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Best Management Practices in Food Scraps Programs



Submitted to:
Materials Management Branch
Land and Chemical Division
US EPA Region 5

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FINAL REPORT

Acknowledgments

***E**conservation **I**nstitute would like to thank all of the program managers, coordinators, public works staff, city staff, and haulers who took the time to complete our survey and make this research possible. We would especially like to express our gratitude to the scores of experts and municipal staff who were willing to be interviewed, sometimes repeatedly, in the course of our research. We would also like to express our appreciation to the state regulatory staff from all of the states in Region 5 who we interviewed. In addition, we would like to thank Chris Newman, the US EPA Region 5 grants coordinator, for his support of this research and organics programs in the region.*

Organization of the Report

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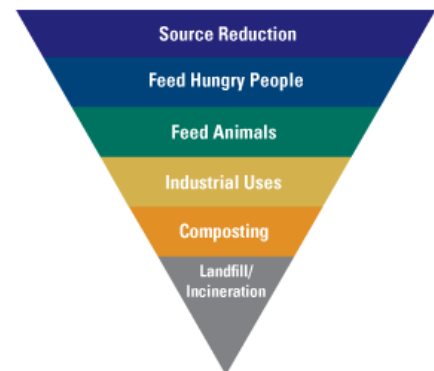
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EXECUTIVE SUMMARY

Data indicate that 12.5% of the US waste stream is food scraps, and only 3% of that is recovered¹. In EPA Region 5, that means only 141,000 tons are recovered out of a total 5.4 million tons generated.

Although food waste collection and composting is not the “highest use” for food scraps, it is a much “higher use” than landfilling this potentially valuable material. This project’s goals are to help communities in Region 5 and beyond recover more tons by:

- Providing in-depth research on leading food scraps programs;
- Providing analysis of best management practices (BMPs) for design, implementation, and collection to guide communities; and
- Conducting webinars, presentations, and other outreach to disseminate the research and BMPs about food scraps collection.



Source: US EPA

Survey Results:

The project identified more than 180 commercial and residential food scraps collection programs across the US, in communities with populations less than 200 and more than 600,000. The majority of current programs are located in EPA Region 10 but Region 5 is a close second, followed by Region 9. We collected data on the program designs, materials, cost and payments, enrollment practices, collection frequency, containerization, incentives and pricing to identify patterns and best management practices (BMPs) or lessons for success that vary based on the type of program and situation.

The report describes examples of programs across the US that include drop-off and curbside versions, variations in materials accepted, and different material and generator targets. We find programs operate in areas in which tip fees for MSW disposal are higher than organics fees, and communities in which the economics are less favorable. Success factors vary, depending on the program, locale, and goals.

The “average” or a “typical” version of residential and commercial programs – and curbside happens to be the most common – is provided in Table 1. The table also includes figures on costs and participation averages. More detail is provided in this report.

These materials are high methane emitters, a material that is 21 times more potent a greenhouse gas than carbon dioxide. According to US Composting Council figures, in Region 5, composting this material would be the equivalent of taking 1.7 million passenger vehicles off the road

¹ U.S. EPA Office of Solid Waste, Municipal Solid Waste in the United States, 2007 Facts and Figures

Table 1: “Average” or “Typical” Food Scraps Program in the US

Residential Programs	Commercial Programs
<ul style="list-style-type: none"> • Commingles yard waste and food scraps • Collects weekly in 32, 64, or 96 gallon poly carts² • Includes soiled paper, meat, and dairy • Is voluntary, and charges an additional fee • Is conducted in a community in conjunction with PAYT • Operates year round • Average costs for organics programs were about \$5.40 per household (median \$7.50), and organics collection rates average about 1/3 of trash costs. • Average organics pounds collected per participating household: 25-30 lbs per/hh/week. Food waste component only 7-9 lbs • Average participation rate in surveyed communities 35-40%. 	<ul style="list-style-type: none"> • Focuses on “targeted” high-food businesses • Collects in 64 gallon poly carts • Provides options for collection at least 3 times per week • Is voluntary and charges extra rates that are lower than MSW • Includes staff and outreach (often by hauler) • 53% of commercial programs were found in suburban communities, 25% in rural areas, and 18% in urban communities; the remainder were in college, tourist, or isolated communities.

Barriers and Best Management Practices:

Interviews showed key barriers included political will, facility issues (a big topic of discussion in interviews), costs, contamination, and the “yuck” factor. The report provides guidance on Best Management Practices to address barriers, concerns, and alternatives, in a number of key areas outlined in Table 2.

Table 2: Best Management Practices Topics for Residential and Commercial Programs

Aspect	BMPS / Alternatives - Residential	BMPS / Alternatives - Commercial
Start-up – getting interest	<ul style="list-style-type: none"> • Summit with stakeholders / face-to-face, match needs with resources, identify and work on barriers • <i>Alternative:</i> Universities as incubators (access to grants, etc.) 	<ul style="list-style-type: none"> • Same
Pilot or no pilot?	<ul style="list-style-type: none"> • Pilot helps especially in areas without many programs; it can address barriers, tweak processing, familiarize, build support, examine efficiencies; use random assignment or selected neighborhood for design, not opt-in for transferability of results • Pilot is not needed in all cases; Less needed if facilities tested or lots of programs in surrounding areas; use literature & neighbors as alternatives; allows for quicker implementation 	<ul style="list-style-type: none"> • Same
Eligible materials	<ul style="list-style-type: none"> • Add food – AND soiled paper to yard waste program if possible – quick & cheap (paper~50%!; “gateway” to greater participation) • <i>Alternative:</i> Food scraps only is an option – consider 12 gallon or smaller container at drop-offs. 	<ul style="list-style-type: none"> • Often pre-consumer first for lower contamination, education issues. Include soiled paper if possible. Compostable serving ware ONLY if processing can really handle • OR pre- and post- consumer for higher tons (but more contamination)

² Most often households were allowed choice. 96-gallons was not too heavy because most programs co-collect with yard waste.

Aspect	BMPS / Alternatives - Residential	BMPS / Alternatives - Commercial
Collection Frequency – Curbside	<ul style="list-style-type: none"> Weekly; some change to every-other-week (EOW) during winter Some EOW year-round in north – alternate organics with recycling collection for efficiencies. <i>Best:</i> EOW trash, weekly organics <i>Alternative:</i> in-sink garbage disposal option 	<ul style="list-style-type: none"> At least as often as trash Weekly not sufficient unless small generators <i>Alternative:</i> in-sink disposal increasing
Collection Frequency – Drop-off	<ul style="list-style-type: none"> Varies – examples include every other day, daily, other 	<ul style="list-style-type: none"> Same
Rates – Collection	<ul style="list-style-type: none"> <i>Best:</i> small container embedded in trash (best use, economies); pay extra for additional service (often with yard waste) <i>Alternative:</i> fee for service PAYT-style <i>Avoid:</i> fully embedded (esp. if collected with YW) because it discourages composting <i>Avoid:</i> computing costs assuming end-product sales – plan for \$0 revenues to be safe 	<ul style="list-style-type: none"> Usually added fee; typically 40% cheaper / discount compared to MSW <i>Alternative:</i> a few embed costs in trash <i>Alternative:</i> if no rate discount; 3 months fee, subsidy (adjusting trash)
Rates - Tipping	<ul style="list-style-type: none"> Organics lower than trash for incentive (however- some programs are still successful when organic tip fees are greater than MSW) 	<ul style="list-style-type: none"> Same
Kitchen or in-building containers	<ul style="list-style-type: none"> Costly – sending to all residents expensive / not sending reduces use Consider inexpensive plastic pitchers (2 if possible) – cheap, 1 can be in dishwasher at any time <i>Alternative:</i> coupons to redeem for container at local vendor (cheaper) <i>Alternative:</i> compostable bags/liners– allow but don't promote (Yuck factor) 	<ul style="list-style-type: none"> Offer free or discounted containers to employees; typically 23-gal slims; larger too heavy. <i>Key:</i> signage and convenient placement <i>Alternative:</i> waxed cardboard for grocery (free!) Some vented /slit for air
Outdoor containers	<ul style="list-style-type: none"> Generally no larger than 64-gallons for weight issues, wheeled, lidded (can offer multiples); 96 gal. can be ok if MOSTLY yard waste <i>Alternative:</i> Compostable bags – typical is to allow but not promote <i>Alternative:</i> Bags (paper with YW ok / clear plastic poor). Plastic bags contaminate, hard to remove 	<ul style="list-style-type: none"> 64 gallon cart (no larger) because weight Multiple 64-gallon carts ok Wash carts (to diminish “yuck”) <i>Alternative:</i> Compactors (10 CY) in some communities; some dehydrators reported <i>Alternative:</i> in-sink, in-ground
Education	<ul style="list-style-type: none"> Consistent, clear, quarterly for new Define food scraps clearly! Electronic, social marketing helps 	<ul style="list-style-type: none"> <i>Key:</i> On-site training (conducted hauler, city, or both); multi-lingual signs, flyers
Yuck Factor	<ul style="list-style-type: none"> Educate / remind it is not new materials – just a different container Suggest layering materials, freeze, or wrap “yucky” items Free compostable bags, pictures of clean organics streams help 	<p>In addition to residential suggestions...</p> <ul style="list-style-type: none"> Washing containers (1-2/yr; some every time) Lining with compostable bags, cardboard, paper towels Empty before full Vented or slit containers for air

Aspect	BMPS / Alternatives - Residential	BMPS / Alternatives - Commercial
Vermin fears	<ul style="list-style-type: none"> Educate / remind not new materials – just different container 	<ul style="list-style-type: none"> Same
“Selling” / Political support	<ul style="list-style-type: none"> Identify motivators for stakeholder at local level (GHG, jobs, Landfill, public) Waste audit to demonstrate Champions, talking notes to elected officials 	<ul style="list-style-type: none"> Highlight potential savings if possible Fits in with some businesses “green” image

Project Resources:

The project includes a website (www.foodscrapsrecovery.com), this report – which includes the topics listed in this executive summary as well as extensive case studies, and several webinars, which were provided in late 2010 and early 2011. More information about the project can be found on the website or by contacting info@econservationinstitute.org.

The tools available on the website for free to all communities include:

- 1) **Best Management Practices Report-** This report is available in downloadable form on the website.
- 2) **Free webinars and presentations-** Visitors to the web site were able to register for a series of free webinars in 2010 and early 2011 covering the results of the project. All project webinar and state conference PowerPoint presentations are posted on the website www.foodscrapsrecovery.com . The first conference presentation was on August 2010 at the California Resource Recovery Association conference; more are expected through 2011 (watch for updates on the website).
- 3) **Interactive community-** A page of the website is dedicated to creating an interactive community of like minded individuals. The “community page” gives visitors a chance to share their successes, questions, advice, and other information.
- 4) **On-line library and bibliography-** In order to complete the BMP report EI researchers conducted an exhaustive literature review. The review included on-line sources, published reports from jurisdictions across the US, and trade journal sources. The results of the literature review and the reports uncovered during this research are available for all visitors to the web site.

SECTION 1. BACKGROUND ON FOOD WASTE PROGRAMS: EFFECTIVE LANDFILL DIVERSION

1.1 Project Genesis and Objectives

The funding for this project was provided by the US EPA 2009 Resource Conservation Challenge grant with the goal of supporting research on the best management practices for food scraps. This research will be used to assist in the development of additional food scraps programs in Region 5 states. In this project, Econservation Institute (EI) researchers conducted the following work:

- Gathered information on real-world programs around the US, and analyzed, compared, and contrasted designs and operation;
- Examined programs to identify success factors and identify Best Management Practices (BMPs) under a number of situations, capitalize on these successful programs, and provide lessons/guidance for Region 5 communities and beyond;
- Prepared a report, website, and webinars / presentations designed to transfer the technology to communities in US.

We realize that each community is unique with different barriers, advantages, politics and populations, and the best practices and case studies included in the report were selected with these community variations in mind.

Each of our research elements were planned to help speed the adoption of well-designed food scrap programs with the ultimate goal of reducing the amount of materials sent to the landfill, increasing composting, and avoiding the emissions of GHG in the US- key goals of the Resource Conservation Challenge.

1.2 Food Waste Situation and Background

Food waste programs, both commercial and residential, have been growing in popularity throughout the US over the past decade. This report seeks to leverage the collective knowledge of existing (and in some cases, no longer existing) food scraps programs to assist communities in the US, and specifically in Region 5, in implementing successful programs. Nationally, the EPA reports that 12.5% of the total generated waste stream is made up of food waste and only about 2.6% of the food waste generated is recovered³. Using 2007 EPA per capita generation estimates and US Census Bureau population statistics, it is estimated that there are approximately 5.41 million tons of food waste generated in

This report seeks to leverage the collective knowledge of existing food scraps programs to assist communities in the US, and specifically in Region 5, in implementing successful programs

³ U.S. EPA Office of Solid Waste, Municipal Solid Waste in the United States, 2007 Facts and Figures

Region 5 per year, of which only about 141 thousand tons are currently being recovered. This leaves nearly 5.27 million tons of food waste being landfilled per year in Region 5.

The food waste hierarchy considers certain programs as highest and best use. Source reduction (reducing the volume being generated) is the highest use. Donations to feed people and then to feed animals are the next levels. Industrial uses (rendering, discards for feed production) follow as the next level on the hierarchy. This report focuses on programs designed for composting and soil-amendment products.

Communities that do adopt food waste programs tend to have very strong diversion rates and many of them already had yard waste diversion programs. The characteristics and programmatic aspects of communities with food scrap programs vary widely and the performance and success of the programs are dependent on these variations. The most common attributes of a residential program (although programs are always crafted to fit the community's needs and capabilities) include:

- Established within the last 10 years;
- Collection of co-mingled food scrap and yard waste stream;
- Weekly collection of poly-carts ranging from 32 to 96-gallons in size;
- Voluntary participation;
- Added fees above and beyond the trash/recycling rates;
- Operation in conjunction with variable trash rates (pay-as-you-throw);
- Service provided by a single contracted hauler;
- Meat and dairy products allowed in the waste stream.

For commercial food scrap programs the following traits are common:

- Only a portion of the businesses in the community participate;
- Voluntary participation for an added fee;
- Rates that are lower than MSW rates;
- Collection in 64-gallon poly-carts;
- Includes meat and dairy in the waste stream;
- Options for collection at least 3 times a week;
- Implementation of staff education and outreach;
- Desire for the highest possible diversion impacts.

1.3 Penetration of Food Waste Programs in the US and Region 5

Econservation Institute combed the literature and conducted scores of calls and interviews to assemble an inventory of food waste programs around the US.⁴ We located more than 180 US programs, including communities with residential and / or commercial programs.⁵ The vast majority of programs have been introduced since 2004; growth has been dramatic since then. The leading states with programs include:

- Washington (more than 50 programs);
- Minnesota and California (more than 40 programs each);
- Ohio, Vermont, Iowa, Massachusetts, Oregon, Colorado, Maine, and Michigan (with 2-5 programs each);

⁴ Note that we also identified many programs in Canada, but we did not include them in this report.

⁵ But excluding communities where just a couple commercial businesses compost their food scraps.

- A number of states with one program each (Connecticut, Florida, Indiana, Missouri, North Carolina, New York, Pennsylvania, and Texas).

Our inventory work found that successful food waste programs are found in many types of communities:

- Large and small communities (population range: 170-900,000; average 62,000, median 21,000);
- Urban / suburban / rural;
- College / tourist towns;
- Geographically-isolated communities.

EPA Region 10 leads the way with more than 60 programs, but Region 5 has the second-most food waste programs among the EPA regions. This bodes well for continued progress in Region 5 because:

- Programs tend to attract other programs – programs “grow” with similar examples nearby;
- Region 5 has a composting siting situation that allows programs to grow in at least a subset of the states in the Region.

Overall, 8.6M United States residents, or 2.7% of the total US population, live in communities in which residential food scraps programs are available for at least a portion of the population.

1.4 Types of Food Waste Programs

This report includes a number of case studies to provide lessons and examples for communities in different situations. Probably the most common methods for introducing programs are to add food waste to an existing yard waste collection program, or to introduce a targeted commercial program. Less common are food scraps only in a separate stream or drop-off only program. A few communities are using every-other-week collection of MSW and recycling coupled with weekly organics collection as a way to reach the next level of diversion-related goals. In this report, case studies are provided in each of the following categories:

- Rural programs;
- Drop-off programs;
- Commercial programs;
- Adding food waste to existing yard waste programs;
- Alternatives to composting;
- Failed and discontinued programs.

In addition to the traditional compost-bound program types, we conducted additional research on a few “alternatives to composting” including:

- Use of in-sink garbage disposals and treatment at a waste water facility as a method for diverting food waste from the landfill;
- Transport of food scraps to a waste water treatment site or anaerobic digesters for diversion from landfill and gas collection.

Each of the alternatives has strengths and weaknesses, which are assessed in a later chapter. Drop-off programs face low collection costs, and have been a success in fairly urban environments. Programs with co-collection of yard and food waste have been a successful

evolution of programs, and are in place in urban, suburban, and rural environments. These include the “Fantastic Three”-type programs in California, as well as many programs in Region 5. Commercial programs divert a large number of tons through tailored, targeted efforts. The attraction of the garbage disposal program is the fact that collection costs are essentially zero (except for the cost of an advertising campaign or addition to an existing one). However, the situation must be “right” for the program to work.

1.5 Tonnage Impacts from Food Waste Programs

Residential

Curbside organics programs, including yard waste and food waste combined, divert an estimated **25 to 30lb** per household per week. Food scraps alone account for **7 to 9 lbs** per household per week.

