



# COMMERCIAL FOOD WASTE COLLECTION IN THE H-GAC PLANNING REGION

Houston-Galveston Area Council



PREPARED BY:

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**Subject: Commercial Food Waste Collection Study | Final Report**

Dear Ms. Livingston:

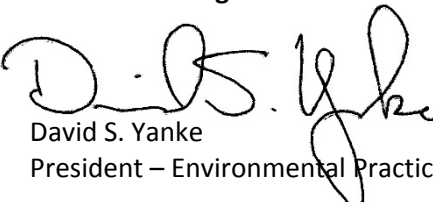
NewGen Strategies & Solutions, LLC (NewGen) and Risa Weinberger & Associates, Inc. (RWA) are pleased to provide the Houston-Galveston Area Council (H-GAC) with a final report regarding the Commercial Food Waste Collection Study.

The analysis and recommendations presented in this study would not be possible without the assistance of many organizations and individuals in H-GAC's planning region. We would like to express our sincere appreciation to those that participated in the conduct of this study. It is particularly important to note the participation of employees from H-GAC as well as the Cities of Houston and Sugar Land.

Should you have any questions concerning the report please contact me at 512.649.1254 or [dyanke@newgenstrategies.net](mailto:dyanke@newgenstrategies.net). We look forward to continuing our work with H-GAC in implementing these initiatives.

Sincerely,

**NewGen Strategies and Solutions, LLC**



David S. Yanke  
President – Environmental Practice

## **Table of Contents**

### **Executive Summary**

<b>Section 1 PROJECT BACKGROUND</b> .....	<b>1-1</b>
<b>Section 2 PURPOSE OF PROJECT</b> .....	<b>2-1</b>
<b>Section 3 PROJECT APPROACH</b> .....	<b>3-1</b>
Research .....	3-2
State Programs.....	3-2
County Programs .....	3-8
Municipal Programs.....	3-10
Businesses.....	3-16
Other Entities.....	3-20
Interviews.....	3-24
Generators .....	3-24
Collectors .....	3-30
Processors.....	3-34
Other Entities.....	3-38
<b>Section 4 FINDINGS</b> .....	<b>4-1</b>
<b>Section 5 RECOMMENDATIONS</b> .....	<b>5-1</b>
<b>Section 6 ACTION PLAN</b> .....	<b>6-1</b>

### **List of Appendices**

A	Contacts for Project Research
B	Contacts for Project Interviews
C	Food Waste Resources

### **List of Tables**

Table 1-1 MSW Generation, Recovery, Composting, and Discards   1960 – 2013 .....	1-3
Table 3-1 NewGen Research Entities.....	3-1
Table 3-2 CalRecycle’s Phased Approach .....	3-2
Table 3-3 Vermont Organics Ban Phased Approach.....	3-7
Table 3-4 Food Waste Diverted in Dana Point Pilot Program .....	3-12
Table 3-5 City of Davis Organics Collection Time Line.....	3-13
Table 3-6 Program Details for Businesses .....	3-13
Table 3-7 NewGen Interview List.....	3-24

**List of Figures**

Figure 1-1. Total MSW Generation (by material), 2013 | 254 Million Tons (before recycling) ..... 1-1

Figure 1-2. Total MSW Recovery (by material), 2013 | 87 Million Tons ..... 1-2

Figure 1-3. EPA Food Recovery Hierarchy..... 1-4

Figure 1-4. Organics Legislation in the United States ..... 1-5

Figure 3-1. New York State DEC Solid Waste Management Facilities Map ..... 3-6

Figure 3-2. Universal Recycling | Materials Management Map ..... 3-7

Figure 3-3. Hennepin Organics Composting Haulers ..... 3-9

Figure 3-4. Zero Waste Zone Participant Directory ..... 3-10

Figure 3-5. Austin’s URO Organics Diversion Timeline ..... 3-11

Figure 3-6. Food Waste Collection Carts..... 3-12

Figure 3-7. Fork it Over!’s Match + Find Mapping Feature..... 3-15

Figure 3-8. BIOFerm EUCOLino – Small Scale Digester ..... 3-17

Figure 3-9. IFSC Northeast Illinois Compost Locations ..... 3-21

Figure 3-10. El Tiempo Waste Composition..... 3-25

Figure 3-11. Food Donation Sources..... 3-27

Figure 4-1. EPA Food Recovery Hierarchy..... 4-1

## EXECUTIVE SUMMARY

### Project Background

For over thirty years, the U.S. Environmental Protection Agency (EPA) has reported data on both the generation and disposal of municipal solid waste (MSW) in the United States. Americans generated 254 million tons of MSW in 2013. That same year, Americans had an individual waste generation rate of 4.40 pounds per person, per day. Of those 4.40 pounds, 1.12 pounds were recycled and 0.39 pounds were composted, on average. A breakout of the materials generated, by category, is shown in Figure ES-1.

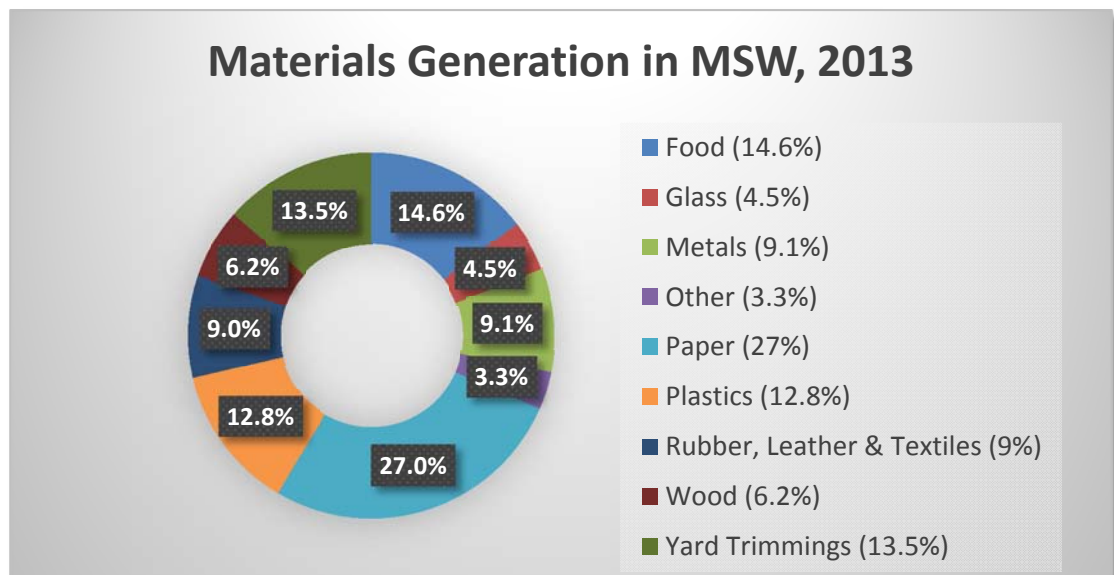


Figure ES-1. Total MSW Generation (by material), 2013 | 254 Million Tons (before recycling)  
 Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

Of the 254 million tons of generated MSW, 87 million tons – or approximately 34 percent – were recovered in 2013. Figure ES-2 shows the break-out, by material, of the 87 million tons recovered in 2012. **Of the 37 million tons of food scraps generated in 2013<sup>1</sup>, only 1.82 million tons were recovered, or less than 5 percent.<sup>2</sup>**

<sup>1</sup> 254 million tons \* 14.6% = 37 million tons.

<sup>2</sup> 2.1% \* 87 million tons = 1.82 million tons. 1.82 million tons ÷ 37 million tons = 4.94%.

