learned as a result of this aspect of the project. First, regarding our outreach materials, the post-survey indicated that 71% of residents utilized some portion of the FWP toolkit. The mock shopping list was reported to be the most utilized piece of the toolkit, with nearly 71% of respondents stating they used some version of this in the intervening month between our pre- and post- survey.

Additionally, 38% of the respondents reported utilizing the Get Smart Challenge, but only 13% returned completed Get Smart Challenge forms. This indicates that while the concept of measuring food waste was compelling to many respondents, very few took the step to complete the forms provided. This is consistent with findings from a previous study conducted by Global Green in Alameda County where seven participating sites utilized the toolkits, but no forms were returned. For future projects, this component of the toolkit should either be redesigned to be more readily returnable, or utilized as an educational tool without a tracking or reporting component.

Subsequently, we measured the effects of FWP outreach by comparing the amount of avoidable food waste recorded during pre- and post-audits of the waste streams. As Sample B received no FWP outreach, and Sample A and C did receive FWP outreach, we treat Sample B as the control group.

In the pre-audit of 14 sites in Samples A and C, there was a total of 255.2 pounds of avoidable food waste in the trash;¹² In the post-audit, there were 245.7 pounds, which represents a 4% decrease in avoidable food waste.

12. Although there were 16 sites that received either Samples A or C, 2 sites receiving Sample A were not included in waste calculations, because a post-audit was unable to be performed.

SITES RECEIVING FWP MESSAGING	AVOIDABLE FOOD WASTE PRE-AUDIT (LBS)	AVOIDABLE FOOD WASTE POST-AUDIT (LBS)
Meridian	14.1	11.4
Villa Vasconcellos	23.4	6.2
Eastmoor	14	13.9
Montgomery	23.9	20
Terrace Glen	5.9	2.7
Pinecrest	13.8	9.3
1432 9th ST	4.37	2.8
948 14th ST	15.09	31.19
960 10th ST/901 Washington	43.21	8.88
1532 9th ST	0.76	11.79
1424 Broadway	36.34	23.82
HPW/HPE	7.82	21.16
2209 Main ST	42.32	49.34
2602 Broadway	10.14	33.24
TOTAL	255.2	245.7
Per Site	17.0	16.4
Percent Decrease		4%

Table 3:
*Chart depicts each site receiving FWP messaging and the total LBS of **Avoidable Food Waste** in both pre- and post-waste audit*

During the pre-audit for Sample B, which did not receive FWP messaging and therefore serves as the control for this aspect of the project, there was a total of 149.7 pounds of avoidable food waste found across 11 sites (2 sites in Sample B were not included because of differing waste audit methodology); in the post-audit, there were 172.4, which represents a 15% increase in avoidable food waste.

SITES WITHOUT FWP MESSAGING	AVOIDABLE FOOD WASTE PRE-AUDIT (LBS)	AVOIDABLE FOOD WASTE POST-AUDIT (LBS)
Sycamore	5.7	15.9
Lafayette Commons	15.8	6.6
Palm Court	7	11.1
1336 Middlefield Rd	28.5	31.3
Berrellesa	31.1	6.4
Heron	8.8	13.6
Grand Oak	11.4	13.8
Greenridge	17.7	9.2
Griffin	14.25	25.35
201 Bicknell	4.49	19.81
2000 Main St	4.97	19.37
TOTAL	149.7	172.4
Per Site	13.6	15.7
Percent Increase		15%

Table 4:

Chart depicts each site that didn't receive FWP messaging and the total LBS of **Avoidable Food Waste** in both pre- and post-waste audit

To compare, we witnessed a 4% decrease in avoidable food waste from pre- to post-waste audit for the sample groups receiving FWP messaging (Samples A and C), and a 15% increase in avoidable food waste from pre- to post-waste audit for the sample group who only received FSR messaging (Sample B); this comparison is broken down in Tables 3 and 4 above and on the previous page.