The average rate charged to a household for organics collection, including food scraps and yard waste, was reported to be \$7.70 per month

Using the EPA reported per capita generation and estimates of what portion of that generation is residential diversion, estimates were calculated for participating households. It is important to note that participation in organics and food scraps programs varies greatly across programs and is highly dependent upon how the program is set-up (mandatory pay versus voluntary, etc.). The average level of participation over all of the programs examined was in the range of **35 to 45%** of eligible households with a maximum participation of around 95% and a minimum of 10% or less.

Table 1.1: Diversion Impacts for Organics and Food Scrap Composting Programs

Organics Collection (Food and YW)		Food Scraps Only	
25 to 30	lbs/HH/week	7 to 9	lbs/HH/week
49% to 59%	Diversion per participating HH	14% to 17%	Diversion per participating HH

Commercial

Determining the impacts of food scraps composting on the commercial sector can be a challenge. Only a portion of the communities responding to the survey were able to report the commercial diversion rates. Overall, the average commercial diversion rate was reported to be **21%** with a maximum of **42%** and a minimum of **8%**. Unlike the residential sector where the program may cover a very large portion of the sector, commercial programs in some communities only impact a handful of targeted or eligible businesses. This makes it very difficult to determine an average diversion rate per business. Additionally, diversion was reported to be extremely variable depending on the type of business and the type of program. Restaurants and grocery stores should have higher food waste diversion rates than many other types of businesses. Compounding the issues was that in many communities commercial programs are lumped together with multi-family programs making it nearly impossible to determine the actual diversion per business. Diversion of the eligible waste stream in participating businesses was reported to be between **20% and 90%** with a high level of variability depending on the type of business, the program aggressiveness, education and outreach, and other factors.

Curbside organics programs which include both yard waste and food waste combined, divert an estimated 25 to 30 pounds per household per week. Food scraps alone account for 7 to 9 pounds per household per week.

1.6 Costs, Opportunities, and Other Impacts of Food Waste Programs

Residential Program Rates/Costs

Determining the program rates depends on a number of factors including whether or not the fees for food scraps / organics are embedded in the trash rates, whether or not there is PAYT in place, and whether or not the program is mandatory pay or not. Taking all of these potential factors into account, the average *rate charged* to a household for organics collection including food scraps and yard waste was reported to be **\$7.70** per month with a median of **\$7.50/month** and a maximum value of **\$9.95/month**.⁵ Only a portion of respondents were able to report on the average *costs to provide service* as opposed to the average rates charged to subscribers. The average costs to provide service were reported to be **\$5.40** per household, about \$2.30 less than the average rates charges to customers. On average, the cost of organics collection is only a fraction of the total trash costs. The average monthly trash fees were reported to be **\$21.80** with a median value of **\$21.50/month**.⁶ Organics collection, *on average, is only a third of the cost of trash collection*. Combined, the average cost for trash, recycling, and organics collection was reported to be \$27.88/month per household.

Just under one-third of the communities reported that the fees for organics collection were included in their trash rates and only one quarter reported that organics collection was a mandatory pay program. Table 2.6 displays the average costs and diversion for residential programs.

Table 1.2: Average Diversion Rates and Costs for Food Scraps and Organics Programs⁷

Diversion (Residential)		Rates and Costs ⁸ (Residential)			
Overall average	52%		Trash Only	Organics Only	Total
National average 2007	33%	Average HH Rate/month	\$21.79	\$7.68	\$ 27.88
Average pounds per participating HH	33 to 37lbs/week	Median HH Rate/month	\$21.50	\$7.50	\$ 27.30
Average participation rate	35-40%	Average HH costs/month	NA	\$5.40	NA

Commercial Costs

The average cost per month charged to businesses for food scrap collection was reported to be on the order of **\$60.00 per cubic yard for one time per week collection**. Prices of course, varied greatly depending on the size of container and frequency. One cubic yard with once weekly collection was a common option available in many of the programs. Generally, organics collection has a lower rate than trash service. The difference, in percentage of trash costs, between food scraps collection and trash collection varied from only a few dollars cheaper to 75% cheaper than trash services. On average, compost collection was reported to be **42%** cheaper than trash collection services, thus providing a real economic incentive for participation. The figure below shows the average, maximum, and minimum charges for once weekly collection of one cubic yard of organics.

⁶ The maximum rate was close it \$70/month for a California city with PAYT, organics, and recycling and the largest size trash cart.

⁷ Food scraps and organics are included together as only 8% of the communities surveyed reported that they collected food scraps separately from yard waste. The 8% weren't included in the calculations.

⁸ Rates reflect what households are charged while costs represent the actual costs to provide service.

Table 1.3: Rates for Once Weekly Collection of One Cubic Yard Compostable

	Monthly Charge Rate
Average	\$60.00
Max	\$161.96
Min	\$28.58

1.7 Siting Issues Associated with Food Waste Programs

Food waste programs are not inherently complex to implement, whether designed as an add-on to the yard waste program, a drop-off system, or other variety. As it turns out, one of the primary barriers to increased food scrap recovery in areas of Region 5 and elsewhere in the Country is the processing facility permitting / siting process at the state level. Program managers want to be certain that there will be a destination for materials from any programs they start; facility owners are reluctant to establish facilities without an existing waste stream. States are working to determine what can be done to streamline facility permitting while protecting the environment. Discussion issues include the definition of yard waste, food scraps, and municipal solid waste; addressing potential environmental issues, setting the regulation level and creating a stable regulatory framework. Several states are working on stakeholder or other rulemaking processes to address these issues. Detail on trends in permitting and the regulations in place in the states in Region 5 and a sample of states elsewhere are presented in Section 4.

1.8 Implications and Diversion Potential for Food Waste Programs in Region 5 and Beyond

Based on the average impacts of food waste collection programs throughout Region 5 and the country, state and regional impacts were estimated by EI. Both low and high estimates were developed based on different rates of participation and levels of diversion⁹. The residential estimates are based on curbside collection programs, not drop-off, and only include the diversion resulting from food scraps programs (including food soiled paper), not yard waste / green waste¹⁰. The calculations did *not* assume a mandatory participation program. The statewide estimates assume that the entire state adopts residential curbside programs¹¹. In addition to the estimated number of tons diverted, and estimate of the percentage of the total generated residential waste stream that could be diverted and the potential metric tons of carbon equivalents avoided is also included¹². Both low and high estimates are provided to give a range of potential impacts. If all of the states in Region 5 were able to implement residential food scrap programs the region would divert between **1,222,000** and **2,021,000** tons of materials from disposal in the landfill which would account for between **4.7%** and **7.8%** of the residential waste stream. In addition, residential food scrap programs have the potential to avoid between 315,900 and 522,500 metric tons of

9 These ranges do not take into account siting issues or compost processing capacity.

10 All of the states in the Region already have landfill bans of yard waste. For communities outside of Region 5 that may be reading this report, estimates for adding a full organics program including yard waste and food scraps, to a community or state that does not have any organics collection would obviously be significantly higher.

11 Eligible households include up to and including 9 units per building, similar to the typical characterizations of existing food scrap programs.

12 The percent of the residential stream that is diverted was determined using EPA 2007 estimates on per capita generation and the MTCE avoided was determined using the US EPA WaRM model.

carbon equivalents. Table 1.4 displays the potential impacts of residential food scrap programs in Region 5.

Table 1.4: Impacts of Residential Food Scrap Programs in Region 5

	Tons of Food Scraps		Percent of Res. Stream		MTCE Avoided	
	Low	High	Low	High	Low	High
IL	279,000	461,000	4.3%	7.1%	72,100	119,200
IN	154,000	255,000	4.8%	8.0%	39,800	65,900
MI	247,000	409,000	4.9%	8.0%	63,900	105,700
MN	121,000	200,000	4.6%	7.6%	31,300	51,700
OH	281,000	464,000	4.8%	8.0%	72,600	120,000
WI	140,000	232,000	4.9%	8.2%	36,200	60,000
Total	1,222,000	2,021,000	4.7%	7.8%	315,900	522,500

To allow communities in Region 5 to estimate what the potential impacts may be on their community Table 1.5 is provided below. The table displays the low and high estimates of food scrap collection programs on different sized communities. The program assumptions and the calculations to determine the impacts used the same formulas as in Table 1.4 above.

Table 1.5: Impacts of Residential Food Scraps Programs in Different Sized Communities

Number of HH's	Tons of Food Scraps		MTCE Avoided	
	Low	High	Low	High
1,500	96	158	25	41
5,000	319	527	82	136
25,000	1593	2633	412	681
50,000	3185	5265	823	1361
100,000	6370	10530	1647	2722

SECTION 2: NATIONAL SURVEY RESULTS

As a means of assessing the current best practices, a nationwide survey of existing and discontinued food scrap composting programs was conducted. Starting with published sources of data including industry publications such as Bio-Cycle, previous EPA reports¹³ and in-house data, Econservation staff contacted nearly 100 different communities with residential and/or commercial programs in the US. The interview process with the first set of programs resulted in a second list of additional communities with potential programs. Through follow-up interviews, both over the phone and on-line, EI was able to identify 183 food scrap composting programs currently operating in the US. We recognize that this is not a static number and realize that there are most likely additional programs yet to be identified. With the rapid growth in the adoption of programs it is likely that by the time of the publication of this report a number of additional programs will be under way. Using the results and data uncovered through the detailed interviews with these cities, EI was able to uncover a number of common practices that make the programs successful. The following section reviews the results of the surveys and highlights the practices that should be transferred to other communities to help increase the potential success of food scrap programs.

Through follow-up interviews, both over the phone and on-line, Econservation Institute was able to identify 183 food scrap composting programs currently operating in the US

2.1 Number and Location of Programs

In total, 183 food scrap composting and collection programs were identified in the United States. This includes communities with residential and/or commercial programs but does not include communities in which one or just a few commercial facilities are composting food scraps. For example, Kroger's Supermarkets in Ohio operates food scrap recovery programs in 44 stores throughout the state but we did not count every community in which a Kroger's was located as having a food scrap program. This is also true for Wal-Mart which has stressed a goal of recovering food scraps at every one of their locations nation-wide. If however, a hauler reported to us that they offer food scrap collection to residents or businesses in several towns we did qualify all of the communities in which they offer programs to have a program available. In some cases this required a judgment call from EI researchers on whether or not to qualify a community as having a food scraps composting program. This was especially true in the commercial sector as well as the university and institutional sector which for the most part were omitted in this research¹⁴.

The average size of the communities with food scrap programs was found to be 62,300 residents. The largest residential program was located in a city with over 617,000 residents and the largest commercial-only program was located in a city with nearly 900,000 residents. The

¹³ *Beyond Recycling: Composting Food Scraps and Soiled Paper*, Center for a Competitive Waste Industry, Report to EPA Region 9, BioCycle National Survey, Food Composting Infrastructure, Reprinted from August 2008 thru December 2008

¹⁴ For those interested in learning more about grocery store specific, institutional, school/university programs, or other types of programs, an on-line library of published research is available as part of this project at www.foodscrapsrecovery.org.

Alameda County, CA

Residential Case Study

Communities in Alameda County have the benefit of StopWaste.org to help implement food waste programs. StopWaste.org is a public agency comprised of the Alameda County Waste Management Authority and the Alameda County Source Reduction and Recycling Board. StopWaste began helping communities set up food waste programs in 2002. There are currently 16 communities in the county that offer food scrap programs. Most of those were introduced during franchise negotiations so there were no additional rate increases, especially if they were already collecting yard waste on a weekly basis. StopWaste is able to provide funding to these communities provided they meet certain conditions. The residential greencart must not cost more than \$8 per household, they must call the program "food scraps" so as to better facilitate future marketing campaigns, pick up must be once a week with no pilot programs, kitchen pails and outreach material must be provided to each household, and materials must go to a permitted facility. The recycling coordinator from Albany, CA said that StopWaste has been extremely helpful, especially with outreach. They've had their program since 2004 with yard waste and food scrap collection. StopWaste has provided twice a year flip lid audits, feed-back, and reminders to residents with stickers and other materials. Overall, more than 400,000 households in Alameda County have access to curbside food scrap collection with an estimated 163,956 tons of organics being collected in 2008.

smallest residential program was located in a rural program in Washington State with only 170 residents and the smallest commercial-only program was found to be in a city with 7,700 residents. The median size was reported to be 21,000 showing that while there are a number of larger cities, there are also a greater number of smaller-sized communities that have implemented food waste programs. The table below displays the average population size for communities with food scraps composting programs.

Table 2.1: Average, Median, Max and Min Populations

Average size	62,300
Largest population (Residential)	617,300
Largest population (Commercial only)	895,000
Smallest population (Residential)	170
Smallest population (Commercial only)	7,700
Median population	21,00

Eighty-one percent of the food waste programs are located in three states - , Washington, Minnesota and California. There are noticeably fewer programs in the south, the southeast, and the western plains. All together, Region 5 is progressing nicely compared to other parts of the country. Only Region 10 which includes Washington, Oregon, and Idaho for a total of 62 communities has more food scrap composting programs than Region 5 (which has 55.) The two figures below display the total count of food scrap composting programs by state and EPA region.

Figure 2.1: Total Program Count by State

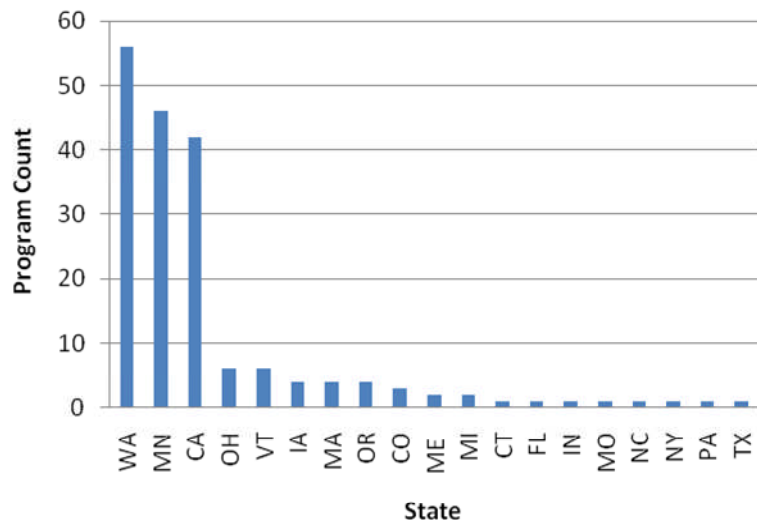
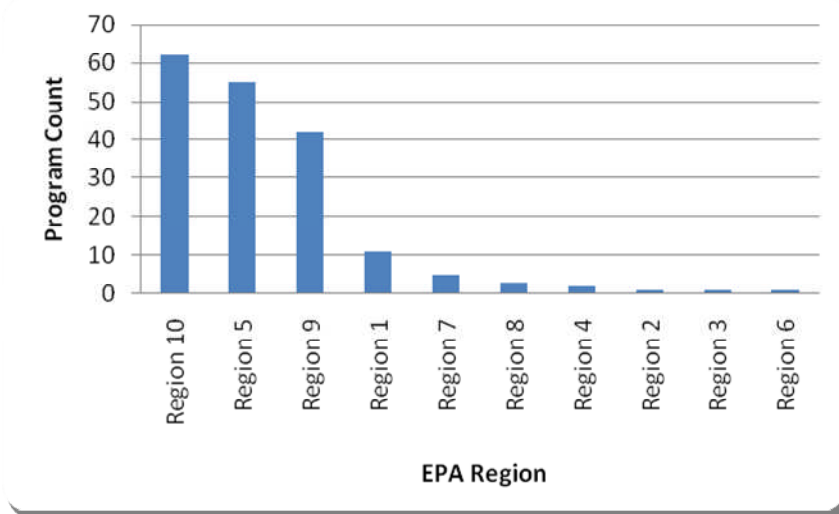
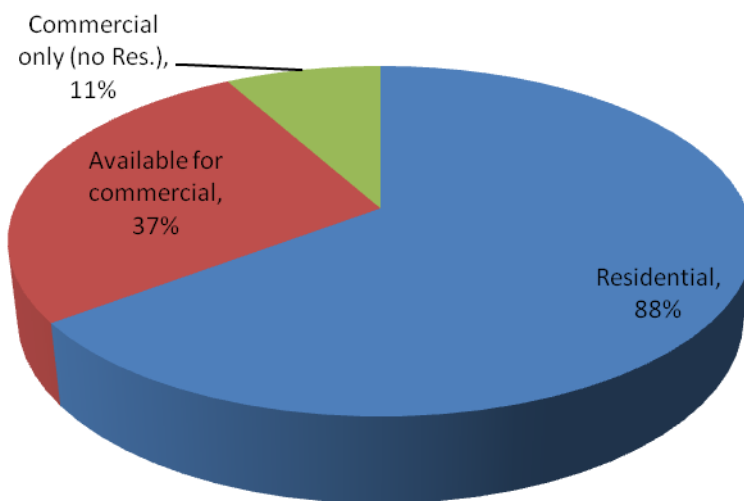


Figure 2.2: Total Program Count by EPA Region



Of the 183 total programs, 88% or 162 have a residential component. Slightly over one-third of the programs, 37% (67 communities) reported that food scrap collection was available for commercial entities. Only 11% are strictly commercial programs with no residential diversion options available. Figure 2.3 below shows the program availability across all communities.