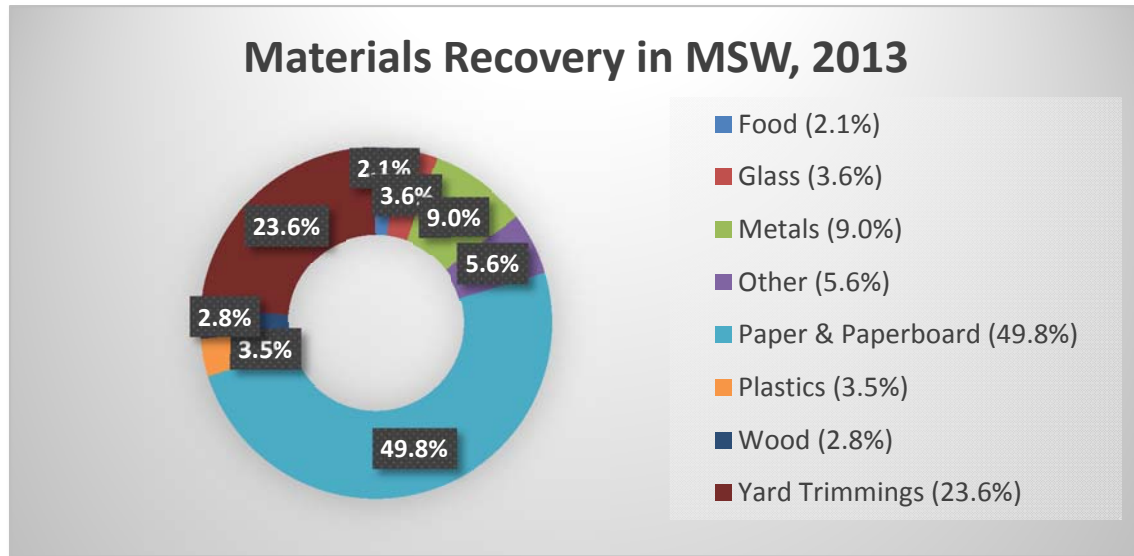


Figure ES-2. Total MSW Recovery (by material), 2013 | 87 Million Tons

Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

As reported in the recently released *Texas Recycling Data Initiative (TRDI)*, published in January 2015, it is estimated that 26.38 million tons of waste were disposed of in Texas landfills.<sup>3</sup> Using the population figures provided in the *Municipal Solid Waste in Texas: A Year in Review (FY 2013 Data Summary and Analysis)*, published in October 2014, the disposal rate in Texas equates to 5.47 pounds per capita per day.

The purpose of the TRDI study was to begin capturing data more accurately to reflect the amount of materials being recycled and composted in Texas. As the recycling and composting infrastructure grows in Texas it is expected that the per capita disposal figure will decline as the recycling and composting per capita figures increase. Consistent with those goals, this study was undertaken by the Houston-Galveston Area Council (H-GAC) to evaluate and determine the most cost effective ways in which to assist in increasing the diversion of commercial food waste from disposal in landfills.

As shown in Table ES-1, on the following page, composting has steadily increased over the past 25 years; however, it has leveled off in the past seven years. During this same period in time, states, cities, and counties in the United States have begun to pass legislation to address food waste concerns as a result of the increased awareness for the need to reduce the amount of food waste being disposed of in landfills.

<sup>3</sup> For the period January – December 2013, adjusted to exclude non-hazardous industrial waste as well as any solid waste imported into Texas.

Connecticut became the first state to pass legislation phasing in a ban of commercial food waste from landfills in 2011. They expanded their law in 2013 with a state mandate that requires generators producing food waste in excess of 104 tons per year by 2014 (and more than 52 tons per year by 2020) to divert their food waste if their businesses are located within 20 miles of a suitable recycling facility<sup>4</sup>. Similar legislation has gained traction in other parts of the northeast, including the States of Vermont, Massachusetts, and Rhode Island as well as New York City.

Table ES-1  
MSW Generation, Recovery, Composting, and Discards | 1960 – 2013  
Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

	Thousands of Tons									
	1960	1970	1980	1990	2000	2005	2009	2011	2012	2013
Generation	88,120	121,060	151,640	208,270	243,450	253,730	244,600	250,540	251,040	254,110
Recovery for recycling	5,610	8,020	14,520	29,040	53,010	59,240	61,890	66,400	65,240	64,740
Recovery for composting*	Neg.	Neg.	Neg.	4,200	16,450	20,550	20,750	20,570	21,330	22,440
<b>Total Materials Recovery</b>	5,610	8,020	14,520	33,240	69,460	79,790	82,640	86,970	86,570	87,180
Discards after recovery	82,510	113,040	137,120	175,030	173,990	173,940	161,960	163,570	164,470	166,930
Combustion with energy recovery**	0	400	2,700	29,700	33,730	31,620	29,010	31,800	32,200	32,660
Discards to landfill, other disposal†	82,510	112,640	134,420	145,330	140,260	142,320	132,950	131,770	132,270	134,270
	Pounds per Person per Day									
	1960	1970	1980	1990	2000	2005	2009	2011	2012	2013
Generation	2.68	3.25	3.66	4.57	4.74	4.69	4.37	4.41	4.38	4.40
Recovery for recycling	0.17	0.22	0.35	0.64	1.03	1.10	1.10	1.17	1.14	1.12
Recovery for composting*	Neg.	Neg.	Neg.	0.09	0.32	0.38	0.37	0.36	0.37	0.39
<b>Total Materials Recovery</b>	0.17	0.22	0.35	0.73	1.35	1.48	1.47	1.53	1.51	1.51
Discards after recovery	2.51	3.03	3.31	3.84	3.39	3.21	2.90	2.88	2.87	2.89
Combustion with energy recovery**	0.00	0.01	0.07	0.65	0.66	0.58	0.52	0.56	0.56	0.57
Discards to landfill, other disposal†	2.51	3.02	3.24	3.19	2.73	2.63	2.38	2.32	2.31	2.32
Population (thousands)	179,979	203,984	227,255	249,907	281,422	296,410	307,007	311,592	313,914	316,129

## Purpose of Project

As noted in the Project Background, food waste is one of the largest components of the waste stream in the United States. If overall recycling rates are to be increased in a material manner within the United States, as well as in the H-GAC planning region, it is essential to increase the diversion of food waste cost effectively. As mentioned previously, according to the EPA's latest data, it is estimated that less than five percent of all food waste that can be diverted from landfills is actually being diverted.<sup>5</sup> For this reason, H-GAC funded this study to see how commercial food waste diversion could be increased utilizing a voluntary and collaborative approach with the private sector.

<sup>4</sup> To put this requirement in perspective, it is not uncommon for a grocery store to “dispose” of two to five tons per week of food that is not sold.

<sup>5</sup> See footnote (3).

The City of Houston participated in this study because there is a desire to see how it can more cost effectively divert food waste from the commercial establishments (food processors, grocery stores, and restaurants) used by the City's 2.1 million residents. The City of Sugar Land was also an active participant in this study, as they recognize the environmental benefit of a commercial food waste program. As a rapidly growing suburban community located approximately 25 miles southwest of Houston and with a population of approximately 85,000, it has many restaurants, and assorted retail food outlets. The City of Sugar Land realizes that with its continued growth it is essential to divert as much food waste and organic material as is economically feasible.

For these reasons, the Houston-Galveston Area Council (H-GAC) retained NewGen Strategies and Solutions, LLC (NewGen) and Risa Weinberger & Associates (RWA) in December 2014 to conduct an analysis of the challenges, opportunities, and solutions associated with commercial food waste collection and diversion in the H-GAC's 13-county planning region.