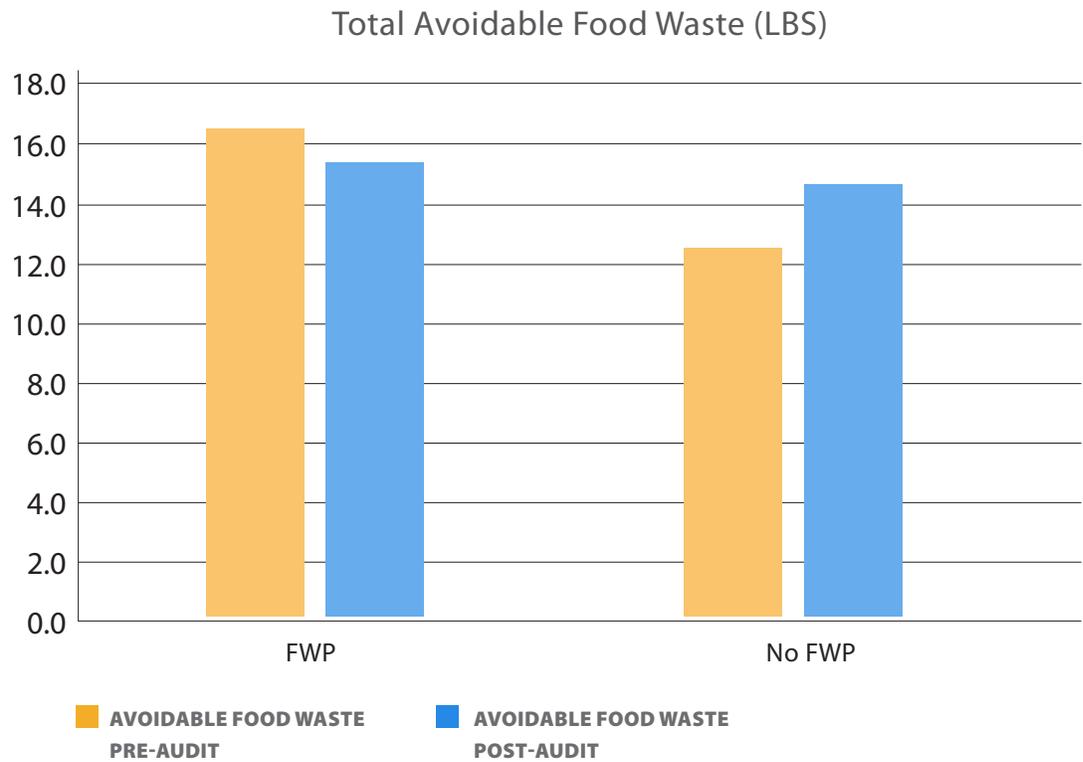


Figure 13: Comparison of groups receiving FWP messaging vs. no FWP messaging in Total Avoidable Food Waste (LBS) from pre- to post-waste audit.

While a 4% reduction in avoidable food waste is a trend in a positive direction for sites that received FWP, it is important to note that there was more total food waste per site for the FWP sites, 16.4 lbs, than for those which didn't receive FWP messaging, 15.7 lbs. With this small sample size, we are unable to correlate avoidable food waste reduction to our food waste prevention messaging. For future research, a larger sample size or a more precise measurement methodology are recommended.

IV.

CHAPTER 4

Guidance to Cities



GUIDANCE TO CITIES

For communities looking to implement FSR programs in MFDs, guidance for a successful program is detailed below:

EVALUATE CAPACITY

Ascertain if the existing infrastructure has sufficient capacity to process additional volume of food scraps or co-collected yard and food waste. If new equipment, such as collection vehicles, carts and bins need to be purchased, it will need to be written into the waste collection contract when renewed.

Evaluating Capacity of Food Waste Processing

- > Establish controls to monitor air and water. It is likely that permits will include safeguards to prevent increased vector populations such as insects and/or rodents
- > Having a facility permitted to accept food scraps within an economically feasible distance to the community will help determine if a FSR program is feasible in a particular community. If the facility exists, learn how much additional organic material is anticipated to be collected from MFDs and whether this will fit below the maximum processing allowances for the facility (tons permitted annually).

Evaluating Capacity in Communities and Multi-Family Dwellings

- > Communities should seek to introduce legislation to require food scrap collection. Programs in communities where food scrap collection is mandatory are more successful at ensuring participation, because site managers will often seek to postpone rolling out a food scrap collection program if it is not something they have to do, even if it has been requested by residents.
- > Consider the costs and benefits of making programs mandatory. In communities with mandatory programs, larger hauling routes are able to achieve economies of scale with the greater participation
- > In MFDs with trash chutes, organics receptacles (23-gallon “slim jims” or internal containers) should be installed near each chute; this makes the discarding of food waste as accessible and convenient for residents as discarding trash. This would also require janitorial, maintenance, other on-site staff, or in some cases, an Eco-Ambassador to empty slim jims into the central trash enclosure organics bin once or multiple times per week (depending on how quickly the slim jims fill).¹³
- > Consider the type of slim jim installation in order to mitigate odors, pests, and overall ease of use for residents. The desired lid used on the slim jim can vary dependent on climatic conditions, seasonal variations in heat and moisture, location of the container (interior or exterior), and preference by residents.¹⁴

PROVIDE INCENTIVES

Develop a rate structure that offers food scrap and organics collection at a discounted rate over the trash rate or for no additional cost. Consider coordinating trash collection schedule with the organics collection schedule in order to further promote participation among tenants, as they will want their putrescible waste to be collected at least once per week.