Figure 2.3: Program Type/Availability

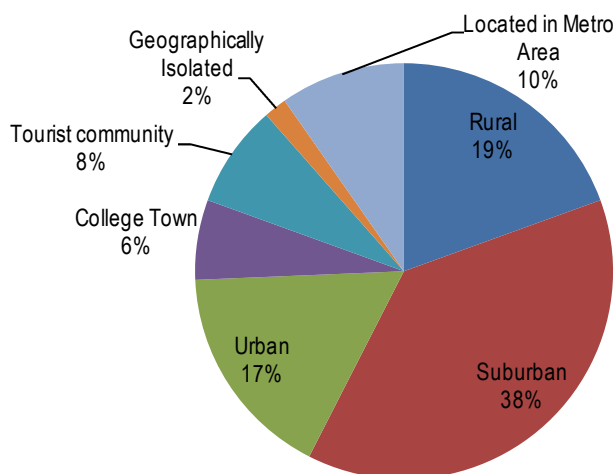


2.2 Residential Program Characteristics

The following section of this report focuses on communities that have residential programs (with or without commercial programs as well). The majority of programs were reported to be located in suburban areas. However, 19% of the programs classified themselves as existing in rural areas compared to 17% that reported they were located in urban areas. Understandably, only 2% reported they were located in geographically isolated locations (however, one very successful program does exist on Mackinac Island, MI, which definitely qualifies as a

geographically isolated location). The figure below displays the self-reported location classifications of food waste composting programs:

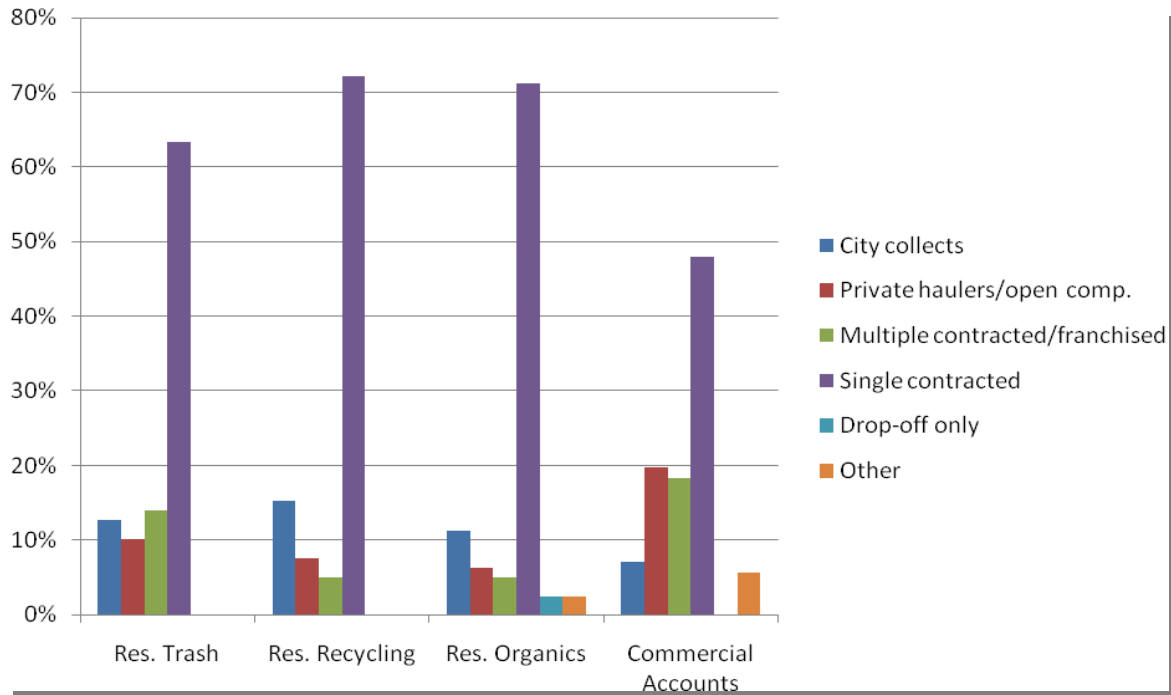
Figure 2.4: Program Location Classifications (Totals do not add to 100% as locations could report more than one location classification)



Who Collects Residential Food Scraps?

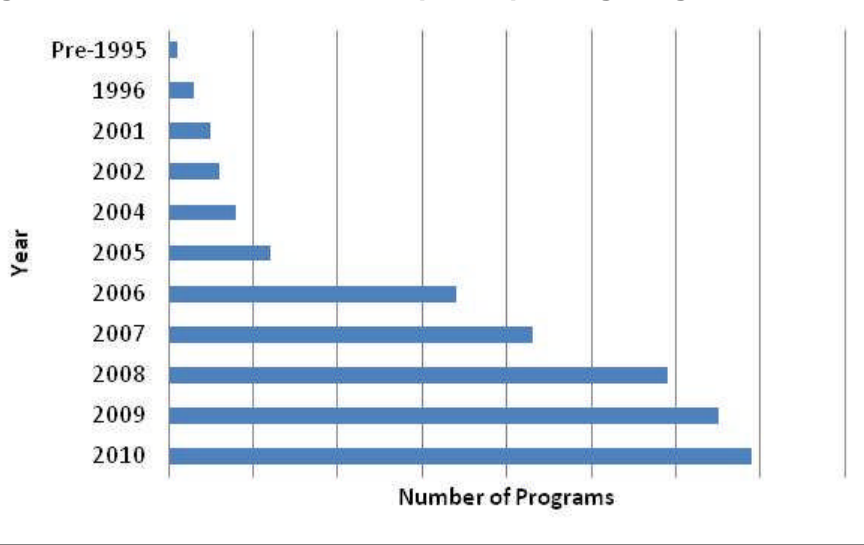
In over 70% of communities with organics composting programs, trash, recycling, and organics including food scraps are collected by a single contracted hauler. Over 10% reported that they have a municipally-run program. Only around 6% reported that they have multiple haulers operating under open competition to provide services. This type of program was most prevalent in Minnesota, while contracted or franchised haulers were more common along the west coast of the US, especially in California. Just under 5% of the communities reported that their residential food scrap composting programs were drop-off only (Duluth, MN and Cambridge, MA are two such examples and are covered in more detail in the case studies section of this report). There were also a number of unique situations uncovered such as special solid waste districts, open competition for commercial recycling only, pilot programs, and others. Figure 2.5 displays the distribution of the responses to who collects organic materials.

Figure 2.5: Distribution of Who Collects Food Scraps



In 2006, the largest number of new food scrap collection programs were established in the US. The number of programs has been increasing since the early 2000s with a slight slow-down in the last 3 or 4 years which corresponds directly to the slowdown in economic activity since 2006. The graph in figure 2.5 displays the growth of residential food scrap composting programs over the last 15 years.

Figure 2.6: Growth of Food Scrap Composting Program in the US Since 1995



Other Program Attributes

The typical residential food scrap collection program includes year-round curbside collection of food scraps combined with yard waste. Only 4% of communities reported that their program was drop-off only. The majority of communities with residential programs also have food scrap collection available for at least some portion of their multi-family housing, typically up to 8-units, and most also have a program available for the commercial sector as well. It is less common in schools and universities. Over 90% of the communities reported that they accept meat and dairy in the food scrap stream, not just vegetative waste, while just one program reported that they have a pilot to compost pet waste. No one reported that they accept diapers in their programs.

Almost 50% of the communities give residents a choice of 32, 64, or 96-gallon carts while 23% provide only 96-gallon carts. When food scraps are co-collected with yard waste it makes sense to use a larger cart. In the commercial sector, where food scraps are often the only items in the cart, 64-gallon containers are preferred due to the high water content and weight of food scraps alone. This makes storing and disposing of food scraps much easier and cleaner. Less than 10% use bags, either plastic or paper, to collect organics manually. Seventy-five percent of the communities reported that they collect organics weekly. Every-other-week collection of recycling was reported to be quite popular with 55% of the households participating. Only 4% of the communities, all of which were located in the northwestern US, reported that they had every-other-week collection of trash. This may be a growing trend in the future as US cities begin to mimic communities in Canada and beyond that have successfully increased diversion through every-other-week garbage collection with weekly organics collection.

In the vast majority of communities, participation in the residential food scrap program is voluntary (only 9% reported that participation is mandatory). Nearly 70% of communities reported that the food scrap program requires an additional fee, and only 31% reported that the fees are embedded in the trash rates. PAYT trash systems exist in 80% of the communities with food scraps programs. With this system it has been found that residents can decrease the amount of their trash and therefore the cost of their trash bill by participating in an organics program. This however hasn't been shown to be a requirement for participation. The figures below display the attributes of food scrap programs around the US.

Figure 2.7: Pilot programs/Schools and Universities

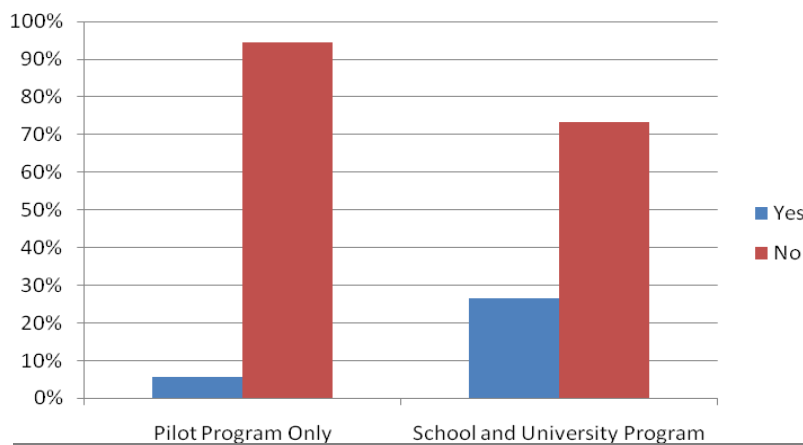


Figure 2.8: Drop-offs and Availability

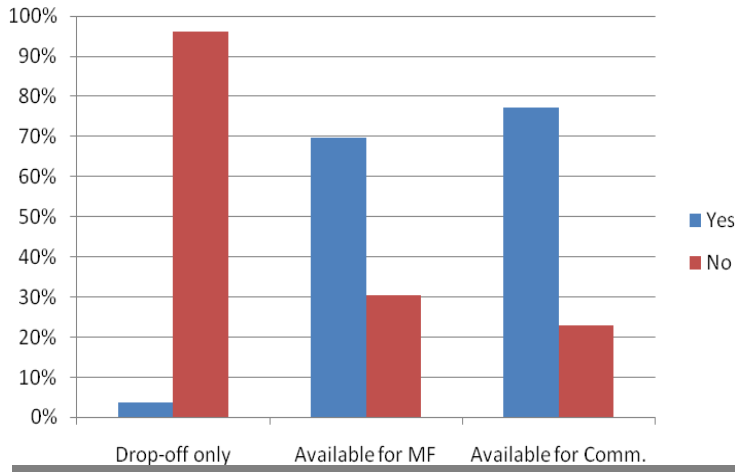


Figure 2.9: Materials in the Stream

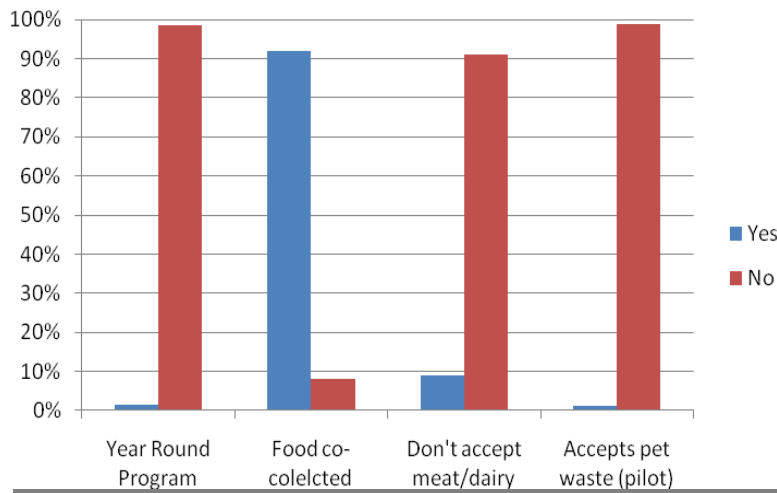


Figure 2.10: Partipation and Payment

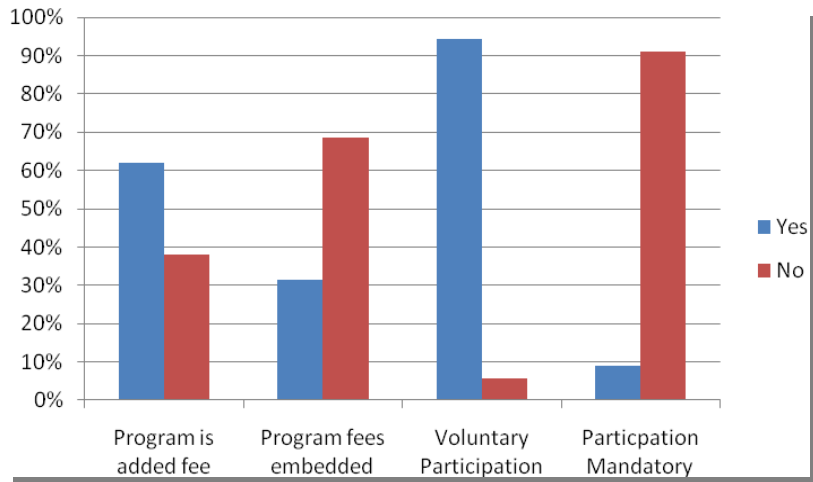


Figure 2.11: Collection Frequency

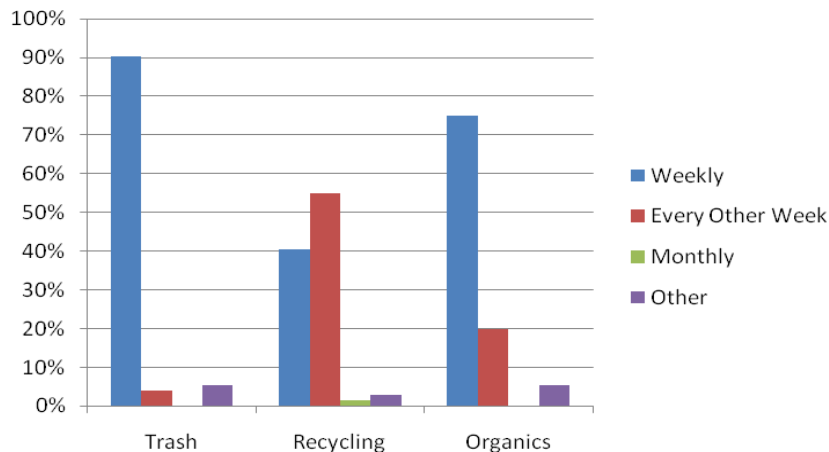
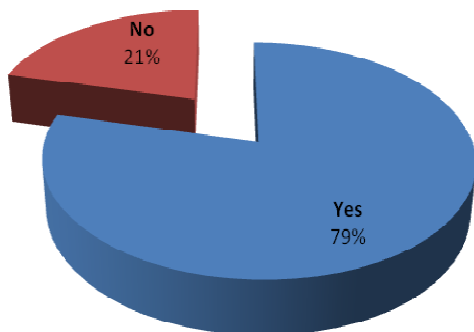


Figure 2.12 Presence of Pay-As-You-Throw

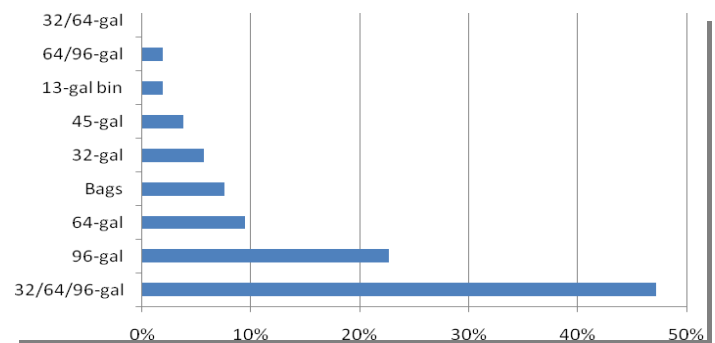


Denver, Colorado

Pilot Program Case Study

In October 2008 the City received a state funded grant to pilot a residential curbside organics collection program. Residential trash and recycling services are provided to residents by city staff and trucks and costs of the program are included in property taxes, making many residents believe that trash and recycling services are “free”. For the pilot program the city targeted 3,000 HHs in every district of the city. Sign-ups for the pilot program were first come, first serve which posed two potential issues for the pilot design. While they were sure to get residents that would be willing to participate every week by this method, the self-selected households were predisposed to divert more which could skew the pilot results to be higher than a randomly selected population *and* the self-selected households might only have one participating house on a block, making collection a challenge. The pilot was successful in diverting materials and on average, the participating households diverted an average of 31lbs/week in the summer and 24lbs/week in the winter. Unfortunately, due to the high costs of the program (long hauls to bring to the compost site and high collection costs partially due to the spread out nature of the pilot) the City was unable to secure permanent funding for the program and was forced to discontinue the program on March 2010. When the City announced their decision to stop the program, the households in the pilot made their voices heard. They called city staff and elected officials requesting the city continue the program. The only way the city could do this was to charge participating households an added fee (remember, trash and recycling services are “free: to all city residents). In order to make the program work the fee based service would cost residents a whopping \$9.75 per month or \$117/year for organics collection alone. As of June 2010 over 1,600 of the original 3,000 households had signed-up for the pay service and the city is in the process of recruiting another 1,600 homes. The City has proposed an expansion of the program to 6,000 homes by 2010.