## Project Approach

To undertake this study, NewGen utilized a project approach that its project team members have employed in similar types of solid waste and recycling research studies.<sup>6</sup> The first step NewGen undertook was to conduct industry research with regard to current trends concerning food waste diversion activities within the United States, as well as Texas, and then specifically within the H-GAC planning region. Shortly thereafter, the project team began to set up interviews with a wide variety of entities in the H-GAC planning region that are involved in some manner with regard to food waste. We categorized the organizations to be interviewed in the following three categories:

- **Generators** – food processors, restaurants, grocery stores, schools, hotels, etc.
- **Collectors** – companies that collect food waste (traditional solid waste collection companies as well as “specialty” waste collection companies, recycling companies, etc.).
- **Processors** – composting facilities capable of accepting food waste.

Finally, we utilized our project team's industry experience with regard to solid waste collection, recycling, and composting operations to validate our research and interviews. The project team then developed a series of findings and recommendations based on the research and interviews.

The final task, upon completing the findings and recommendations, was to develop a five-year action plan that incorporated the findings and recommendations to develop a series of action steps that will allow the H-GAC region to increase its diversion of food waste from being landfilled - for either consumption, or to be used as a supplement within the composting process.

The project team developed this study to also serve as a resource guide that local governments, private businesses, and entrepreneurs could use to develop a network of contacts within the H-GAC region concerning food waste diversion activities. It also provides a summary of some of the ways in which food waste is successfully being diverted within the H-GAC region, as well as some of the key action steps which must be taken in order to have a successful food waste diversion program.

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<sup>6</sup> We will use the term “study” and “report” interchangeably in reference to this document.



**Research**

NewGen conducted a thorough and extensive “research process” pertaining to food waste collection programs and current trends across the United States with regard to food waste diversion activities. NewGen’s research is presented in Section 3 and included the following entities:

**Table ES-2  
NewGen Research Entities**

<b>State Programs</b>	
<ol style="list-style-type: none"> <li>1. California Department of Resources Recycling and Recovery</li> <li>2. Connecticut Department of Energy &amp; Environmental Protection</li> <li>3. Maine Department of Environmental Protection</li> <li>4. Massachusetts Department of Environmental Protection</li> </ol>	<ol style="list-style-type: none"> <li>5. New Hampshire Department of Environmental Services</li> <li>6. New Jersey Department of Environmental Protection</li> <li>7. New York State Department of Environmental Conservation</li> <li>8. Vermont Department of Environmental Conservation</li> </ol>
<b>County Programs</b>	
<ol style="list-style-type: none"> <li>1. Charleston County, SC</li> </ol>	<ol style="list-style-type: none"> <li>2. Hennepin County, MN</li> </ol>
<b>Municipal Programs</b>	
<ol style="list-style-type: none"> <li>1. City of Atlanta, GA</li> <li>2. City of Austin, TX</li> <li>3. City of Dana Point, CA</li> </ol>	<ol style="list-style-type: none"> <li>4. City of Davis, CA</li> <li>5. City of Dubuque, IA</li> <li>6. City of Portland, OR</li> </ol>
<b>Businesses</b>	
<ol style="list-style-type: none"> <li>1. Hilton San Diego Bayfront Hotel</li> <li>2. BIOFerm Energy Systems, WI</li> </ol>	<ol style="list-style-type: none"> <li>3. Maine Compost School</li> <li>4. Rust Belt Riders Composting</li> </ol>
<b>Other Entities</b>	
<ol style="list-style-type: none"> <li>1. Ample Harvest</li> <li>2. Denver Food Rescue</li> </ol>	<ol style="list-style-type: none"> <li>3. Illinois Food Scrap Coalition</li> <li>4. Onondaga County Resource Recovery Agency</li> </ol>

## Interviews

NewGen conducted interviews with over twenty representatives from restaurants, grocery stores, food waste collection companies, and composting facilities, in addition to representatives from local governments and trade associations. Each conversation is summarized in Section 3, and a detailed contact sheet for each interviewee is presented in Appendix B. Entities interviewed include:

Table ES-3  
NewGen Interview List

Generators	Collectors	Processors	Other
1. Ruggles Green	1. Liquid Environmental Solutions	1. Nature's Way	1. Pat Greer, Eco-Ology
2. Radical Eats	2. Nexus Disposal	2. New Earth	2. SMART Recycling of South Carolina, LLC
3. El Tiempo Cantina	3. Waste Management	3. Living Earth	3. Texas Restaurant Association
4. Hilton Americas-Houston	4. Tap, Inc.	4. Waste Management	4. Greater Houston Restaurant Association
5. Houston Food Bank	5. Little Joy Recycling		5. Feeding America
6. Sysco	6. City of Plano		
7. Whole Foods Market	7. City of Tucson		
8. University of Houston			

## Findings

The NewGen project team's research led to a series of findings concerning the commercial collection of food waste within the H-GAC region. The key findings that the NewGen project team have identified are as follows:

1. The environmental, economic, and social benefits that occur in the diversion of food waste from landfills are innumerable.
2. Houston area compost processors have significant excess capacity to accept additional food waste.
3. Some grocery stores and commercial food waste processors in the H-GAC region are already currently active in food waste diversion.
4. Clear and consistent education regarding TAC Title 30, Chapter 332, which outlines the requirements for composting, is needed.
5. One of the biggest barriers to a more active commercial food waste program is the lack of food waste collection companies in the H-GAC region.
6. Building designs/layouts at some commercial businesses (primarily restaurants) present challenges because some locations have limited room for food waste collection containers, or existing enclosure laws make it difficult to create room for additional carts.
7. Restaurants are not typically large generators of pre-consumer food waste.

8. Most compost processors are hesitant to accept post-consumer food waste due to contamination issues.
9. Many businesses who already participate in a food waste program do so because of their dedication to sustainable practices.
10. Successful commercial food waste collection programs require on-going education.
11. The development of any successful and vibrant food waste diversion program is driven by three primary factors: 1) the quality and quantity of available material; 2) the cost to collect and transport the material; 3) and, the differential between disposal fees at landfills versus processing fees at composting sites.

## Recommendations

Based on the series of findings from the conduct of this study, the NewGen Project developed the following recommendations:

### Short-Term (first twelve months)

1. H-GAC to host a quarterly commercial food waste roundtable, utilizing the Action Plan (Section 6) as a guide for the meetings.<sup>7</sup>
2. Coordinate education and outreach. This would include the development of training materials for generators of food waste.
3. Clarify materials accepted by compost processors (may include a meeting with TCEQ).
4. Discuss with compost processors the potential consideration for a tiered rate structure for incoming food waste.
5. Focus initial food waste diversion efforts on commercial food processors, wholesale food distributors, and retail grocery stores.
6. Pursue food waste from entities located on Produce Row.
7. Pursue liquid food processors, or companies that create a liquid food waste byproduct.
8. Follow up with collection companies who currently collect solid waste or recyclables and research whether they would consider expanding their collection services to include the collection of food waste.
9. Identify compost processing facilities with crush pads that would enable the extraction of food and beverages from containers.
10. Examine Hilton Americas-Houston – “beta results”.
11. Begin development of a GIS database of food waste generators, collectors, and processors in the H-GAC planning region.

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<sup>7</sup> It may be beneficial for H-GAC to consider whether the Houston Area Research Center may be an organization interested in participating in the roundtable. They were mentioned to the NewGen project team during the interview phase of this study. They are a largely grant funded research organization, and receive some funding from Exxon (see Recommendation #14), amongst other organizations.

12. Develop a database to track generators, collectors and processors of food waste – location, volumes, frequency, etc.
13. Coordinate with the Cities of Houston and Sugar Land’s Departments of Health (regarding the requirements for food donations).

### **Mid-Term (13 months to 36 months)**

14. Explore opportunities with Exxon Corporate Campus.
15. Coordinate food waste diversion programs with restaurants.
16. Explore food waste diversion to farms.
17. Develop model ordinances for use by local governments to incentivize or mandate food waste diversion from landfills by selected generators or haulers.