PROVIDE RESOURCES

Provide educational resources for tenants such as brochures, kitchen pails, instructions on lining the kitchen pails, and where to purchase compostable bags. Work with the haulers to ensure they create MFD-specific literature that is educational, image-based, and is translated into languages commonly spoken in the local community.

13. This strategy was implemented at the following Santa Monica sites: Santa Monica Avalon on Main, 201 Bicknell Ave, High Place East, High Place West, and 1424 Broadway. If residents are able to discard their trash and recycling through a chute, but have to walk an extra distance to the central trash enclosure in order to discard their food waste, we have found they are less likely to divert their food scraps into the organics bin. For example, at High Place East and High Place West (these adjacent sites share organics bins) where slim jims were installed next to trash and recycling chutes on each floor, 61% of organics generated were successfully diverted into the organics bins, with only 34% of organics ending up in the trash at the post-waste audit. To compare, at Seaview Apartments in Redondo Beach where there are trash chutes, but slim jims were not installed, 64% of organics were found in the trash, with only 34% successfully diverted at the post-waste audit.

14. With a site piloted in Downtown Los Angeles, we utilized a swing top lid where residents could drop their food scraps easily through the lid without having to touch the slim jim, and positive feedback was received about the set-up. However, these same swing top lids were deployed for several sites in Santa Monica, and complaints were received regarding issues with unmanageable flies and odors. For these latter sites, closed top lids were requested by residents, and are currently being deployed to test if the closed lids will resolve the issues with odors and flies. Additionally, organics diversion set-ups involving compostable bags and bag dispensers have been shown to increase participation rates and mitigate issues with odors and pests. For example, at Aviation Townhomes in Redondo Beach where compostable bags and a bag dispenser were deployed with program roll-out, 70% of organics generated were successfully diverted into the organics bin, with only 30% of organics found in the trash at the post-audit.

LAUNCH PILOTS

Preceding universal roll out in communities where emerging or new programs exist, start small with selected sites identified in partnership with the waste hauler. This will help identify issues on a smaller scale before the program is rolled out to all MFDs in a community.

Successful pilot programs utilizing the Global Green model will include outreach to site managers, enhanced resident engagement in the form of D2D outreach, community meetings, brochures, posters, stickers or other printed, mailed or emailed information about the program. Identify an Eco- Ambassador whenever possible to shepherd the program and provide continuity when new residents move in.

ADVANCE BUILDING CODES

Write into local building codes for all new construction and renovations, a requirement for ample space in trash enclosures to accommodate multiple bins. Limit the use of trash chutes in new construction or require that if trash chutes are installed, they are also installed for recycling and organics collection.

CULTIVATE COMMUNITY SUPPORT

Enlist resident(s) who are passionate about the program to support property management and engage/motivate tenants to participate.

Identify these residents through community events and neighborhood-based listservs such as Nextdoor or through social media.

Maintain awareness of the program by periodic mail inserts, bus stop signage, billboards, etc. Marketing language should prioritize the community effort and benefit.

In the event a community is not able to roll out a FSR program in the near future, for whatever reason, it is recommended that messaging be provided to residents about the role of FWP in reducing GHG emissions and the environmental impact of our discards. This is a way of starting the conversation, and FWP is a higher priority than composting food scraps, because 1) it takes no infrastructure to introduce, 2) it results in financial savings to residents directly versus buying food that goes to waste before consumption,¹⁵ and 3) the residential sector represents a significant amount of the overall food waste nationwide, according to the EPA.¹⁶

14. Buzby, Jean C., and Jeffery Hyman. "Total and per capita value of food loss in the United States." *Food Policy* 37.5 (2012): 561-70. Elsevier. Web.

16. United States. Environmental Protection Agency. Office of Resource Conservation and Recovery. *Food Waste Management in the United States*, 2014. Dec. 2016. Web. 1 Aug. 2017.



Raising awareness about food waste prevention and organic waste diversion programs