Figure 2.13 Cart Sizes/Types



Costs and Impacts of Residential Programs

In order to gauge the success or failure of a program it is important to be able to measure the impacts of the program as well as the costs to achieve those impacts. The following section shares the reported costs for food scrap composting programs as well as the potential impacts of the programs on diversion from the landfill.

Diversion Rate: The average residential diversion rate, including recycling, yard waste, and food scraps, was reported to be **49%**. When communities were asked to report their overall diversion rate for all sectors the average was reported to be **52%**. Many of the communities reported that they were unable to separate the residential and commercial sectors in their reporting and thus were only able to report a total diversion rate. The maximum reported total diversion was reported to be 77% in San Francisco, CA while the lowest reported diversion rate was 20% in a rural community with less than 1,000 residents and no curbside recycling. This same community reported that their diversion rate was only around 5-7% prior to implementing their food scraps recovery program. The median total diversion rate was reported to be **55%**. This is significantly higher than the most recent national average

of 33.4%¹⁵ reported by the US EPA. This could be due to two main reasons:

- 1) Diverting food scraps (often included with yard waste) has the potential to impact about 25% of the waste stream leading to a significantly higher diversion rate in communities with food scrap programs;
- 2) Most of the communities that are implementing food scraps programs already have well established recycling programs and other diversion opportunities and are looking at food scraps as the next step to achieve greater diversion.

Diversions:

In order to calculate the pounds per household per week EI researchers used the residential diversion tonnage, the number of households eligible, and the number of households participating in the program. On average, participating households in municipalities reporting that they collected organics, including both yard waste and food scraps diverted an average of **25 to 30 lbs** per household per week. In addition to the level of diversion per household for organics, EI researchers drilled down into the data collected from the surveys and used the detailed city interviews to determine what food waste alone diverts from households. The average lbs per household per week diverted through food scraps alone is in the range of **7 to 9 lbs** per participating household. Higher rates to as much as **12 lbs/HH/week** were reported in the oldest and most mature programs where the program managers are focusing on outreach and education for an already established program. A drop-off only program may lead to around **3 to 4 lbs** per household per week. Newer programs varied greatly depending on how they were set-up. An opt-in pilot program may see very high rates of both participation and diversion as it reaches only the households that are enthusiastic and diligent recyclers and diverters. This type of pilot program tends to provide skewed results of what final diversion numbers may be. Having a randomly selected route or demographically selected area participate in the pilot will provide more realistic data.

Participation:

The average level of participation over all of the programs examined was in the range of **35 to 45%** of eligible households with a maximum participation of around 95% and a minimum of 10% or less. This rate of course, depends heavily upon how the program is designed and whether it is a mandatory pay program (fees embedded in trash rates), a mandatory participation program (like San Francisco and Seattle), or a strictly voluntary program.

Program Rates/Costs:

Determining the program rates depends on a number of factors including whether or not the fees for food scraps/organics are embedded in the trash rates, whether or not there is PAYT in place, and whether or not the program is mandatory pay or not. Taking all of these potential factors into account, the average *rate charged* to a household for organics collection including food scraps and yard waste (only 8% of the programs uncovered collected food scraps separately and they were not included in these calculations) was reported to be **\$7.70** per month with a median of **\$7.50/month** and a maximum value of **\$9.95/month**. Only a portion of respondents were able to report on the average *costs to provide service* as opposed to the average rates charged to subscribers. The average costs to provide service were reported to be **\$5.40**, about \$2.30 less than the average rates charges to customers. On average, the cost of organics collection is only a fraction of the total trash costs. The average monthly trash fees

¹⁵US EPA office of Solid Waste, Municipal Solid Waste in the United States, 2007 Facts and Figures

were reported to be **\$21.80** with a median value of **\$21.50/month**¹⁶. Organics collection, on average, is only a third of the costs of trash collection. Combined, the average cost for trash, recycling, and organics collection was reported to be \$27.88/month.

Just under one-third of the communities reported that the fees for organics collection were included in their trash rates and only one quarter reported that organics collection was a mandatory pay program. Table 2.2 displays the average costs and diversion for residential programs.

Table 2.2: Average Diversion rates and Costs for Food Scraps and Organics Programs¹⁷

Diversion		Rates and Costs ¹⁸			
Overall average	52%		Trash Only	Organics Only	Total
National average 2007	33%	Average HH Rate /month	\$21.79	\$7.68	\$ 27.88
Average pounds per participating HH	33 to 37lbs/week	Median HH Rate /month	\$21.50	\$7.50	\$ 27.30
Average participation rate	35-40%	Average HH Costs /month	NA	\$5.40	NA

Figure 2.14: Distribution of Mandatory Pay and Embedded Fee Programs

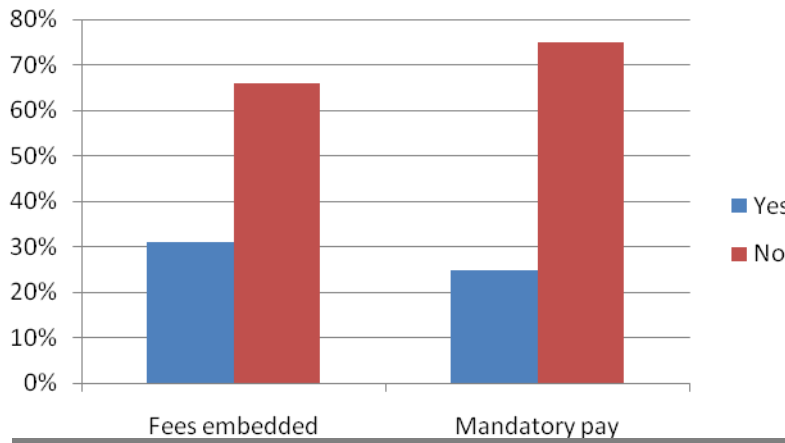
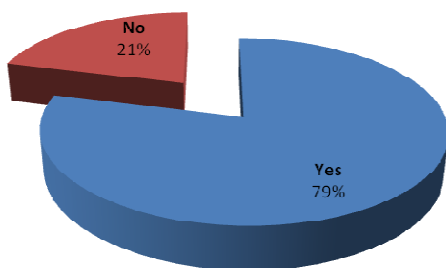


Figure 2.15: Presence of Pay-As-You-Throw



16 The maximum rate was close to \$70/month for a California city with PAYT, organics, and recycling and the largest size trash cart.

17 Food scraps and organics are included together as only 8% of the communities surveyed reported that they collected food scraps separately from yard waste.

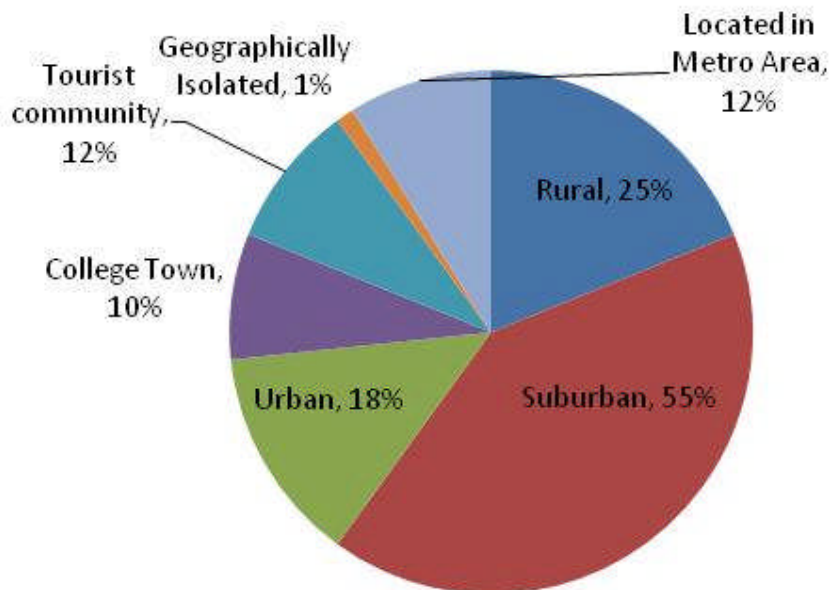
18 Rates reflect what households are charged while costs represent the actual costs to provide service

2.3: Commercial Program Characteristics

The following section of this report covers the characteristics, attributes, and trends in commercial programs. The majority of the commercial programs are located in communities that also have residential food scrap programs available. Overall, 37% of the 183 programs identified as having food scrap composting programs had programs available for the commercial sector. Of these 67 programs over 90% also had a program available for residents.

Commercial food scrap programs can be successful in any type of community, urban, rural, or suburban. The majority of commercial food scrap composting programs are located in suburban communities (55%) and a quarter of the communities report that they are rural communities. Less than one-fifth (18%) reported that they were located in an urban setting.

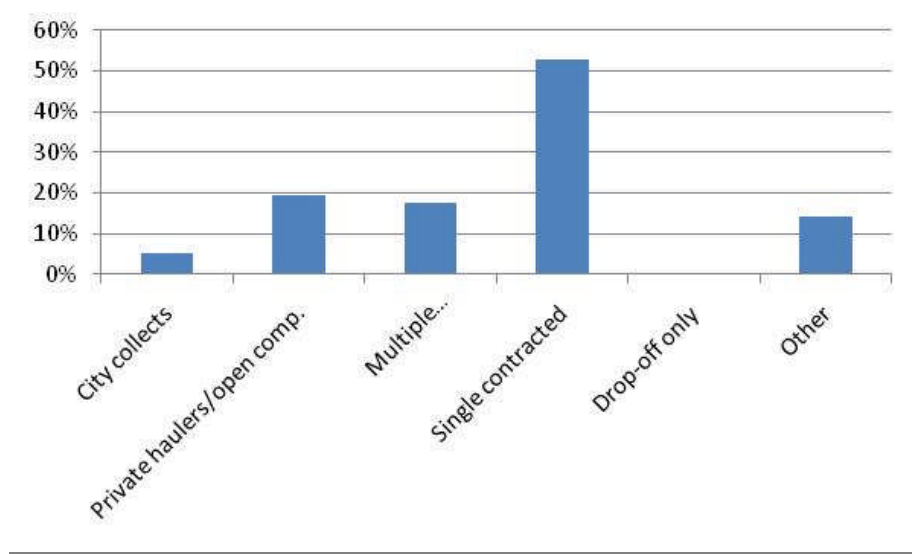
Figure 2.16: Program Location Classifications (Totals do not add to 100% as respondents could report more than one location classification)



Who Collects Commercial Food Scraps?

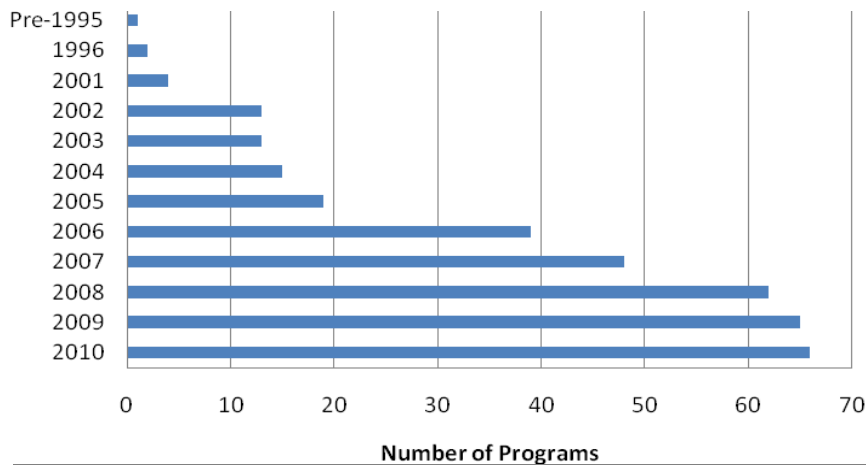
For over 50% of the communities with commercial food scraps programs materials are collected via a single contracted hauler. About one-fifth of communities reported that food scraps are collected through private haulers in open competition. Municipal collection of commercial food scraps is a relatively rare occurrence.

Figure 2.17: Who Collects Commercial Food Scraps



The largest growth in commercial food scrap programs occurred from 2005 to 2006, around the same time the economy was doing very well. While new programs have been started every year since the mid-nineties, growth has been a little slower over the past two or three years. Figure 2.18 displays the growth in commercial food scrap programs over the past 15 years in the United States.

Figure 2.18: Growth of Commercial Food Scrap Composting Programs in the US



Costs and Impacts of Commercial Programs

Diversification rate:

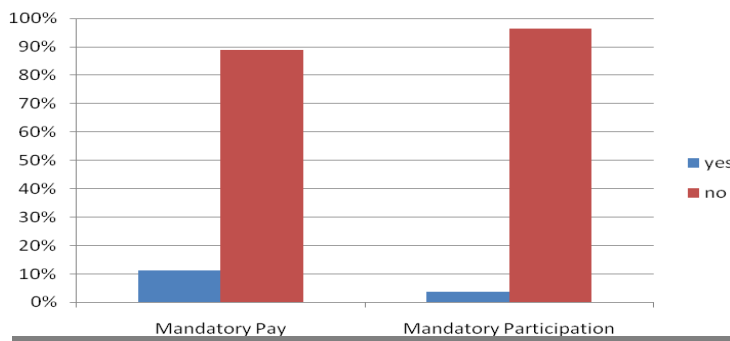
Determining the impacts of food scraps composting on the commercial sector can be a challenge. Only a portion of the communities responding to the survey were able to report the commercial diversion rates. Overall, the average commercial diversion rate was reported to be **21%** with a maximum of **42%** and a minimum of **8%**. Unlike the residential sector where the program may cover a very large portion of the sector, commercial programs in some communities only impact a handful of targeted or eligible businesses. This makes it very difficult

to determine an average diversion rate per business. Additionally, diversion was reported to be extremely variable depending on the type of business and the type of program. Compounding the issues was that in many communities commercial programs are lumped together with multi-family programs making it nearly impossible to determine the actual diversion per business. Diversion of the eligible waste stream in participating businesses was reported to be between **20%** and **90%** with a high level of variability depending on the type of business, the program aggressiveness, education and outreach, and other factors.

Costs and participation:

The majority of commercial programs are strictly voluntary. Just over 10% of the communities reported that the program is mandatory pay for commercial entities while only two communities reported that the program is both mandatory pay *and* mandatory participation for the commercial sector.

Figure 2.19: Mandatory Pay and Participation for Commercial Programs



The average cost per month charged to businesses for food scrap collection was reported to be on the order of **\$60.00 per cubic yard for one time a week collection**. Prices of course varied greatly on the size of container and frequency, however one cubic yard with once weekly collection was a common denominator. Generally, food scraps/organics collection was reported to be less expensive than an equivalent level of trash service. The difference, in percentage of trash costs, between food scraps collection and trash collection varied from only a few dollars cheaper to 75% cheaper than trash services. On average, compost collection was reported to be **42%** cheaper than trash collection services, thus providing a real economic incentive for participation.

In Washington state garbage is regulated and services are taxed while recycling and organics collection services are not taxed, meaning that at a minimum, these services are around 10% cheaper than garbage. Some programs offer compostable collection with no cart or container rental as an incentive for participation while others do charge an additional monthly fee for container rental. In Boulder, Colorado, the City incentivizes commercial organics collection with a \$2.50 subsidy per cubic yard of subscribed collection. This was reported to be a necessary and popular incentive in a community in which the costs to tip garbage are significantly lower than the costs to tip compostables. The figure below shows the average, maximum, and minimum charges for once weekly collection of one cubic yard of organics.

Table 2.3: Rates for Once Weekly Collection of One Cubic Yard Compostable

	Monthly Charge Rate
Average	\$60.00
Max	\$161.96
Min	\$28.58

2.4: Analysis of Tip Fees

An economically driven program, one in which the tip fees for trash are higher than the fees to tip organics, tends to be the most common and successful model for the implementation of a food scraps composting program. That is not to say that a program cannot be successful if the tip fees locally or statewide are cheaper for composting than landfilling. States such as Colorado where the trash tip fees are significantly lower than the costs to tip organics / food waste are seeing growth in programs despite the poor economics. Additionally, portions of Minnesota have organics tip fees that are equal to or higher than MSW tip fees and they are one of the national leaders in programs.

The average tip fee for MSW in communities with food scrap programs was reported to be **\$82.00 per ton** with a maximum cost of \$148/ton and a minimum of \$15/ton. The average cost per ton to tip organics including food scraps was reported to be **\$44.00** with a maximum of \$90.00/ton and a minimum of \$18.00/ton. More importantly however, is the difference in each community between the cost to tip MSW and the cost to tip organics.

Is it always cheaper to tip organics?