### **Long Term (37 months and longer)**

18. Undertake a feasibility study near Produce Row to determine whether there is a suitable site in the area to develop a new food waste composting facility.

### **Acknowledgements**

The project team for this assignment consisted of staff from NewGen Strategies & Solutions, LLC and Risa Weinberger & Associates, Inc. The project team would like to acknowledge the contributions of key participants – local governments, non-profit organizations, private businesses, and trade associations – that were contacted and contributed to the development of this study. Appendix A contains a listing of researched entities, while Appendix B details the contacts made during the interview portion of this study.

## Section 1 PROJECT BACKGROUND

For over thirty years, the U.S. Environmental Protection Agency (EPA) has reported data on both the generation and disposal of municipal solid waste (MSW) in the United States. Americans generated 254 million tons of MSW in 2013. That same year, Americans had an individual waste generation rate of 4.40 pounds per person, per day. Of those 4.40 pounds, 1.12 pounds were recycled and 0.39 pounds were composted, on average. A breakout of the materials generated, by category is shown below in Figure 1-1.

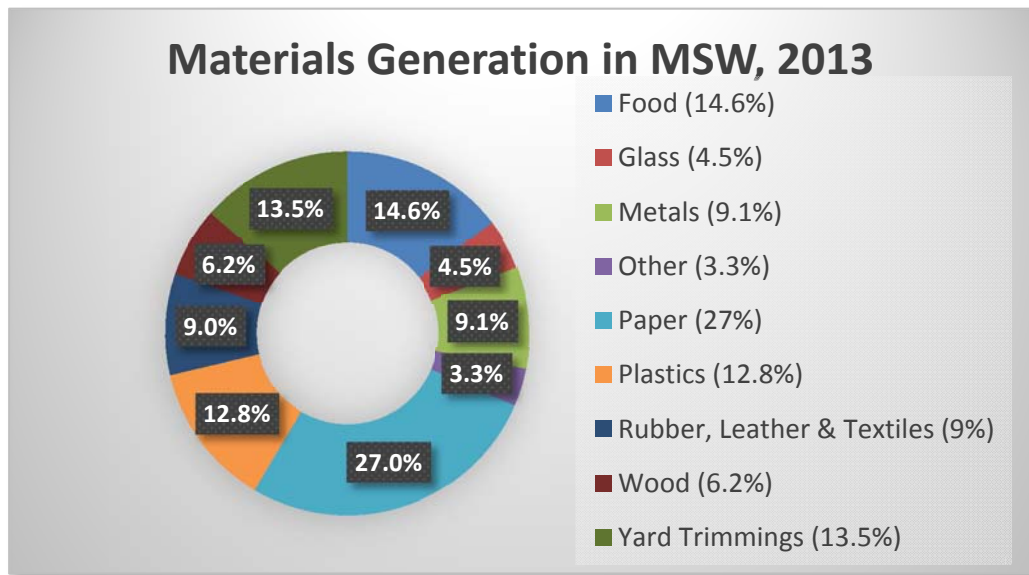


Figure 1-1. Total MSW Generation (by material), 2013 | 254 Million Tons (before recycling)  
 Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

Of the 254 million tons of generated MSW, 87 million tons – or approximately 34 percent – were recovered in 2013. Figure 1-2 show the breakout, by material, of the 87 million tons recovered in 2013. **Of the 37 million tons of food scraps generated in 2013<sup>8</sup>, only 1.82 million were recovered, or less than five percent.<sup>9</sup>**

<sup>8</sup> 254 million tons \* 14.6% = 37 million tons

<sup>9</sup> 2.1% \* 87 million tons = 1.82 million tons. 1.82 million tons ÷ 37 million tons = 4.94%.

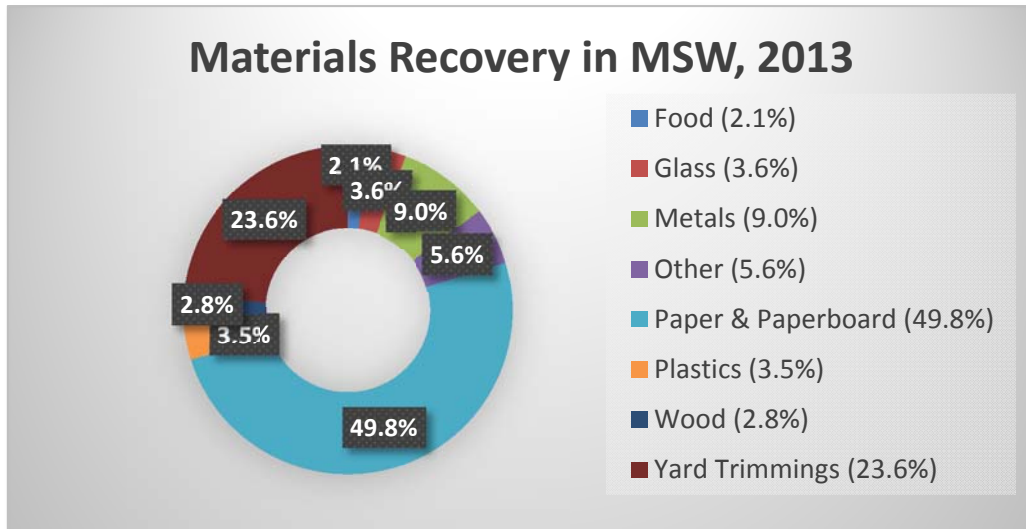


Figure 1-2. Total MSW Recovery (by material), 2013 | 87 Million Tons

Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

As reported in the recently released *Texas Recycling Data Initiative (TRDI)*, published in January 2015, it is estimated that 26.38 million tons of waste were disposed of in Texas landfills.<sup>10</sup> Using the population figures provided in the *Municipal Solid Waste in Texas: A Year in Review (FY 2013 Data Summary and Analysis)*, published in October 2014, the disposal rate in Texas equates to 5.47 pounds per capita per day.

The purpose of the TRDI study was to begin capturing data more accurately to reflect the amount of materials being recycled and composted in Texas. As the recycling and composting infrastructure grows in Texas it is expected that the per capita disposal figure will decline as the recycling and composting per capita figures increase. Consistent with those goals, this study was undertaken by the Houston-Galveston Area Council (H-GAC) to evaluate and determine the most cost effective ways in which to assist in increasing the diversion of commercial food waste from disposal in landfills.

The *Texas Recycling Data Initiative* estimated that only 19,768 tons of food and beverage materials were diverted in Texas to composting and mulching facilities.<sup>11</sup>

<sup>10</sup> For the period January – December 2013, adjusted to exclude non-hazardous industrial waste as well as any solid waste imported into Texas.

<sup>11</sup> While difficult to quantify, based on NewGen’s research during the course of this study we now know that significantly more food and beverage material is being diverted from landfills versus what is reported in the TRDI study.

As shown in Table 1-1, composting has steadily increased over the past 25 years; however, it has leveled off in the past seven years. During the past five years, states, cities, and counties in the United States have begun to pass legislation to address food waste concerns as a result of the increased awareness for the need to reduce the amount of food waste being disposed of in landfills. Connecticut became the first state to ban commercial food waste from landfills, with a state mandate that requires generators producing food waste in excess of 104 tons per year, effective January 1, 2014, to divert the food waste if the business is located within 20 miles of a suitable recycling facility.<sup>12</sup> Similar legislation has gained traction in the northeast, including the States of Vermont, Massachusetts, and Rhode Island, as well as New York City.