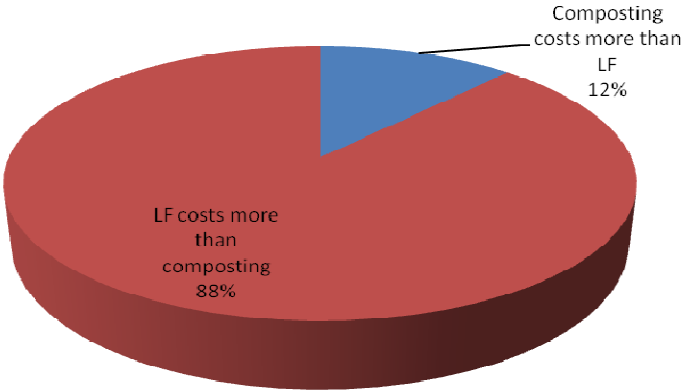
In 88% of the communities reporting, it is cheaper to tip organics than it is to tip MSW while for the other 12% it costs more to tip organics at the compost yard than MSW at the landfill. The average difference between the cost to tip MSW and organics was reported to be **\$28.00**. At the one extreme, it costs \$28 *more* to compost than to landfill and at the other, it is \$88 cheaper to bring materials to the compost site than to drop of materials at the landfill, a rather enviable economic position. The average price difference in communities where it costs more to tip compost than MSW was reported to be \$11.65/ton. When the compost and landfill rates are compared, the compost tip fees are on **average 29% cheaper** than the tip fees at the landfill.

Table 2.4: Comparison of Tip Fee Rates

	LF tip fee	Compost Tip Fee	Difference in Fees	% Difference in Fees
Average	\$82.00	\$44.00	\$28.00	29%
Maximum	\$ 148.00	\$ 90.00	\$ 88.00	69%
Minimum	\$ 15.00	\$ 0.00 ¹⁹	\$(22.50)	-77%
Median	\$ 95.00	\$ 45.00	\$ 22.50	42%

¹⁹ One program in MN reports that they are not charged a tip fee on organics and that organics are also exempt from taxes.

Figure 2.20: Comparison of Tip Fees



SECTION 3: BEST MANAGEMENT PRACTICES

3.1: Program Barriers

A number of major barriers were found to be common across communities in the US. Some of these were *actual barriers* and some were reported to be *perceived barriers*. A perceived barrier is one in which the perception of the programs impacts is much greater than the actual impact. For example, residents may perceive that putting food waste in a compost cart will cause odor issues, but when the program is implemented the odor issue does not arise. Perceived barriers are just as meaningful as actual barriers when it comes to program participation and adoption. Regardless of the reality underlying the barrier, both types must be overcome in order to make the program successful. Knowing ahead of time what potential barriers a program may face will assist in program planning, outreach, and education. It is important to note that all of the barriers can be dealt with and overcome through different efforts, techniques, and technologies.

The most common barriers and a few of the solutions are described below. The best management practices to overcoming barriers and implementing food scrap programs are covered in more detail in Tables 3.1 and 3.2.

Actual Barriers

- Political willingness- Without the political will behind a program, implementation rarely happens. Whether or not a community can get its elected officials and leaders on-board to support a program is an important factor in program success.
 - Solutions- Education of elected officials / decision-makers on why the program should be adopted. Motivators for program implementation, as reported in the interviews, commonly include avoided landfill disposal costs or saving landfill space, using organics diversion as a means to meet community or business GHG targets, doing “good” for the environment, citizen or private business-driven programs, job creation, and others. Waste audits are a helpful tool to show how much of the current waste stream can be diverted although not always necessary, especially on the residential side. Depending where the community is located there is an ample number of already completed and publicly available data on waste characterizations. Waste audits can be particularly useful in the commercial sector to help generators realize the potential in costs savings from diversion. Starting a citizen committee, a business group, or a trade group to start the ball rolling is a common path toward implementation. One or two dedicated individuals in a community can go a long way toward getting a program started. Statewide stakeholder groups gathering all the players including generators, haulers, processors, and elected officials can also help get programs started.
- Facility related issues- A host of barriers related to facilities were reported by communities throughout the US and within Region 5. Most common were permitting issues including costs, lack of definitions of food scraps, design requirements, too

stringent restrictions, not enough regulation, and others as well as a lack of facilities²⁰ or processing capability. Other facility related issues reported as barriers were NIMBYism, odors at existing facilities, distance to the nearest facility, and time delays related to changing existing programs to those that can accept food scraps.

- *Solutions-* Policy changes at the state level may be needed in some areas (please see Section 5 of this report), siting facilities farther from neighbors, following best practices in processing to avoid odors, and working with commercial generators to identify particular loads that may be troublesome (i.e. milk, cheese, meat) were all identified as solutions. Pilot programs are also useful to allow the facility to perfect the “recipe” for processing, i.e. mix of C to N, bulking agent requirements, etc.
- Costs- Costs, whether they are related to residential or commercial user fees or rate structures, community or government costs for carts, collection, trucks, etc., private hauler costs, or the food scrap tip fees are common barriers to food scrap programs. A few suggestions for dealing with costs are listed in the following section however, this is a difficult barrier to overcome and in many successful programs cost issues have yet to be fully addressed.
 - *Solutions-* In areas where the MSW tip fees are equal to or higher than compost/organic tip fees cost issues are especially prevalent. Regional or state efforts to assist in changing the tip fee differentials to favor composting are ideal but may not be politically attractive or feasible in many locations. Ways to address program costs on the residential side identified through the research include partnering with other communities or counties for outreach, not giving kitchen pails to all households, (only those that request them), using PAYT trash rates and embedding the costs of a base service level for organics collection in the trash rates (often for a 32-gallon level of service with additional costs for additional levels of service), alternating every-other-week collection of recyclables with every-other-week collection of organics using the same trucks, and applying for local, state, and national grants to help get the program started. To help overcome barriers on the commercial side some communities are partnering with large corporations or supporting private programs (i.e. Wal-mart, Kroger’s, Ohio Supermarket Association, others), providing audits to interested businesses to show them how they can potentially save money by enrolling in a program through reducing trash service levels, providing three free months of service (or paying for three months of service) to get commercial generators ‘hooked’ on the program, or providing a subsidy to commercial generators to make food scraps / organics collection competitive with trash or recycling. When planning rates communities and processors should not necessarily count on generating revenues from the sale of compostables. Planning the program rates to cover the *entire costs* of the collection and processing will help ensure viability over the long term regardless of vagaries in the market.
 - Contamination, bio-bags, and others- Contamination in the stream, particularly plastic bags, and issues concerning compostable bags, cornware, and others is a common barrier to program success.

²⁰ Section 4 of this report deals specifically with permitting and regulatory issues in Region 5 and beyond.

- *Solutions-* Education is the key to overcoming this barrier. On the residential side community based social marketing can be useful and on the commercial side employee training and staff meetings to get employees behind the program have been shown to reduce contamination. Some programs have banned the use of any plastic bag regardless of whether or not it is compostable while other programs have invested in equipment on the processing side similar to a large vacuum to deal with the small pieces of shredded plastic bags. How biodegradable bags are dealt with is often an individual community decision. Some processors, especially the largest ones, reported they did not have an issue with compostable bags and they encourage their use, despite the added costs. Other programs say they basically ignore the compostable bags and neither encourage nor discourage generators from using them, while still other programs ban the use of compostable bags. Weighing the costs and benefits of compostable bags should be a local decision.

Perceived Barriers

- *The “Yuck” factor, participation, and generator perceptions-* The idea that food scraps that were once attractive, edible, products become a pest-ridden and disgusting item once they are transferred from the plate to the composting pail or bin is a common problem in food scrap composting programs, especially initially. This tends to be especially true in residential programs but was also noted to be an issue among employees in some commercial programs.
- *Pests, animals, and other vectors-* perceptions that food scraps / compostables will attract greater amounts of pests at the curb is a common barrier. Although food scraps have always been disposed of at the curb, generators often believe that food scraps when combined with other compostables will attract a greater number of pests and disease vectors. Typically this is not an actual issue at the curb; however it is an important issue on the facility side.
 - *Solutions-* For both of these barriers, like many of the earlier ones, education, persistence, and a consistent message are the keys. Changing the mind-set for residents and businesses can be a daunting task and many of the best management tips in the tables below can be useful in combating the “yuck” factor and fears of pests and animals.

3.2: General Trends, Best Management Practices, and Alternatives- Residential

The table below highlights the general trends and advice for success as provided by leading communities in the US. It is important to remember that every community is unique and although the majority of places are finding success in a certain practice or technology other alternatives may be appropriate in other communities.

Table 3.1: Summary of Trends and BMPs in Residential Programs

Aspect	Current Best Practices	Alternatives/other Options
“Seeding” a program	<p>Organize a summit. Generating interest in a program for both the residential and commercial sector for generators, decision makers, haulers, processors, and others can be a challenge. States with building and expanding programs (such as MA) have fostered the growth of programs through state-wide composting / food meetings / forums. By getting all of the interested parties together for an annual meeting, relationships are fostered and program growth can increase. Generators or haulers can meet with processors and identify potential streams, businesses, or communities to target and match up needs with service providers. It is important that all of the stakeholders are involved including the processors, generators, haulers, decision-makers, and regulators and that the groups are encouraged to work together to identify and overcome the barriers to program growth in the state. This can also be done on a county or community level.</p>	<p>University/college incubators. Partnering with a local college or university, if possible, can be a good way to get a commercial or residential program rolling. Colleges and universities were identified as common program “incubators”. These institutions can often get grants to start programs easier than other entities, are a good source of clean materials (both pre and post consumer) in a concentrated area, and students can provide good ideas and inexpensive labor/effort to help get a program started.</p>
Pilot program	<p>Conduct a pilot program for a portion of the residential or commercial sector. For communities looking at food scrap programs where very few neighboring communities already have programs, a pilot program can be very useful in uncovering barriers to success and perfecting the 'recipe' at the processing facility. This may be especially true in communities in IL, OH, IN and MI without a lot of programs near-by. However, for communities in areas with a high penetration of programs in the surrounding areas a pilot may be unnecessary and can give those not supporting the program an excuse to not let the program go full scale (see the alternative option). If a pilot program is used, a random assignment program, not an opt-in program should be preferred. An opt-in program can skew results as only those that already want to participate sign-up.</p>	<p>Do not do a pilot. Do not conduct a pilot and use the existing literature, studies from neighboring communities, and others to start full scale. This alternative was recommended by communities in which many of their neighbors have already started programs and they felt a pilot could be redundant and time consuming.</p>
What to include / not include	<p>Add food scraps to yard waste if possible, make sure to include paper. Adding food scraps to an existing yard waste stream is the quickest and cheapest way to implement the program. It is important to include soiled paper in the organics stream. Paper products were reported in some communities to make-up as much as 50% of the materials collected by weight. Soiled paper can also be seen as a "gateway" material. It is relatively easy to get residents to include pizza boxes in the organics stream and can be a good way to get them started in the program.</p>	<p>Food scraps only. A food scrap only stream (including soiled paper) collected in a 12-gallon container or less often at a drop-off is used in some communities.</p>
Collection Frequency	<p>Weekly. In general collection is conducted on a weekly basis. Some communities switch to every-other-week in the winter months and some have every-other-week collection</p>	<p>Every-other-week trash with weekly organics. Some communities in the</p>

Aspect	Current Best Practices	Alternatives/other Options
	<p>year round. Weekly collection, although more expensive, helps reduce concerns about disease vectors and complaints about odor issues. Communities in more northerly climates may wish to examine every-other-week organics collection alternating with every-other-week recycling as an option to reduce the costs of collection and equipment / new trucks.</p>	<p>Northwest are implementing every-other-week trash and recycling collection with weekly organics / green waste collection as a way to greatly increase diversion. This is spreading rapidly in portions of Canada as well. Another option that is beginning to show up in a few places (please see Section X Case Studies for more on this topic) is increased use of in-sink garbage disposals to send food waste to the waste water treatment plant.</p>
Rates (collection)	<p>Embed a base level of organics in trash fees. Although the majority of communities with programs have organics collection as an added optional service / fee, we recommend embedding a minimal level of service in the trash rates so that all households pay. Under this type of system, all households pay a fee (around \$6-7/month) for a base level of service (32-gallons of organics) and if they would like a higher level of service they pay an additional amount. All households generate some organics while others with larger yards may generate significantly higher amounts of materials. The rates should be designed to encourage participation in organics diversion. The rate should be planned to cover the entire costs of composting - do not count on selling the compost as an end-product when planning the rates.</p>	<p>Pay-as-you-throw trash rates. Pay-as-you-throw, or variable trash rates often go together with successful organics programs. PAYT uses economic incentives to encourage participation in the organics program. While not necessary in creating a successful program, PAYT can be a very useful tool by serving as a constant reminder and economic incentive to the rate payer.</p>
Rates (tipping)	<p>Organics tip fees lower than trash tip fees. Having a higher tip fee for trash compared to organics is the ideal situation but is not always possible. County or even state actions may be needed to help impact the trash tip fees and streamline compost facility siting. With more compost facilities available economic hardships related to travel distance as well as gate fees/tip fees will be reduced.</p>	<p>Trash tip fees equal to or over organics tip fees. Programs can still work where the tip fees for organics are higher than the tip fees for MSW but strong political support will be needed to overcome the economic barriers.</p>
Kitchen pails	<p>Kitchen pails are 1-2 gallon sealable containers that residents use to collect materials in the kitchen to bring out to the cart. They can be a large cost to the program and their effectiveness is debatable. Some programs strongly advocate them while others say that they get mis-used by residents, get thrown away, and are an unneeded expense. The majority of programs have used them but the trends seem to be moving away from their use. More mature</p>	<p>As an alternative to giving all customers a kitchen pail, use coupons that residents can redeem for a free container at local stores. This will allow only the households that will actually use a kitchen pail to get one and limit the</p>

Aspect	Current Best Practices	Alternatives/other Options
	<p>programs are "going beyond the pail" and helping residents find their own containers to collect materials in such as juice pitchers that can easily go in the dishwasher, paper bags, larger cartons, stainless steel bowls, etc. The pails can be a good outreach / awareness tool but the costs may outweigh their effectiveness in promoting the program and increasing participation.</p>	<p>households that either just throw them out or never use them from getting the pails.</p>
Carts	<p>Variable sized wheeled, lidded carts 32, 64, 96-gallon. The most successful programs offer their customers a range of cart sizes to choose from for different rates. This allows the small generators to pay less and get a smaller size cart while households with large families or yards can pay more and get a 96-gallon cart. Haulers reported that they often prefer 64-gallon carts for collection due to weight limits. Some haulers offer 2 64-gallon carts to customers prior to offering one 96-gallon carts due to ease in collection.</p>	<p>Bags. Bags, whether paper or plastic, were listed as alternatives. Clear plastic bags allow the hauler to see if there is contamination in the stream but require an extra step in processing to be removed. An alternative is to use clear bags for trash to allow inspection of the trash stream in a few of the communities with mandatory programs.</p>
Compostable bags	<p>Allow compostable bags but do not actively promote them. The overall trend is to allow compostable bags but not to recommend them to residents to use. At this point, many program managers said that compostable bags may be a necessary evil. The bags are often quite expensive and on the processing side the vast majority reported that they did not like to deal with compostable bags. The bags get shredded and are very difficult to breakdown. (The exception to this rule was the largest one or two processors that said they had no problem whatsoever dealing with the bags). However, program managers said at this point they are willing to deal with the harder to compost material as a way to increase participation and help residents overcome the "yuck" factor. A few programs have banned the use of any type of plastic bag, compostable or not, due to issues related to processing.</p>	<p>A number of alternatives are popping up around the country to deal with the issue</p> <ol style="list-style-type: none"> 1) Large rubber bands that go around the top of the compost cart and let the bag stay in the cart after it is tipped. Residents decide when to replace the bag liner but it can stay in for multiple weeks. 2) Suggesting residents use paper towels, paper bags, cardboard, or other materials to line their carts/pails instead of bags 3) Giving residents one or two bags to get them "hooked" on the program.
Education/outreach	<p>Consistent, clear, education. This may be the most important aspect of the successful programs. At least quarterly outreach for a newer program is recommended. Some of the trends that are emerging include community based social marketing, on-line tools such as facebook, using focus groups / surveys to uncover barriers and design outreach, communities / counties working together to conduct a widespread campaign, and others. One program was able to get emails from a high proportion of their residents and sending email reminders and real time updates proved to be a very helpful tool. Having a</p>	<p>There is no alternative, education is a must</p>

Aspect	Current Best Practices	Alternatives/other Options
	<p>consistent message was reported to be an important aspect to good outreach and education. Offering 'free' compost to participants helps them see the process is full circle and understand what the materials they generate can be turned into. Establishing a definition of "food scraps" and or "green waste" and making that definition well known around the community was another common educational piece.</p>	
Yuck factor	<p>Education. Use education to change the mind-set that food scraps in a separate stream / cart are "yucky" while food scraps in the trash stream are perfectly ok. A few free compostable bags, education with pictures of "clean" looking organics streams, not messy dirty ones, just keeping at it, and time were reported to be the most effective ways to overcome the issue</p>	<p>Layer materials, freeze, or wrap 'yucky' items. Have residents place food waste in the middle of the yard waste as a way to bury it in the cart. Another alternative is to wrap food waste such as meat or other messy items in paper towels prior to placing them in the cart. Some communities are recommending that residents store meat items in the freezer until collection day to keep it from smelling in the cart.</p>
Pests/animals	<p>Education. Similar to the 'yuck' factor, education is the best way to overcome concerns about pests and animals. Informing residents that they are not adding any new materials to the trash, they are just putting them in a different cart is one of the most effective ways to overcome this issue.</p>	<p>See above.</p>
"Selling" the program / political support	<p>Identify motivators for program stakeholders. Garnering political support for a program can greatly increase the likelihood for successful implementation. Motivations to implement a program can be tied to GHG emission reductions, job creation, saving space in the landfill, meeting public demand, or others. Identifying an underlying motivation that is in-line with the generators as well as public officials (which may or may not be the same reason why the program manager wants to implement the program) is important. A waste audit to ID the compostables that are currently going to the landfill and could alternatively be composted can be a useful tool in selling the program. Planning ahead of time to deal with a vocal minority of residents who may not support the program and letting the elected officials know that this is expected will help smooth the implementation process.</p>	<p>Mandated diversion. A mandated diversion rate can be a strong motivator. If there is a local, county, or statewide mandate to reach a high level of diversion, there is a strong motivation to implement a program.</p>
End-product	<p>Procurement mandate for local certified compost. Selling the end-product can be an issue for many communities. Some processors report that they have an</p>	<p>Free compost for participants. Allowing for participants in the program</p>

Aspect	Current Best Practices	Alternatives/other Options
	over abundance of processed compost and cannot even give it away. A local, county, or potentially even a state wide mandate for the use of local certified compost in public works projects, department of transportation projects, and others can greatly increase demand and help create a market for the finished product. All of the processors and many of the program managers and haulers interviewed for this project reported they were very supportive of these types of measures	to have 'free' compost once or twice a year is a good way to increase participation and education. One program reported that this was one of the major reasons residents signed-up for collection.

3.2: General Trends, Best Management Practices, and Alternatives-Commercial

Table 3.2 builds on the best management practices provided in 3.1 and adds advice and tips garnered from communities covering commercial sector programs. Some of the tips are the same for both residential and commercial programs.

Table 3.2: Summary of Trends and BMPs in Commercial Programs

Aspect	Current Best Practices	Alternatives/other options
"Seeding" a program	See Residential Practices Table	See Residential Practices Table
Pilot program	See Residential Practices Table	See Residential Practices Table
What to include / not include	Developing programs in some cases reported that they started with pre-consumer only programs. These programs, targeting cafeterias, schools, and restaurants, are able to collect a relatively clean stream while minimizing outreach efforts. Pre-consumer programs require less containerization and less education, generally these conduct education of staff only, not customers. Similar to the residential stream, including food soiled paper is advised. Whether or not compostable serving ware should be included in the stream depends upon the local processor. In smaller programs (less tonnage) the processors tended not to like, or in some cases, even accept compostable serving-ware. In communities in which a large amount of tons were being collected and processed, the processors reported that they did not have any issues handling compostable serving ware or bags, as long as they were pre-approved.	Including pre and post consumer materials gathers the highest amounts of diversion but may lead to increased contamination in some instances.
Who to include	Unlike the residential sector, commercial sector programs may impact a number of different types of businesses, some of which generate large amounts of food scraps while others generate little or none. Ranking and categorizing potential program targets by the amounts of materials they generate, locations close to existing or planned collection routes, potential to save money on trash costs, and other factors is a recommended approach. It is not necessary to target all	A few communities have targeted all of the commercial generators. In some cases (San Francisco, Seattle) it is required that all commercial generators divert food scrap materials.

Aspect	Current Best Practices	Alternatives/other options
	commercial generators to get large diversion. In many communities a small proportion of generators contribute a large portion of the waste stream. Obviously, food markets, institutions, and restaurants are early targets. Large office buildings with significant lunch rooms are also an early target. Where the decision-makers are located may also play a factor in who to target. Under a voluntary type program, large chain stores (both grocery and restaurant) may not have the authority locally to decide whether or not they participate, it is a national decision.	This is the exception at this time, not the rule.
Collection Frequency	Collection frequency should be at least as often as trash . Weekly collection will not work except for the smallest generators. A minimum of 3 available collection days per week is recommend with daily collection required in some cases. In one example, a metropolitan program in a business district utilizes twice daily collection to minimize nuisance odors and vectors,	
Rates (collection)	The majority of communities offer food scrap collection to commercial generators as an added fee in addition to trash and recycling services. Typically, organics collection was found to be about 40% cheaper than trash rates, creating an economic incentive for participation. The most successful communities report that they identify generators that may be able to reduce their trash bills by enrolling in the food scrap collection program and target these businesses first. In a few programs organics collection costs are embedded in the trash rates.	In instances where food scrap collection rates are on par with trash collection communities have tried several alternatives to encourage participation: 1) provide customers with " 3 free months " of service to get them hooked on the program 2) offer an on-going subsidy to generators to help cover the difference in costs or to make food scraps at least slightly cheaper than trash. In one community the commercial subsidy, provided by the community to the generator, can cover as much as 50% of the monthly costs.
Rates (tipping)	See Residential Practices Table	See Residential Practices Table
In building containers	Offering free or discounted containers for employees to use in the business is an effective tool. Typically these are 23-gallon slim fitting containers that can fit in narrow places. It is important to not use containers that are much larger as they get too heavy for employees to lift. Placement of the containers as well as signage and direction is integral to success. Grocery stores are recommended to use waxed cardboard containers for the collection of food scraps. These	

Aspect	Current Best Practices	Alternatives/other options
Carts	<p>boxes are free, plentiful, and can contain any leaks.</p> <p>The preferred cart for commercial collection is reported to be a 64-gallon cart. Unlike residential where 96 gallon carts are often preferred, in the commercial sector there is little to no yard waste materials being deposited in the cart meaning that a 96 gallon, 110-gallon, or other size can get too heavy to lift. Haulers use multiple 64-gallon carts over one 96 gallon. Washing extremely dirty carts with a mobile cart washing unit or replacing older, smellier carts with clean ones helps to reduce wear and tear on carts as well as the yuck factor.</p>	<p>Compactors, and containers as large as 10 cubic yards were reported to be used in some communities. Several companies are also touting commercial organics dehydrators that remove a large portion of the moisture content from the organics and are reported to reduce transportation costs. Whether this is a cost effective method of treating materials on-site prior to transportation has not been reported. Another alternative to carts for collection is increased use of in sink garbage disposers and materials being stored in underground tanks for shipment to a treatment facility or materials going through the sewage line to the treatment plant.</p>
Compostable bags	See Residential Practices Table	
Education/outreach	<p>Providing on-site training of employees is a common and important tool to building a successful commercial program. Whether this training is provided by the community or the hauler varies among programs. In municipally driven programs (i.e. municipal collection or single contractor) city staff typically provide the outreach and staff training. In open hauler competition areas, haulers often provide the staff training as a value added service and a way to keep their streams clean. Staff training, regardless of who provides, was reported to be a good investment economically. The training may take anywhere from 20 minutes to an hour (depending on the size of the staff) but will greatly reduce contamination in the streams. Including full-color signage, picture signage, multi-lingual signs, quick reference flyers, and properly placed internal and external collection carts are common best practices in education. It is not uncommon for a hauler or city staff to require a commercial generator to go through staff training prior to allowing collection to occur.</p>	<p>No alternatives. Education is a must.</p>
Yuck factor	Commercial programs, much like the residential sector, must	

Aspect	Current Best Practices	Alternatives/other options
	<p>deal with the "yuck" factor at two locations - the internal collection locations, and the external carts or containers. Internally, washing out containers, compostable bag liners, or lining bags with cardboard or paper towels is recommended. Locations with an ample supply of waxed cardboard boxes are using the boxes for the internal collection and transportation of food scraps. Using education to teach staff to empty containers before they get too full to prevent spilled or ripping bags is also common. Some programs are starting to use vented or slited in-house containers to allow the food scraps to "breathe" and compost aerobically to reduce some odor and release some moisture content. Haulers provide cart cleaning services for outdoor carts and trade out indoor containers for cleaner carts in some cases. Cart cleaning frequency ranges from once or twice a year to every collection. Education and staff training are irreplaceable when it comes to overcoming this barrier.</p>	

SECTION 4: STATE REGULATIONS AND PERMITTING

One of the primary barriers to increased food scrap recovery in the US lies in state permitting and siting regulations. Without the infrastructure to process collected food scraps both haulers and municipalities report that there is a reluctance to start new programs. A Catch-22 exists in food scrap facilities; program managers and haulers are hesitant to start new programs without existing facilities to process the collected materials and at the same time, facility operators are reluctant to start new facilities without an existing waste stream. The states in Region 5 exemplify both examples. In Minnesota there are scores of programs collecting food scraps from households and businesses yet there is a dearth of facilities while in Ohio, there are ample facilities with only a few burgeoning programs. The reasoning behind the differences in the two states can be traced back to the permitting rules and regulations.

The states within Region 5 employ various rules and regulations to cover the processing of food scrap materials, some with more success than others. Almost all of the states in Region 5 are actively addressing food scrap composting and are participating at some level in a rule making process. States such as Michigan and Minnesota are entering into the public comment phase of the process while others are still meeting with stakeholders. States are working to determine what needs to be done to streamline facility permitting while at the same time protect the environment and be a good neighbor. The questions that the states are grappling with, or have already overcome, generally deal with the following main points:

- The definition of yard waste, food scraps, and municipal solid waste;
- Setting the correct level of regulation that is not too stringent and not too loose;
- Addressing the potential environmental issues;
- Creating a stable regulatory framework and removing uncertainty in the market place.

Almost all of the states in Region 5 are actively addressing food scrap composting and are participating at some level in the rule making process

4.1 Trends in Permitting

Following a review of the statewide regulations in Region 5 and other regions, the following trends and recommendations were uncovered:

Stakeholder meetings and public comments- Whether or not a public process and stakeholder meetings are mandated in the rulemaking process for the state, almost all states considering changes to the regulations undertake both. By getting all of the important voices on the matter involved in the conversation the state is able to develop a regulation that meets the needs of the generators, industry, and the environment and gather enough support to get passed. By making sure that all the stakeholders are involved from the onset it increases the likelihood that the final regulations will be passed.

Definition of food scraps- States are making an effort to properly define food waste. In some cases, food waste falls under the MSW category meaning that in order for a facility to process food scraps they must also obtain an MSW permit. This can be an expensive and difficult

burden often requiring the facility to meet very strict regulatory guidelines. On the other hand, if

food scraps are not specifically defined they may fall under yard waste composting site permitting which may not provide enough regulation to protect the environment from storm water run-off and neighbors from odors. It is recommended to clearly define food scraps separately from yard waste and solid waste. By defining what food scraps are, a proper level of regulations dealing specifically with the stream can be developed.

Northampton, MA

Drop-Off Case Study

Northampton, MA is a community with a population of 28,370 and 12,771 households. It has a drop-off food waste program at the Locust Street Recycling Center that began on June 14, 2010. The Northampton Department of Public Works is running this pilot program that is free to residents for at least a year and will be used to assess the level of interest in diverting organic wastes from the residential waste stream by measuring participation and generation rates. Two hundred and fifty households have signed-up at this time. Participants receive a free collection container for use inside their homes. The participants only need to have a valid vehicle permit for the center that can be purchased for \$25 per year or for \$5 for seniors. At the site there are ten 64-gal carts available for food waste such as meats, fish, dairy, food-soiled paper, and all other non-recyclable paper products. No bio-bags are allowed. The food waste may not be combined with yard waste which can be brought to another facility and dropped-off there for free composting. In the 10 weeks since the program began, slightly less than 5 tons of food waste has been collected for an average of about 4 pounds per household per week. They are hoping for 1 ton per week once the program becomes more wide-spread. This is a very inexpensive way to offer composting of food waste to residents. The city has a budget of \$5000 per year for the program which included the purchase and distribution of the indoor containers. The town's diversion rate is 47% without including yard waste.

Setting a new facility classification / developing a tiered regulatory structure - A leading and successful trend in not only Region 5 but also in other parts of the US is to develop a tiered regulatory framework and establish new classification for food scrap composting facilities. By creating a tiered permitting framework and setting a classification specifically for food scrap composting, the state can promulgate regulations that encourage the development of facilities with the proper level of regulation. As stated earlier, MSW regulations are often too strict while yard waste composting regulations are not strict enough. With tiered levels, the state can set regulations that meet the environmental needs of the material being processed. States are leaning toward creating a middle ground, a classification that covers such environmental concerns as set-backs, flood plains, pads or liners, and odor control while at the same time not being over burdensome for food scrap facilities.

Examining and addressing the environmental / NIMBY concerns early on - Odors can shut down a facility. It is important to draft regulations that deal with air quality issues from the start. Whether this is through set-back requirements from neighbors, cover systems, inspections, or a combination, it is integral that odor issues are addressed and that facilities are good neighbors to the community.

Lowering permitting fees - Many states are significantly lowering or all together dropping the permitting fees associated with food composting facilities to encourage the development of new sites and remove the cost barrier. Although this may be revenue loss for the state, if the cost was such a barrier that no sites were being permitted it will be a net zero change to revenues. It may be possible to have reduced or lower fees for a few years, then as more facilities are established ramp up the fees to cover inspections and regulations of new sites. This may encourage the early adopters to set up facilities in the state while meeting revenue needs in the future.

Exemptions for yard waste facilities - All of the states in Region 5, and 17 other states in the US have existing yard waste disposal bans in place and hence, have an established yard waste composting infrastructure. As a way to speed the adoption of additional food scrap composting programs some states are allowing already permitted yard waste programs to accept a minimal amount of food scraps (generally 5-10%) without any changes to their existing programs. It is assumed that this is a relatively low impact on current operations and will not significantly impact run-off or odor controls. By combining exemptions with other regulatory changes some states can quickly and relatively easily establish a viable infrastructure for food scrap composting.

Innovation in the Rulemaking process- Each state has existing regulations and rulemaking processes and the way that the state deals with these requirements may need to be a new and innovative process. For example, Indiana chose to remove the solid waste permitting requirement for food scrap composting facilities and instead use the marketing and distribution permit instead. By doing this the state was able to quickly address barriers to new facility development and remove the onerous \$12,000 permitting fee while still addressing environmental concerns. Illinois chose to pass a State Senate Bill (SB099) to define food waste and location standards and Michigan is *adding* more regulations to help spur food waste composting. In Alameda County, CA, StopWaste changed the definition of ADC to disallow the use of food waste and compostable materials, in effect banning the disposal of food waste and compostables at the landfill and creating a mandate to compost food waste.

4.2 Existing Regulations and Upcoming Changes in Region 5 and Beyond

The table below highlights the existing state composting regulations in Region 5 as well as any recent or upcoming changes to the regulations. All of the states in the Region (along with 17 others) have yard waste disposal bans. A few states from outside of Region 5 (Iowa and California) are also included for comparison.

Table 4.1: Review of Existing and Planned Regulations

State	Region	Existing Regulations	Recent Actions/Planned Changes
Illinois	5	Until recently Illinois permitting was a detrimental barrier to food waste composting in the state. Yard waste has been banned from disposal in the landfill since 1990. Food waste was defined as solid waste making the permitting process very difficult. With the passage of SB099 in 2009 (first introduced in 2004) food waste was separated from solid waste to allow for food waste to be commercially composted in the state. The bill exempts food waste composting facilities from pollution control facility requirements, regulating more like yard waste facilities, outlines environmental requirements, and allows landscape waste composters to accept up to 10% non-landscape waste (if permit allows).	The state is currently encouraging the siting of compost facilities and the implementation of food scrap collection programs. The state EPA is reviewing and monitoring potential food waste composting issues including location standards, odors, vectors and others.