Table 1-1  
MSW Generation, Recovery, Composting, and Discards | 1960 – 2013  
Source: EPA Advancing Sustainable Materials Management: Facts and Figures 2013

	Thousands of Tons									
	1960	1970	1980	1990	2000	2005	2009	2011	2012	2013
Generation	88,120	121,060	151,640	208,270	243,450	253,730	244,600	250,540	251,040	254,110
Recovery for recycling	5,610	8,020	14,520	29,040	53,010	59,240	61,890	66,400	65,240	64,740
Recovery for composting*	Neg.	Neg.	Neg.	4,200	16,450	20,550	20,750	20,570	21,330	22,440
<b>Total Materials Recovery</b>	5,610	8,020	14,520	33,240	69,460	79,790	82,640	86,970	86,570	87,180
Discards after recovery	82,510	113,040	137,120	175,030	173,990	173,940	161,960	163,570	164,470	166,930
Combustion with energy recovery**	0	400	2,700	29,700	33,730	31,620	29,010	31,800	32,200	32,660
Discards to landfill, other disposal†	82,510	112,640	134,420	145,330	140,260	142,320	132,950	131,770	132,270	134,270
	Pounds per Person per Day									
	1960	1970	1980	1990	2000	2005	2009	2011	2012	2013
Generation	2.68	3.25	3.66	4.57	4.74	4.69	4.37	4.41	4.38	4.40
Recovery for recycling	0.17	0.22	0.35	0.64	1.03	1.10	1.10	1.17	1.14	1.12
Recovery for composting*	Neg.	Neg.	Neg.	0.09	0.32	0.38	0.37	0.36	0.37	0.39
<b>Total Materials Recovery</b>	0.17	0.22	0.35	0.73	1.35	1.48	1.47	1.53	1.51	1.51
Discards after recovery	2.51	3.03	3.31	3.84	3.39	3.21	2.90	2.88	2.87	2.89
Combustion with energy recovery**	0.00	0.01	0.07	0.65	0.66	0.58	0.52	0.56	0.56	0.57
Discards to landfill, other disposal†	2.51	3.02	3.24	3.19	2.73	2.63	2.38	2.32	2.31	2.32
Population (thousands)	179,979	203,984	227,255	249,907	281,422	296,410	307,007	311,592	313,914	316,129

In the past few years, there has been an increased awareness regarding food waste issues. It was recently reported in a New York Times article that approximately 60 million metric tons of food is wasted annually in the United States, and about 32 million metric tons of that is landfilled.<sup>13</sup> Forty percent of all food in this country does not make it to the table, which costs

<sup>12</sup> Effective in 2020 if the generator has in excess of 52 tons per year of food waste it must be recycled, if located less than 20 miles from a suitable recycling facility.

<sup>13</sup> <http://www.nytimes.com/2015/02/26/us/food-waste-is-becoming-serious-economic-and-environmental-issue-report-says.html>

upwards of \$165 billion to the U.S. economy.<sup>14</sup> Food waste programs present unique challenges when compared to other targeted materials (i.e. perishable, odor, vector control, dense, high water content), which can prove difficult in planning for its recovery.

Food waste is being increasingly discussed in social media, and should, therefore, be appropriately defined. The United States Department of Agriculture (USDA) distinguishes between the terms “*food loss*” and “*food waste*.” Food loss refers to reductions in edible food mass during production, postharvest, and processing that is available for human consumption but is not consumed for any reason. This includes cooking loss and natural shrinkage (i.e. moisture loss); loss from mold, pests, or inadequate climate control; and food waste. Food waste, alternatively, is a component of food loss that occurs when an edible item goes unconsumed, as in food discarded by retailers due to color or appearance, and plate waste by consumers. This report will focus on reducing food waste with regard to food waste generated in the commercial sector. ***For the purpose of this study, we will use the term food waste to refer to all food that is currently being landfilled and is still eligible for either consumption or could be composted.*** The EPA Food Recovery Hierarchy shown in Figure 1-3 provides a visual aid in prioritizing food recovery.

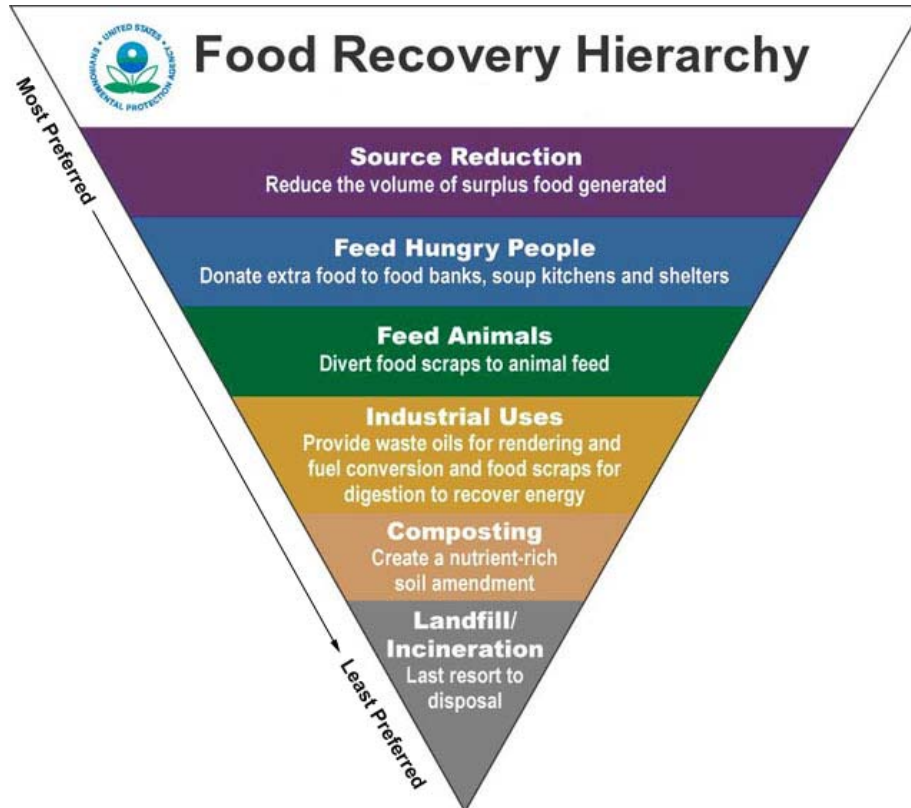


Figure 1-3. EPA Food Recovery Hierarchy  
(source: EPA - <http://www.epa.gov/foodrecovery/>)

In some states, grant programs have been established to provide incentives for diverting food waste. These programs range in scope, and involve either the donation of food to feed people, funds appropriation for collection equipment (i.e. purchase of new collection vehicles or

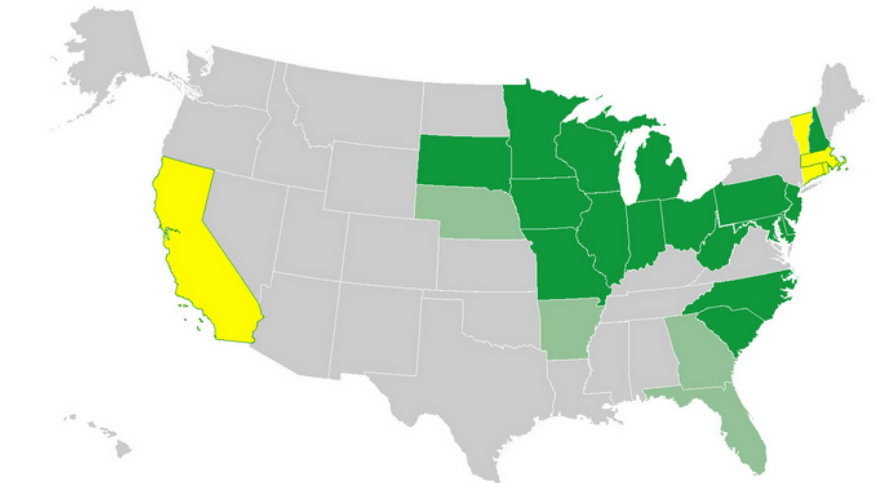
<sup>14</sup> <http://www.npr.org/sections/thesalt/2014/11/17/364172105/to-end-food-waste-change-needs-to-begin-at-home>



retrofitting current vehicles to collect food waste), or directly composting materials. The City and County of San Francisco have provided the San Francisco Food Bank a \$97,000 grant to procure a refrigerated truck for produce collection and a partial year's salary for a full-time driver. Hennepin County, Minnesota, also provides grants ranging from \$10,000 to \$50,000 to local business and nonprofits to divert food waste, either for donations or composting. North Carolina and Indiana have also established food recovery grant programs which divert thousands of tons of excess food from landfills each year.