State	Region	Existing Regulations	Recent Actions/Planned Changes
Indiana	5	<p>There was very little action covering food scrap composting until just a few years ago in Indiana. Previously, any yard waste program that wanted to accept food waste for composting could do so and yard waste (leaves, grass, woody vegetative matter) was banned from the landfill (since 1997). If a YW facility wanted to accept food waste they were required to get a solid waste permit which has some strict regulations as well as a \$12,000 registration fee. This was seen as a large barrier to site developments and the state worked to change the regulations, much of which was driven by Wal-mart's desire to have facilities to bring their materials to.</p>	<p>In 2008/2009 the state changed the permitting process. The solid waste regulations no longer applied and the state adjusted the existing marketing and distribution permit that is required by yard waste facilities to cover food scraps as well. They dropped the \$12,000 fee down to \$0 and covered some environmental issues in the marketing and distribution permit. The new rules are in the draft form and they are taking comments on it now. The draft rule language is being used as guidance and the state predicts that if anything, the finalized version will be less stringent than the draft. This is however leading to some uncertainty among facilities as they are unsure what the final language will look like and some of the older, more established sites have expressed some concern over what will happen. By using the marketing and distribution permitting process the State was able to be more reactive and change the rules quickly however there may be some potential challenges to the rules in the future. It is possible that the rules will be finalized in 6 to 12 months.</p>
Michigan	5	<p>Unlike other states that have regulations that may be too strict, Michigan is coming at it from a different direction. There are currently no permitting, licensing, or regulations specifically addressing food waste composting in the State. As long as food waste is kept separate from solid waste it is not considered solid waste and there are no specific regulations. There are yard waste composting regulations and yard waste is banned from the landfill but food waste does not fall in the yard waste category. Despite the loose regulations there are only 3 to 4 composting facilities in the state that currently accept food waste. This is due to the fact that local authorities are hesitant to permit a facility without any state regulations covering the site. The lack of permitted facilities is referenced as one of the main barriers to the growth of food waste collection programs in Michigan.</p>	<p>Over the past decade the State has worked with stakeholder groups, public comments, and others to develop a proposed new set of composting regulations. There has been a cry from industry to create a set of rules to encourage more facilities to start. Industry reports that by setting statewide standards there will be a "level playing field" for all which will help the industry grow. It will also help to alleviate some of the local trepidation regarding facility siting. The new regulations will cover environmental issues such as set-backs, water and air issues, odor controls, and others and will be quite similar to the existing yard waste regulation. They also propose to allow yard waste facilities to accept up to 5% incoming food waste.</p>

State	Region	Existing Regulations	Recent Actions/Planned Changes
Minnesota	5	<p>Currently, food waste falls under the definition of solid waste and is regulated much differently than yard waste which has been banned from disposal since 1995. This is causing some facility permitting issues in the State and they are working hard to remove these barriers. The current solid waste rules require strict and often expensive to follow guidelines. This makes it very difficult for food waste composting facilities to compete with landfills in terms of cost per ton disposed. On the other hand, the YW regulations are too lax and do not meet the environmental standards needed to properly compost food waste. To overcome this barrier the state has a handful of source separated organics facilities that are operating under a demonstration project designation. This is allowing for the generator and private sector driven growth of food waste composting programs while the state works on ways to overcome the permitting barrier.</p>	<p>The state is early on in the process of changing the existing rules. They are currently in the first round of public comments and are waiting for comments from stakeholders to come in. The first stakeholder meeting will be in November 2010 and the state expects that the draft rules will be prepared by early 2011, and the new rules may be ready as early as the summer of 2011. At this point SSO is still considered solid waste but this may change in the new rules. The state is looking at a model similar to the one in Ohio with a tiered regulatory framework where food waste composting falls somewhere in between the regulations for yard waste and the regulations for solid waste. The facility permitting issue is reported to be hindering the growth of curbside programs because new communities are afraid that they will have nowhere to bring the material streams they collect, or if they do, the price will not be competitive with landfilling.</p>
Ohio	5	<p>Ohio is one of the success stories for permitting regulations in the region and was cited by both Michigan and Minnesota as a model for their regulatory changes. In 2003 the state examined their existing regulations and made adjustments to make it easier to accept food waste for composting. The success of the regulations can be seen in the growth of facilities in the state (in 2007 they had only 3 facilities registered, they now have 19) and it is predicted that with the growth of these facilities there will be a significant increase in the presence of collection programs in the near future. This is especially true in the commercial sector. The state recognizes four classes of facilities: I- All municipal solid waste II- Facilities eligible to receive and process food waste from external sources III- yard waste and animal waste facilities IV- yard waste only (banned from disposal in the landfill since 1994). Annual fees are based on daily maximum tons and range from \$330/year for 12/tons/day to \$1,800/year for 51 to 75 tons/day.</p>	<p>The State is planning to work more closely with local health departments to issue licensing locally, not at the state-level in order to streamline to process.</p>

State	Region	Existing Regulations	Recent Actions/Planned Changes
Wisconsin	5	Wisconsin has banned the disposal of yard waste in the landfill since January 1993. The state has various level of regulation depending on the size of the facility and makes a clear distinction between vegetative food waste/yard waste and non-vegetative food waste. Currently, there are exemptions for vegetative food waste composting and yard waste facilities can be exempted from permitting depending on the amount of materials they accept. However, non-vegetative food scraps are regulated as a processing facility and face a significantly higher level of regulation. These facilities are required to have plan approval from the DNR and there are only a small handful of facilities with this approval in the state.	Wisconsin is nearing completion of a significant draft re-write of their current regulations. The initial public comment period is planned for the fall of 2010 and potentially, a new rule regarding yard waste permitting could be in place by the summer of 2011. The draft rules have two purposes: 1) Increase diversion in the state by making it easier to compost food scraps (including meat dairy and soiled paper). The state is drafting rules to make it easier for yard waste facilities to accept food scraps and is planning to better define SSO materials. Depending on what materials and how much materials a YW facility accepts it will be exempt from certain permitting requirements, the largest facilities will not be exempt but will be able to be permitted as a YW and not SW facility. 2) Develop compost quality standards to help increase demand for product (both from State DOT and general consumers) and to level the playing field for compost processors. They are drafting a Class A compost certification. They hope that the new rules will combine to increase diversion, make it easier for a facility to accept food waste, increase demand for end-products, and remove uncertainty in the market place to encourage the development of new sites.
California	9	CA has a mandate for jurisdictions to meet diversion goals and some jurisdictions have reported to the state that they were having trouble meeting the diversion standards partially due to composting regulations impacting facility siting. The state does use a three tiered structure for green/food waste, however, the tiers require facility permits for composting that are reported to potentially be too stringent. There is an exemption for composters accepting under a certain level of materials per day (500 cy) and less than 10% food scraps. Food material was not well defined and they are considering delineating the definition to cover the sources or generators of food waste materials. The state has established a definition of "food material" separate from "green material" and solid waste.	In 2009 the CIWMB reviewed the regulations of composting facilities and identified areas of concern and improvement. The state has made some minor adjustments based on the review and is contemplating further amendments to the rules sometime in the future but it is not known when. Some of the big issues remaining in the state include a strong NIMBY activism over new sites and the potential that local governments (counties) may enact stricter regulations in air and water that will adversely impact the ease with which compost sites may operate. The state is considering a closer examination of their tiered structure to potentially make it easier for some tiers to accept greater amounts of food waste. They are also currently completing a BMPs in food scrap processing report that should be available sometime in the next 6 to 12 months.

State	Region	Existing Regulations	Recent Actions/Planned Changes
Iowa	7	<p>Large composting facilities that want to accept food scraps must apply for and receive a solid waste permit. The SW permit requires an engineered pad, run-off and water quality, air quality, and other factors and requires approval from the state. This can be a long and costly process. As a way to test and learn more about the potential to compost food scraps, in 2003 the state made exemptions for “small composting facilities” to be exempt from this requirement. They allow exempt facilities to accept food scraps for composting under permit by rule and do not require a full SW permit. However, to qualify as an exempted small composter the facility must accept less than 2 tons/week of food scrap material, a limiting factor in the few food scrap collection programs in the state. The exempted facilities must still adhere to regulations regarding run-off, odors, and nuisance issues.</p>	<p>The state is in the first stages of examining ways to change to rules and regulations to encourage more facilities to accept larger amounts of food scraps. There is growing pressure in IA from the processors, haulers, and generators, to reduce the regulatory burden associated with food scrap composting. Although the state is looking at the issue it does not appear to be the top priority at this time. There are currently no plans in the works to rewrite the rules. Last year a piece of legislation regarding the permitting issue was introduced but it did not get far in the legislative process. More likely than not, the issue will be dealt with through the rule-making process and not a legislative one.</p>

SECTION 5: BEYOND COMPOSTING

5.1: An Alternative to Collection and Composting

One potential alternative²¹ to the collection and transport of food scraps to a compost site for processing is the increased use of in sink food waste disposals. This option has been gaining recognition and support over the past few years. Under this type of program, generators, either commercial, residential, or both, are encourage to use of existing in sink garbage disposals or to install new disposers to dispose of the majority of their food scraps. The program uses outreach and education to change generator behaviors. It is estimated that almost half of the homes in the US have in sink garbage disposers installed²² and according to the Association of Home Appliance Manufacturers over 42 million homes in the US already have garbage disposals. The food scraps are transferred, via existing sewage lines, to wastewater treatment facilities. This reduces the costs and the emissions related to transporting food scraps via trucks. While no definitive study has been published citing the efficacy of garbage disposals in pulling materials from the waste stream, some of the literature suggests that up to 50% of the food scraps generated in the residential stream can be diverted through the garbage disposal. An often cited report by Carol Diggelman of the University of Wisconsin-Madison (published in 1998) studied the impacts and costs of five systems for processing 100kg of food waste including landfilling, food waste disposals, and others. The report concluded that a food waste disposer processing food waste through a publically owned treatment works has the lowest cost to the municipality and the least air emissions of any of the five systems²³. It is important to note, however, that both Dr. Diggelman and a number of the experts and individuals in the field reported that for food waste disposals to function effectively as an alternative to disposal there are a number of conditions to the system that should be met. These include the collection of bio-gas, and end-market for the by-products of processing, and ample facilities. Where this type of program has shown the most promise is in communities in which the wastewater treatment facilities have anaerobic digesters that can use the increased amount of bio-solids to produce and capture greater amounts of methane gas. This gas is in turn used to provide energy for the facility or potentially sell the captured energy at a profit. Developing a 'renewable' energy source for waste water treatment plants is a significant challenge and opportunity in the country, according to the US EPA wastewater treatment plants account for 3% of total electric load in the US. Additionally, if the facility is able to convert the sludge end product of the treatment process into a useful fertilize and return it to the soil this can be a very attractive alternative to curbside collection²⁴. Under this type of scenario the in sink garbage disposal are used as a compliment to at-home composting and an alternative to collection.

21 There are a number of alternatives to food waste composting available. As reported earlier in this report, composting food scraps is toward the bottom of the EPA's resource recovery hierarchy. This report does not cover a number of viable and important programs such as food donation programs, food re-use, and food scraps as animal feed.

22 Ferrara, Joe. *Going Global by Going Green; Garbage-Disposal Maker Finds Environmental Pitch Sinks In in Europe*. Wall Street Journal, February 26, 2008

23 Diggelman, Carol, and Ham, Robert. *Life-Cycle Comparison of Five Engineered Systems for Managing Food Waste*. Final Report to the National Association of Plumbing-Heating-Cooling Contractors.

24 Another recent and meaningful report on the subject is entitled "*Final Report: Food Waste to Energy and Fertilizer*" published by the Wisconsin Department of Natural Resources in March 2010. The report documents an experiment at three grocery stores in the area where one conducted business as usual, the other used in sink garbage disposal to send materials to the treatment plant, and the third used the garbage disposal in conjunction with a holding tank. The report concluded that both the test

In situations where the wastewater treatment facility is already overburdened, there is not a way to collect and use the methane produce through the process, or there is no efficient way to get rid of the resulting and increased amount of sludge at the end of the process, this option may not be as attractive. Critics have also cited issues with increased water or electricity usage, clogging drains, changes in nutrient load and removal (N and P), and a potential increase in biochemical oxygen demand (BOD) during treatment. Unlike curbside programs that compost not only food scraps but also yard waste and a large amount of food soiled paper, garbage disposals are only targeting a portion of the total divertible organics stream. If a community already has a curbside organics program and is thinking about adding food scraps or is planning a program to accept food scraps, yard waste, and food soiled paper, the amount of diversion from a curbside program would be much greater than a garbage disposal only program in both the commercial and residential sector. Overall, there is potential in the system and in some communities, such as Milwaukee, or one in which there is no compost site anywhere to bring materials or in communities in which hauling is not an option.

West Lafayette, Indiana is using a combination of anaerobic digestion for energy bio-gas generation at the wastewater treatment plant and curbside collection and transportation of food scrap materials as an alternative to processing materials at a compost facility. The waste water treatment facility can handle 17 to 20 tons/day of combined food scraps and grease. The bio-reactor was installed first and the sewage district planned to accept only cooking oil. The engineers at the WWTP realized that food waste has a higher BTU value than cooking oil and started working with Purdue University to collect their pre-consumer food waste materials and transport them to the digester. Both the University and the sewage district reported that they believe this model makes sense for other areas and is as close to a sustainable option as you can find. A new facility is being built in Northern Colorado that will accept over 40 tons of food scraps per day combined with agricultural organics for anaerobic digestion and energy creation. The facility is predicting that they generate enough electricity annually to power 20,000 homes. The figure below reviews a few of the advantages and potential disadvantages of food waste disposers as an alternative to curbside collection and composting.

Table 5.1: Potential Advantages and Disadvantages of In Sink Food Waste Disposals as an Alternative

Advantages	
Uses existing system	The majority of households and businesses in many parts of the US already have garbage disposals and the saturation in new buildings is increasing. Unlike a curbside program this only requires a change in behaviors, not the entire system. No new trucks, carts, or compost site needed to handle the food scraps.
Cheaper to the municipality	Reports published by the largest manufacturer of garbage disposals, independent researchers, and some University's report that this is the least expensive way for a municipality to handle increased amounts of food scraps- if- the existing system can handle the materials or can be modified to do so

treatments resulted in lower food scrap disposal costs for the generator compared and GHG emissions overall when compared to business as usual. It is important to note however, that the experiment took place in a sewage district with anaerobic digestion and methane collection as well as a well established end market for the sludge produced during the process (Milorganite in this case).

Decreases GHG emissions	If a community can harness the methane produced from the anaerobic digestion of the increased bio-solids in the waste water it can greatly reduce GHG emissions, the methane can also be harnessed and used on site for power or sold as an alternative energy source. The system can also reduce the GHG emissions associated with hauling materials to the LF or compost site.
Potentially creates a 'renewable' energy source (bio-gas)	The methane created in the waste water treatment process can be used or sold as energy and in some pilot projects in Europe multi-family complexes are starting to collect the food scraps from garbage disposals separately from sewage lines and convert the material to methane on site as a way to produce power for the units.
Source of fertilizer	The Milwaukee Metropolitan Sewage District (MMSD) is able to use the sludge produce from their sewage treatment plant to make Milorganite, a value added end product that is used as fertilizer around the country.
Can be a compliment to other programs	To operate, at least at some level, the system only requires outreach and education to change generator behavior. It can potentially work with and compliment at home composting and potentially even curbside organics programs as an additional education piece.
Removes "yuck" factor, odors	Some of the largest barriers to food scrap composting at the curb are removed through the system, both the "yuck" factor and potential odors from materials sitting in a hot cart for a few days
Disadvantages	
Changes in water and electricity usage	The literature reports that increased use of garbage disposals also increases the use of water (perhaps 1 gallon or more per day per house) and electricity to run the disposal. Both of these impacts are very small, however, in some water constrained portions of the US this might be a larger concern
Clogged drains	Increased amount of oils and fats going down the drain may cause clogs in the sewage systems. A few preliminary studies have reported that the clogging may be minor to non-existent; however, not a lot has been published on the impacts on sewers. This may be especially true in the commercial sector and in restaurant heavy portions of the system.
Burdens on existing system	The program will send more materials to the wastewater treatment plant and whether the plant can handle the changes will be a local decision. There will be impacts on the biochemical oxygen demand (BOD), the amount of nitrogen and phosphorus in the wastewater. It will also increase the overall amount of solids in the wastewater stream which the treatment plant may or may not be able to successfully process. Some systems may need to increase the size of their aeration tanks, their processes and treatments, etc. Cities such as New York and Philadelphia with a large portion of the population living in older buildings with older pipes, public works departments have expressed concerns about sending more materials down the pipes and sewers.
Increases the sludge by-product	The most successful case study, Milwaukee, is able to market and sell the sludge that is created as a by-product of waste water management. May communities may not be able to do so and must ship the by-products to a landfill for disposal, thus increasing operating costs

Does not address food-soiled paper, yard waste	In some food scrap programs as much as 50% of the additional organic material collected is reported to be food soiled paper. This material is not a candidate for disposal in a garbage disposal. Additionally, garbage disposals do not accept yard waste materials which make up a large portion of the waste stream
Functions best in certain situations	Diverting food waste through garbage disposals appears to work best in communities with ample waste water treatment facilities, methane collection and combustion for the generation of energy, and where the sludge by-product can be used productively and not landfilled.

5.1: The “Food is Fuel” Campaign

In the winter of 2008-2009 the Milwaukee Metropolitan Sewage District (MMSD) partnered with InSinkErator, the nation’s largest producer of in sink food waste disposals²⁵ to pilot an outreach and education campaign. InSinkErator’s worldwide headquarters is in Racine, WI and they had previously worked with the district on a pilot program in a few natural grocery stores in the area. The public-private partnership worked together to promote the “Food is Fuel” outreach program in the spring of 2009. The outreach directed consumers to increase the use of their food waste disposals and to send materials to the South Shore plant instead of placing in their garbage and sending it to the landfill for disposal. A curbside collection program for food waste is not available for residents (or businesses) and the program was designed to compliment at home composting efforts, not replace them. The South Shore plant uses an anaerobic digester to convert the materials to methane which is used to power the plant and the resulting sludge is converted to Milorganite. Milorganite is a bio-solids fertilizer that is sold throughout the northern hemisphere as a lawn fertilizer and the name is a blend of the words *Milwaukee Organic Nitrogen*. The education campaign used television spots, local radio spots, websites, special events, store tags, a facebook and twitter campaign, education PowerPoint presentations YouTube, and others.

When SERA researchers interviewed representatives from the sewage district they reported that they were unable to quantify the actual impacts of the outreach program. They guessed that there was an increase in the amount of materials diverted to the sewage system from the trash stream but were not able to report changes in per capita generation or disposal. They did however report that in the first year of operation the anaerobic digester produced an equivalent of \$1.8M worth of energy and last year they produced \$800K. The difference was due to a drop in the price of natural gas. The sewage district reports that for them, the program works well and makes sense. They have the anaerobic digester in place that harnesses the methane and they have an established end market for the sludge by-product in Milorganite. The district is a strong supporter of the program but also said that they could not report whether or not a similar program would make sense in every community. They did not notice a marked increase in sewers clogging due to the program or a much greater burden on the treatment plant. The district is in a unique position with their treatment plant as they are actively searching out greater inputs of bio-solids as a way to increase methane production. They have tried a pilot project with grocery stores to collect bio-solids in holding tanks on site and ship them to the sewage plant and are working with the University and the airport to collect the glycol, a material used in plane de-icing, and transport it to the sewage plant for digestion.

²⁵ InSinkerator reports it makes about 80% of the garbage disposals in use world-wide. Brat, Ilan “Going Global by Going Green: Garbage-Disposal Maker Finds Environmental Pitch Sinks In in Europe, Asia”. The Wall Street Journal. February 26 2008

On the opposite end, Bates College in Lewiston ME implemented a source separated organics program as a way to reduce the amount of food materials they were sending down the food waste disposers. The college found that the food waste they were sending down the sewage lines was using up to an additional 3,300 gallons of water a day and that the food waste was potentially causing a high BOD in the wastewater. The high BOD could, if unchecked, remove dissolved oxygen from streams and rivers in which the water is discharged, in effect suffocating aquatic life. The source separated food was collected and transported to local pig farms for feed and a composting site.

SECTION 6: OTHER RESOURCES AVAILABLE

As a way to assist communities in Region 5 and elsewhere adopt food scrap programs EI has developed a number of on-line and interactive tools. These tools can be accessed on the project web site www.foodscrapsrecovery.com. The tools available on the website for free to all communities include:

1. **Best Management Practices Report**- This report is available in downloadable form on the website
2. **Free webinars and presentations**- Visitors to the web site can register for a series of free webinars that are being conducted in 2010 and early 2011. The webinars have been advertised to the communities that filled out the food scrap community surveys as well as an exhaustive list of state recycling organization members amassed by EI. The first webinar was conducted in December 2010. In addition to the webinars, all PowerPoint presentations on the project shared at state conferences are posted on the website www.foodscrapsrecovery.com. The first presentation was August 2010 at the California Resource Recovery Association conference, with others continuing through 2011 (see updates to the schedule on the website).
3. **Interactive community**- A page of the website is dedicated to creating an interactive community of like minded individuals. The “community page” gives visitors a chance to share their successes, questions, advice, and other information.
4. **On-line library and bibliography**- In order to complete the BMP report EI researchers conducted an exhaustive literature review. The review included on-line sources, published reports from jurisdictions across the US, and trade journal sources. The results of the literature review and the reports uncovered during this research are available for all visitors to the web site.

APPENDIX 1: FOOD SCRAP CASE STUDIES

A total of 209 surveys and interviews were conducted either electronically or over the telephone to determine the national inventory of food scrap composting programs in the US as well as the best practices in existing programs. In addition to the broad surveys, a number of detailed 30 minute to hour-long interviews were conducting with program managers, haulers, and experts throughout the country to uncover state-of-the-art trends. The following selection of case studies shares the results of many of these interviews including drop-off programs, rural programs, commercial programs, adding organics to yard waste programs, and alternatives to composting.

1: Small/Rural Programs

Luckey, OH

Luckey, OH is a village in Wood County in the Toledo metro area. It has a population of about 991 which consists of 420 households. The organics program in Luckey, OH, which began in October of 2009, is unique because residents incorporate their paper and cardboard, along with yard waste and food scraps into their organics cart. This incorporates needed Carbon into the organic stream. Some of the food waste that residents can add to their cart includes vegetables, fruits, breads, coffee grounds, dairy, eggs, meats and bones. Organics are placed in an orange-lidded 65 gal container and collected every week along with trash by NAT Transportation. The organics collection must be used at least every other week. Recyclable glass, plastic and cans are self-hauled to a "U-sort" trailer near the Post Office that is available on the fourth Saturday of the month from 8AM to 12PM. The program is open to all residents and currently has 43% or 181 households participating, with one or two being added per week. They are hoping to have 60% participation by next spring.

The cost for the organics program is embedded into the trash rate of around \$12/month for weekly pick-up of one 96 gal trash container (however, the contracted trash rate for nearby towns is \$1 to \$1.50/month lower). The amount of organic material diverted has been found to vary seasonally since yard waste is included with the food waste and other materials. The diversion rate for the town was previously around 5% to 6% before program implementation. Now the diversion rate was 12% for the first quarter of 2010, 22.4% for the second quarter, and 19.5% for the first 2 months of the third quarter. In the first 8 months of 2010, the hauler has collected 50 to 51 tons of organic materials from the residents of Luckey, which is about an average of 20 pounds of organics per household per week (previously residents disposed of 40 pounds of trash per household per week). As a result, residents have found that they could get by with a smaller trash container, so the hauler is looking to switch to a 65 gal cart for trash.

The composting site is run by Hirzel Farms, a tomato grower that uses the final product on its fields. The tipping fee at the composting site is \$30/ton as opposed to \$41/ton at the landfill, which makes it more cost effective to use the composting site. Collection is semi-automated because the driver gets out of the truck to check the contents of each container before collecting. There is a zero tolerance policy for mixing materials, and if a container contains any incorrect material, then it isn't collected. A note is left on the container and then education is offered. The primary barrier to implementing the organics program was acceptance by the town council. The hauler considers the program, with collection of organics and self-hauling of other recyclables, a success and will offer it to any other communities that are interested.

2: Drop-Offs Accepting Food Waste

Northampton, MA

Northampton, MA is a community with a population of 28,370 and 12,771 households. It has a drop-off food waste program at the Locust Street Recycling Center that began on June 14, 2010. The Northampton Department of Public Works is running this pilot program that is free to residents for at least a year and will be used to assess the level of interest in diverting organic wastes from the residential waste stream by measuring participation and generation rates. Two hundred and fifty households have signed-up at this time. Participants receive a free collection container for use inside their homes. The participants only need to have a valid vehicle permit for the center that can be purchased for \$25 per year or for \$5 for seniors. At the site there are ten 64 gal carts available for food waste such as meats, fish, dairy, food-soiled paper, and all other non-recyclable paper products. No bio-bags are allowed. The food waste may not be combined with yard waste which can be brought to another facility and dropped-off there for free composting. The food waste site is open Mon-Sat from 7AM to 4PM.

Since many residents already use the Recycling Center since they don't have curbside collection of trash and recycling, visits to the drop-off for disposal of food waste can be combined with regular recycling trips (there are however many private haulers that offer trash and recycling services). In the 10 weeks since the program began, slightly less than 5 tons of food waste has been collected for an average of about 4 pounds per household per week. They are hoping for 1 ton per week once the program becomes more wide-spread. "The residents love it!" says Karen Bouquillon from the DPW. This is a very inexpensive way to offer composting of food waste to residents. The city has a budget of \$5000 per year for the program which included the purchase and distribution of the indoor containers. The town's diversion rate is 47% without including yard waste. Northampton previously had a successful food waste program that had to be discontinued when the composting facility shut-down. Since then the city had been waiting for another composting facility to open that was close enough to make the program economically feasible (the town also wanted to have a back-up plan in case something went wrong with the current facility), so it took a while to reestablish the program.

Duluth, MN

Duluth, MN has a population of 84,419. It is part of the Western Lake Superior Sanitation District (WLSSD) which also includes Cloquet, Hermantown, Proctor, Carlton, Scanlon, Thomson and Wrenshall, and the surrounding rural townships of Silver Brook, Thomson, Twin Lakes, Canosia, Duluth, Grand Lake, Lakewood, Midway, Rice Lake and Solway for a total of 43,895 households. The WLSSD coordinates a residential food waste drop-off program at 7 sites in the area – WLSSD Yard Waste Composting Site, WLSSD Household Hazardous Waste Facility, WLSSD Materials Recovery Center, Marshall Hardware, Willard Munger Inn, Coffee Den, and Chester Creek Café. These sites are also available to residents of Superior, WI which increases the potential users by 11,515 for a total of 55,410. The first food waste drop-off site was opened in 2004 after a curb-side pilot ended and residents still wanted to be able to keep food waste out of the landfill. Additional sites were added until 2008 and were spread-out among the area – at both ends, in the middle, up the hills, etc so people could reach them easily. In 2009 a commercial only drop-off was added. Originally some of the sites were locked, but there were problems with sticking locks and forgotten combinations, so only the business ones are now. Sites are situated where they are visible to help prevent problems. All of the sites are open daily, with some open 24 hours.

The program provides free drop-off for food waste contained in compostable bags (several sizes available, currently using Cortec and BagToNature). The bags are free at the WLSSD facilities, or can be purchased from the host sites. Bag use reduces contamination and keeps the host sites cleaner. Accepted food waste includes meats, dairy, fish, small bones, bread, coffee, and spoiled and moldy foods. Most sites have 2 cubic yard dumpsters for the food waste collection, but a few have 95 gal carts. All of these are collected once a week whether full or not to cut down on odors. The food waste is gathered, mixed with shredded yard waste from the Yard Waste Facility, and composted year-round. The compost is then sold as 'Garden Green Compost'. The composting facility processes more than 40 tons of organics per month, but this includes commercial accounts as well as the drop-offs. At the most heavily used drop-off sites, between 400 and 750 pounds of food waste are collected per week. The only cost that has been measured is the cost of each pick-up which is \$20 each. The tipping fees for organics are \$0/ton, and for trash are \$45.28/ton. The WLSSD offers a free Waste Free Party Kit for people to use to further promote the food waste program.

3: Commercial Programs

Cambridge, MA

The City of Cambridge MA, located in the Boston metropolitan district, began a commercial food waste collection program in 2006²⁶. The City partnered with a local hauler to start the program. During discussions with the city prior to implementation, the hauler reported that they were concerned about collecting enough materials and getting high enough participation in the program to make it worthwhile. As a way to ensure that they would be able to start a successful commercial food scraps program the city and the hauler applied for a DEP grant with the goal of hiring a consultant to target and identify customers and to market the program to those customers. The City was awarded a \$40K grant that helped pay for marketing and a portion of it went to the hauler to help them purchase a new truck for the collection of food scraps.

To identify customers the team started by developing a list of all commercial food waste generators in the community. Once the list was created they went through it one by one and organized the businesses from high to low for potential generation and diversion. The outreach was then targeted at the high and medium generators with the potential to divert the most materials (grocery stores, restaurants, etc.). Some of these targets were easier than other to get on board, often depending on the corporate structure and local decision-making power. For instance, some of the larger grocery store chains or chain restaurants did not have the local authority to make the decision to participate and getting approval from a national headquarters was a barrier. The generators were incentive to participate by pricing the food scraps collection at or below the cost of trash collection. The program now has over 60 participating businesses. On-site training of staff and assistance in helping commercial customer's set-up their kitchen areas to make it easier for staff to divert materials were reported as keys to success. Another key to success for the Cambridge program (and the other burgeoning programs in the State) has been an annual organics summit in which all of the stakeholders in the state gather to discuss the issues. The state has held 13 such summits to date. Typically, the hauler collects materials in 68-gallon carts at the loading docks and indoor carts range from 5 gallon pails to 45-gallon rounds. The hauler reports that providing food waste collection is a great value added service and they have been able to grow their business as a result of the program. They are

²⁶ The city also has a residential drop-off only program and a schools program in one school.

now one of the most popular haulers in the city and have started providing zero waste consulting and business services as a result of the expansion. Unfortunately, processing capacity for the collected materials is starting to become an issue as more customers sign-on for the service.

4: Adding Food Waste to Existing Yard Waste

El Cerrito, CA

Since July 1st, 2010, residents of El Cerrito have had the option of putting food scraps and food-soiled paper into their green carts along with their yard waste. The city was able to provide this additional service for a minimal cost increase by using the existing every other week yard waste pick-up. The slight increase in cost of approximately \$.34 per month came from switching from a yard waste mulching facility to a composting facility. All residents currently pay for the yard waste in their Integrated Waste Management Fee that comes with their garbage bill. The fee varies slightly depending on the size of trash cart used. The IWM fee also pays for the cities' in house recycling program which has been single stream since 2008.

Garbage Container Size	Collection rate	IWM Fee	Disposal Rate	Total Monthly
20- gallon cart	\$11.25	\$7.68	\$4.77	\$23.70
35-gallon cart	\$18.74	\$7.68	\$7.62	\$34.04
64-gallon cart	\$37.48	\$15.36	\$15.24	\$68.08

There was some concern as to whether every other week would be sufficient for food scraps, but the initial cost increase for weekly service would be closer to \$1 per household and the city felt the smaller cost increase using the existing program would be better received. With this year's unusually cool summer, every other week appears to be working and El Cerrito can later switch to weekly should it be needed.

Unlike neighboring Alameda County, El Cerrito does not receive help from the County for their program. They are part of the West Contra Costa Integrated Waste Management Authority (now Recyclemore) which includes the cities of Richmond, Hercules, El Sobrante, Pinole and San Pablo. This collaboration has been a tremendous help in getting their program off the ground. Richmond also kicked off their yardwaste/foodwaste program July 1st, and San Pablo begins theirs September 2010. Each community receives help for outreach of approximately \$20,000 from the SWA. Garth Schultz of El Cerrito estimated the cost of outreach to be in the area of \$23,000 although it was helpful that residents were already familiar with the green carts with yard waste. They also purchased kitchen food scrap pales for those residents who call in and request them.

With local landfills closing and neighboring counties adding surcharges or refusing to service out of county waste, tipping fees continue to go up. El Cerrito currently pays \$148 per ton for trash. The food and green waste costs only \$60/ton. This savings can be passed on to residents as they reduce the size and therefore the cost of their garbage service by recycling, and composting their yard and food waste.

San Ramon, also of Contra Costa County, but not in the same SW Authority, is one of those communities that were able to take advantage of the changing landfill conditions. Their neighboring county enacted laws that prohibited their hauler from using their yard waste as ADC (Alternative Daily Cover). The new facility where they now take their yard waste includes food

scraps at the same rate as yard waste alone. They worked with their hauler to pick up the food scraps at the same time and now have a successful program.

Alameda County, CA

Communities in Alameda County have the benefit StopWaste.org to help implement food waste programs. StopWaste.org is a public agency comprised of Alameda County Waste Management Authority the Alameda County Source Reduction and Recycling Board. StopWaste began helping communities set up food waste programs in 2002. There are currently 16 communities in the county that offer food scrap programs. Most of those were introduced during franchise negotiation so there were no additional rate increases, especially if they were already collecting yard waste on a weekly basis. StopWaste is able to provide funding to these communities provided they meet certain conditions. The residential greencart must not cost more than \$8 per household, they must call the program “food scraps” so as to better facilitate future marketing campaigns, pick up must be once a week with no pilot programs, kitchen pails and outreach material must be provided to each household and materials must go to a permitted facility. Nicole Almaguer of Albany said that StopWaste has been extremely helpful, especially with outreach. They’ve had their program since 2004 with yard waste and food scrap collection. StopWaste has provided twice a year flip lid audits, feed-back, and reminders to residents with stickers and other materials. Overall, more than 400,000 households in Alameda County have access to curbside food scrap collection with an estimated 163,956 tons of organics being collected in 2008.

5: Failed/Discontinued Programs

Burnsville, MN

The City of Burnsville, MN has a population of around 60,000 residents and is located south of the Twin Cities, just on the edge of the metropolitan area. The City started a pilot program with a national waste hauler to collect curbside food waste in two neighborhoods. The pilot was discontinued due to two main reasons:

- 1) *Low participation*- Only a relatively small proportion of the households in the pilot areas were participating in the program and adding ample amounts of food waste materials to the stream. The low participation meant that the hauler was not able to fill up their truck with enough materials to make the collection and transportation economically feasible
- 2) *Distance to markets*- Facility siting is an issue in Minnesota (See Section 4- State Regulations and Permitting). The only available composting facility was about a 60 mile round trip

The pilot program was extremely popular with the participating residents and once it was discontinued, residents complained to the city and some are actually now self-hauling their food waste to the compost site themselves. The city is working with the hauler and the landfill to try and get materials accepted at the local landfill for composting but permitting issues have made it very difficult to overcome the distance barrier. Despite issues with the first pilot, the city reports that one of the other haulers serving the town saw some potential in the program and is preparing to offer their own food scrap collection program to residents in the near future. The City’s recycling coordinator believes that the growth of food scrap collection in her area will be driven by residential preference and market differentiation. Haulers view food scraps collection

as a value added service and a way to distinguish themselves in the market place, growth is occurring in a bottom-up not top-down manner, and competition among haulers is a good driver for food scrap collection.

City of Denver, CO

The City of Denver is both a discontinued program and a success story. In October 2008 the City received a state funded grant to pilot a residential curbside organics collection program. Residential trash and recycling services are provided to residents by city staff and trucks and costs of the program are included in property taxes, making many residents believe that trash and recycling services are “free”. Prior to winning the grant the city conducted a waste audit and found that 58% of the residential waste stream could be composted and used this data to both sell the program to elected officials and the state when applying for the grant. For the pilot program the city targeted 3,000 HHs in every district of the city. This was originally planned to cover a broad spectrum of demographics but due to the spread-out nature of the districts it made the collection routes very difficult to plan and the greatly increased hauling costs. Sign-ups for the pilot program were first come, first serve which posed two potential issues for the pilot design. While they were sure to get residents that would be willing to participate every week in this method, the self-selected households that were predisposed to divert more which could skew the pilot results to be higher than a randomly selected population and the self selected households might only have one participating house on a block, making collection a challenge.

The pilot was successful in diverting materials and on average, the participating households diverted an average of 31lbs/week in the summer and 24lbs/week in the winter. Unfortunately, due to the high costs of the program (long hauls to bring to the compost site and high collection costs partially due to the spread out nature of the pilot) the City was unable to secure permanent funding for the program and was forced to discontinue the program on March 2010. When the City announced their decision to stop the program, the households in the pilot made their voices heard. They called city staff and elected officials requesting the city continue the program. The only way the city could do this was to charge participating households an added fee (remember, trash and recycling services are “free: to all city residents). In order to make the program work the fee based service would cost residents a whopping \$9.75 per month or \$117/year for organics collection alone. When the city determined this cost they assumed that the program would be dead in the water and that very few residents would sign up for the added fee service. As of June 2010 over 1,600 of the original 3,000 households had signed-up for the pay service and the city is in the process of recruiting another 1,600 homes. The City has proposed an expansion of the program to 6,000 homes by 2010.