Figure 1-4 illustrates areas where food and yard waste legislation is taking effect.

### States that Ban Organics or Mandate Organics Recycling - October, 2014



**Ban/mandate some yard debris:** Arkansas\*, Delaware, Florida\*, Georgia\*, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska\*, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, West Virginia, Wisconsin

\*Allow yard debris disposal in landfills that generate energy

**Ban/mandate food scraps:** California, Connecticut, Massachusetts, Rhode Island, Vermont.  
Also of note: New York City, Seattle

Source: Haaren, Themelis and Goldstein, State of Garbage in America, BioCycle Magazine, Oct 2010, updated 5-2011, 3-2012, 4-2013, 6-2014, 10-2014

Figure 1-4. Organics Legislation in the United States

Source: US Composting Council

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## Section 2

# PURPOSE OF PROJECT

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As noted in the Project Background, food waste is one of the largest components of the waste stream in the United States. If overall recycling rates are to be increased significantly in the United States, as well as in the Houston-Galveston Area Council planning region, it is essential to increase the diversion of food waste in a cost effective manner. Presently, it is estimated that less than five percent of all food waste that can be diverted from landfills is actually being diverted.<sup>15</sup> For this reason, H-GAC funded this study to see how food waste diversion could be implemented utilizing a voluntary and collaborative approach with the private sector. The City of Houston participated in this study because there is a desire to see how it can more cost effectively divert food waste from its commercial establishments (food processors, grocery stores, and restaurants) used by the City's 2.1 million residents. The City of Sugar Land was also an active participant in this study. As a rapidly growing suburban community located approximately 25 miles southwest of Houston and with a population of approximately 85,000, it has many restaurants, and assorted retail food outlets. The City of Sugar Land realizes that with its continued growth it is essential to divert as much food waste and organic material as is economically feasible.

For these reasons, H-GAC retained NewGen Strategies and Solutions, LLC (NewGen) and Risa Weinberger & Associates (RWA) in December 2014 to conduct an analysis of the challenges, opportunities, and solutions associated with commercial food waste collection and diversion in the H-GAC's 13-county planning region.

The scope of NewGen's analysis is comprised of the following tasks.

- **Task 1:** Schedule a strategy meeting with staff from H-GAC, the Cities of Houston, and Sugar Land.
- **Task 2:** Develop a list of challenges associated with commercial food waste collection in the H-GAC region through interviews with local governments and businesses, online research, and existing industry knowledge.
- **Task 3:** Develop solutions to address these challenges that are practical and economical for the H-GAC region.
- **Task 4:** Produce an action plan with specific steps that H-GAC and local governments and businesses can implement to plan for and "jump start" commercial food waste collection.
- **Task 5:** Prepare and conduct a workshop detailing the findings of the study.

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<sup>15</sup> See footnote (3).

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## **Section 3 PROJECT APPROACH**

To initiate this study, NewGen held a kick-off meeting with staff from the Houston-Galveston Area Council (H-GAC), as well as the Cities of Houston and Sugar Land to review the project work plan, schedule, and finalize the overall project approach. The NewGen project team followed a methodical process to obtain and analyze information. Primary research was gathered through internet research, trade journals, industry contacts, telephone interviews, and in-person interviews with key community contacts. Interviews were conducted with three categories of businesses - generators of food waste, collection companies, and processors of organics within the H-GAC planning region. All three must be integrated effectively to create a dynamic, successful, and sustainable commercial food waste diversion program.

The first section within the Project Approach summarizes the research conducted by NewGen. A listing of the entities researched (both on-line and via phone calls) is listed below:

**Table 3-1  
NewGen Research Entities**

<b>State Programs</b>	
1. California Department of Resources Recycling and Recovery	5. New Hampshire Department of Environmental Services
2. Connecticut Department of Energy & Environmental Protection	6. New Jersey Department of Environmental Protection
3. Maine Department of Environmental Protection	7. New York State Department of Environmental Conservation
4. Massachusetts Department of Environmental Protection	8. Vermont Department of Environmental Conservation
<b>County Programs</b>	
1. Charleston County, SC	2. Hennepin County, MN
<b>Municipal Programs</b>	
1. City of Atlanta, GA	4. City of Davis, CA
2. City of Austin, TX	5. City of Dubuque, IA
3. City of Dana Point, CA	6. City of Portland, OR
<b>Businesses</b>	
1. BIOFerm Energy Systems, WI	3. Maine Compost School
2. Hilton San Diego Bayfront Hotel	4. Rust Belt Riders Composting
<b>Other Entities</b>	
1. Ample Harvest	3. Illinois Food Scrap Coalition
2. Denver Food Rescue	4. Onondaga County Resource Recovery Agency

## Research

NewGen conducted a thorough and extensive “research process” pertaining to food waste collection programs and current trends across the United States. NewGen’s research is presented in this section.

## State Programs

### 1. California Department of Resources Recycling and Recovery (CalRecycle)

In October 2014 [AB 1826 Chesbro \(Chapter 727, Statutes of 2014\)](#) was signed by Governor Brown concerning the recycling of organic material by businesses.<sup>16</sup> Starting April 1, 2016, all businesses



that generate a specific amount of organic material (per week) will be required to arrange for the recycling of organic material in a specified manner. CalRecycle offers a phased approach that decreases the threshold amount in stages until 2020. The process is described below:

Table 3-2  
CalRecycle’s Phased Approach

Time Period	Threshold
January 1, 2016	Local jurisdictions must have an organic waste recycling program in place. These jurisdictions must also conduct public education efforts to inform businesses how to recycle the organic waste within the specific jurisdiction.
April 1, 2016	Businesses that generate more than eight cubic yards of organic material per week, must arrange for organic recycling services.
January 1, 2017	The required amount of <u>organic material</u> generated per week by businesses is reduced to four cubic yards.
August 1, 2017 (and ongoing)	Jurisdictions must provide information on their organic recycling program implementation in their annual report submitted to CalRecycle.
Fall 2018	CalRecycle conducts a formal review of the jurisdictions
January 1, 2019	Businesses that generate four cubic yards of <u>commercial solid waste</u> per week must arrange for organic recycling services.
Fall 2020	CalRecycle conducts formal review of the jurisdictions.
Summer/Fall 2021	If CalRecycle determines that the statewide disposal of organic waste in 2020 has not been reduced by 50 percent of the level of disposal during 2014, the organic recycling requirements on businesses will expand to cover businesses that generate two cubic yards or more of commercial solid waste per week. Additionally certain exemptions, previously discussed, may no longer be available if this target is not met.

Additionally, CalRecycle offers resources to a variety of generator types regarding the [management of food scraps](#).<sup>17</sup> These categories provide hotels, restaurants, institutions, and households with a wealth of information, FAQs, and best practices to start or enhance their current organic recycling program(s).

<sup>16</sup> California Legislative Information: <http://leginfo.legislature.ca.gov/faces/billHistoryClient.xhtml>

<sup>17</sup> CalRecycle Organic Materials Management: <http://www.calrecycle.ca.gov/Organics/Food/>

## 2. Connecticut Department of Energy & Environmental Protection

A 2009 waste characterization study of Connecticut's waste stream found that food scraps are the single most common recyclable material, by weight, of the State's disposed waste. As a result, Connecticut set a precedent for food scrap diversion when it became the first state to mandate food scrap recycling. Connecticut passed [Public Act 11-217](#) in 2011, which addresses the recycling of organic materials by certain supermarkets, food manufacturers, conference centers, and food wholesalers.<sup>18</sup> Connecticut refined the law in 2013 with the passage of [Public Act 13-285](#) which targets diversion by volume.<sup>19</sup> Entities that are within 20 miles of an authorized composting site and generate an average projected volume of 104 tons per year (as of January 2014) are required to divert their food scraps. The required volume of food scraps is further reduced to 52 tons per year starting January 1, 2020.



## 3. Maine Department of Environmental Protection

For the state of Maine, organic composting is regulated under [Maine Solid Waste Regulations, 06-096, CMR 410 "Composting Facilities."](#)<sup>20</sup> However, each municipality is responsible for their own program, if applicable. Currently, there are approximately 12-15 programs running in schools throughout the state. Additionally, Maine has one licensed anaerobic digester, Exeter Agri-Energy (EAE). EAE is fully permitted by the state to accept all forms of digestible organic materials, including liquids, solids, and a range of slurry products, including grease trap waste.



Small towns continue to be problematic for the organics market in Maine as these small towns do not have the equipment for such programs or the required route density.

## 4. Massachusetts Department of Environmental Protection

Massachusetts Department of Environmental Protection (MassDEP) estimates that food waste accounts for more than 25 percent of the state's waste stream (over 1 million tons per year).<sup>21</sup> However less than 10 percent of food waste is currently being diverted. The passage of Massachusetts's commercial organic materials ban ([310 CMR 19.000](#)), coupled with available state-funding sources, are expected to generate a significant growth in the composting industry in Massachusetts.<sup>22</sup>



<sup>18</sup> Connecticut General Assembly: <http://www.cga.ct.gov/2011/ACT/PA/2011PA-00217-R00SB-01116-PA.htm>

<sup>19</sup> Connecticut General Assembly: <http://www.cga.ct.gov/2013/ACT/PA/2013PA-00285-R00SB-01081-PA.htm>

<sup>20</sup> Maine Department of Environmental Protection – Sustainability Rules (for composting facilities): <http://www.maine.gov/dep/sustainability/rules/index.html>

<sup>21</sup> Sources of food waste include commercial facilities and residential units.

<sup>22</sup> Massachusetts department of Environmental Protection – Commercial Food Waste Disposal Ban: <http://www.mass.gov/eea/agencies/massdep/recycle/reduce/food-waste-ban.html> and Regulations: <http://www.mass.gov/eea/docs/dep/service/regulations/wbreg14.pdf>

Pursuant to [Massachusetts' 2010-2020 Solid Waste Master Plan](#), the MassDEP set goals to divert at least 35 percent of organics from landfills by 2020.<sup>23</sup> MassDEP recognizes that additional processing, in the range of 300,000 tons per year, will be necessary to help achieve this goal. MassDEP is working to complete a number of tasks toward meeting their Master Plan objectives, including, but not limited to:

- **Increased Composting Capacity:** MassDEP recognizes the need for increased processing capacity to meet the State's Master Plan goals, and supports the development of composting, and anaerobic digestion facilities through loans and targeted grants.
- **Regulations:** MassDEP regulates compost facilities and has established a commercial organic material ban that applies to businesses (and institutions) that generate more than one ton of food waste in one week, effective October 2014.
- **Route Density:** MassDEP works to achieve cost effective route density by collaborating with interested haulers. MassDEP offers a food waste generator database that allows haulers to find generators in specific geographic areas.
- **End Markets:** MassDEP secures demand for a finished compost product by working with the Operational Services Division and the Massachusetts Highway Department.

## 5. New Hampshire Department of Environmental Services

New Hampshire is in the midst of revising their composting rules in order to lift the restriction on what can be composted under the different types of permits. New Hampshire's current rules are a barrier to encouraging successful food waste diversion and composting activities. The state currently offers two types of permits, one of which does not allow for the composting of meat and dairy. An explanation of the two permits is provided below:



### [Solid Waste Permit-by-Notification](#)<sup>24</sup>

This permit is designed for small-scale composting facilities, receiving 30 tons per day, or less. This permit has a fast processing time of typically 30 days. However, this permit does not allow the processing of meat or dairy products.

### [Solid Waste Standard Permit](#)<sup>25</sup>

This permit applies to larger composting facilities which receive more than 30 tons of material a day. The process for this permit is difficult to navigate, and takes a minimum of 120 days.

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<sup>23</sup> Massachusetts 2010-2020 Solid Waste Master Plan:

<http://www.mass.gov/eea/docs/dep/recycle/priorities/swmp13f.pdf>

<sup>24</sup> New Hampshire Department of Environmental Services – Solid Waste Facility Permitting:

[http://des.nh.gov/organization/divisions/waste/swmb/pdrs/permit\\_sw\\_by\\_notification.htm](http://des.nh.gov/organization/divisions/waste/swmb/pdrs/permit_sw_by_notification.htm)

<sup>25</sup> New Hampshire Department of Environmental Services – Solid Waste Facility Permitting:

[http://des.nh.gov/organization/divisions/waste/swmb/pdrs/permit\\_sw\\_standard.htm](http://des.nh.gov/organization/divisions/waste/swmb/pdrs/permit_sw_standard.htm)



## 6. New Jersey Department of Environmental Protection

The largest barrier for New Jersey at the present moment is the lack of composting facilities. The entire geographical area took a step backward in the fall of 2014 when a large composting facility near the Port of Wilmington went out of business. New Jersey now relies on one registered farm, Ag Choice – located in Sussex County – to accept organic material, which consists of mostly bakery waste.<sup>26</sup> Ag Choice’s two food scrap programs are detailed below:



- **Ag Choice Feed Program:** The organic material that Ag Choice collects from bakeries and snack food manufacturers goes through a proprietary process which produces a high energy feed ingredient. This processed material is used to supplement feed grains for swine, turkey, chickens, and cattle.
- **Ag Choice Compost Program:** Ag Choice offers this program to businesses to save money and keep food scraps out of landfills. Ag Choice will work with existing haulers (if required) or will place proprietary containers at the business for the collection of organic material.

Both of Ag Choice’s programs start with a consultation. Based on the results of the consultation, Ag Choice will recommend a waste diversion program. Ag Choice will also train staff members on best practices and will maintain the program and collection containers. Costs for the Ag Choice feed and compost programs will vary based on volume, product type, container size, location, and frequency of pick-ups.

## 7. New York State Department of Environmental Conservation

Under New York State solid waste regulations, the three levels of regulatory oversight for organic recycling facilities are as follows: exempt, registered, and permitted.

Exempt facilities pose the least potential for adverse environmental impacts, followed by registered facilities, and finally permitted facilities.

The Department of Environmental Conservation (DEC) offers an [interactive map](#) (Figure 3-1) that shows all registered composting facilities in the state, along with clarifying information for the facility (e.g., region in the state, regulatory status, and expiration date).<sup>27</sup>



<sup>26</sup> Ag Choice Organics Recycling: <http://www.ag-choice.com/>

<sup>27</sup> New York Composting – Solid Waste Management Facilities Map: <https://data.ny.gov/Energy-Environment/Composting-Solid-Waste-Management-Facilities-Map/y4ic-kfv6>

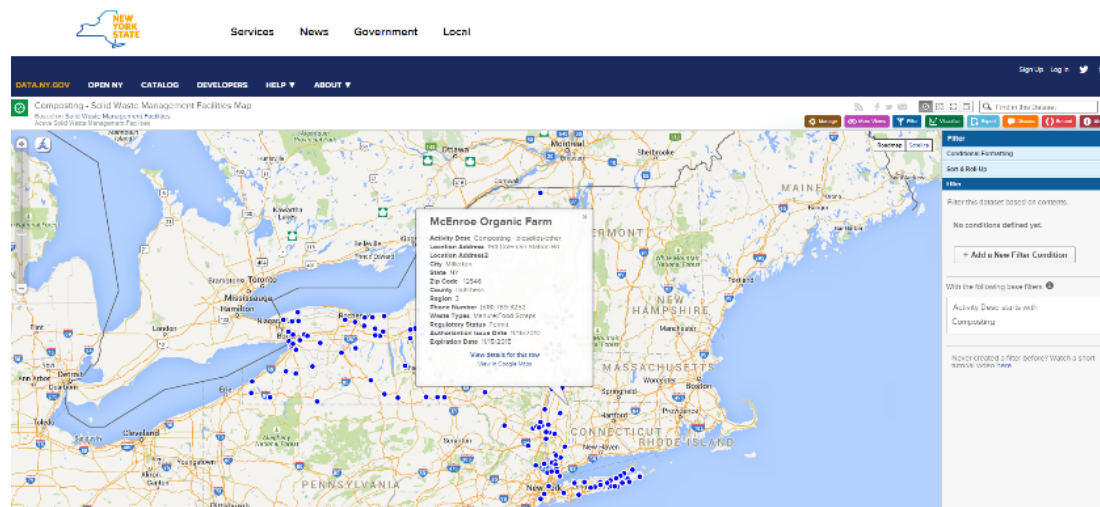


Figure 3-1. New York State DEC Solid Waste Management Facilities Map

Fruits and vegetable scraps are being taken from area Wal-Mart stores to farms throughout the state and used as animal feed. Generators of food waste that plan to use the food scraps for animal feed must receive a [beneficial use determination](#) (BUD) from the DEC.<sup>28</sup> Once the DEC grants a BUD, the material in question ceases to be considered a solid waste. Generally speaking, BUDs are for waste material used in the following manners:

- As an alternative fuel;
- As a substitute material in the manufacturing of a product; or
- As a substitute for a commercial product.

Furthermore, animal feed is regulated by the New York State Department of Agriculture and Markets under [Article 5 Section 72-a](#).<sup>29</sup> This article details the type of food scraps that are permitted as animal feed. Particularly, certain discarded items are not considered solid waste per Article 5, and as a result, can be fed to swine (e.g., outdated eggs, sale baked goods, discarded fruit and vegetables).

## 8. Vermont Department of Environmental Conservation

Vermont has the most aggressive ban on organics. It gradually lowers the thresholds until all businesses, regardless of size, divert all organics by 2020. This phased approach is part of Vermont's Universal Recycling law and the associated ban established by [Act 148](#).<sup>30</sup> This Act provides clear directives on what will be banned from landfills, and when these bans take place.



<sup>28</sup> New York State Department of Environmental Conservation – Beneficial Use Determinations: <http://www.dec.ny.gov/chemical/8821.html>

<sup>29</sup> New York State Department of Agriculture & Markets – Swine Laws and Regulations: <http://www.agriculture.ny.gov/AI/Alswine.html>

<sup>30</sup> Vermont Department of Environmental Conservation – Waste Management & Prevention Division: <http://www.anr.state.vt.us/dec/wastediv/solid/Act148.htm>

The comprehensive phases of the Vermont Universal Recycling Law outlining materials that are to be diverted from landfills are as follows:

- Recyclables by July 1, 2015
- Leaf, yard debris, and clean wood by July 1, 2016
- Food scraps (in phases), by 2020

A detailed listing of the phased approach as part of Act 148 is provided in Table 3-3. This targets larger food scrap generators if a certified composting facility is within 20 miles of their location.

Table 3-3  
Vermont Organics Ban Phased Approach



Year	Tons/Week
2014	>2
2015	>1
2016	>1/2
2017	>1/3
2020	>0

To augment Vermont's efforts to meet the stated goals of having zero food waste in landfills by 2020, the state offers a robust [materials management map](#) to connect haulers, generators, and composters.<sup>31</sup> The goal of the materials management map is to save resources and reduce waste. A screenshot of the interactive map is shown below in Figure 3-2.

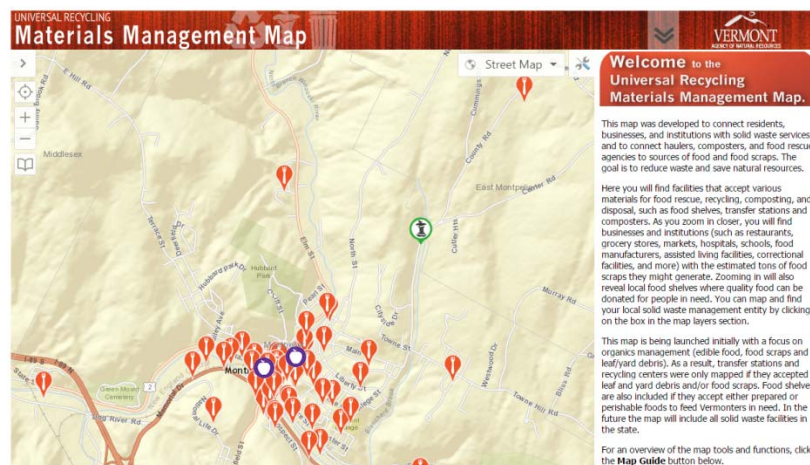


Figure 3-2. Universal Recycling | Materials Management Map

<sup>31</sup> Vermont Universal Recycling Materials Management Map:  
<http://www.anr.state.vt.us/dec/wastediv/solid/MaterialsMap.html>

## County Programs

### 1. Charleston County, SC

In 2009-2010, the Environment Management Department of Charleston County (County) completed a waste composition audit and discovered that food scraps (and yard waste) accounted for over 20 percent of the County's waste stream. The County obtained approval in September 2010 for a 12-month pilot program, whereby 1,859 tons of food waste was composted. The County received their operating permit effective June 2012 to process food waste at the Bees Ferry Facility.<sup>32</sup> The County was the first in the State of South Carolina to initiate food waste composting, and today the Bees Ferry Composting Facility covers 35 acres and composts nearly 60,000 tons a year (yard and food waste).



The County partners with five different haulers to collect and haul the food waste. Businesses who wish to establish a food waste collection program should contact the haulers directly:

- Carolina Waste Services
  - Republic Services
  - SMART Recycling of South Carolina
  - Fisher Recycling
  - Food Waste Disposal
- (see write-up under "Interviews")

### 2. Hennepin County, MN

Hennepin County (County) offers a robust organics program that follows the core tenets of the EPA food recovery hierarchy. The County's model is:



1. Food-to-people
2. Food-to-animals
3. Organics composting

Additionally, the County stocks their website with a vast amount of resources, free assistance and on-line tools. These free items are available for businesses, schools, and organizations interested in starting, or improving, their organics program:<sup>33</sup>

- **Grants:** Businesses, organizations, and schools can be awarded grants for containers, supplies, signage, and free assistance.
- **Educational Material:** The County supplies a number of different brochures and handouts, free of charge.
- **Events:** The County will assist event coordinators by securing food recycling containers, providing event recycling, waste reduction planning guides, and signage/communication tools.
- **Haulers:** The County offers a listing of available haulers on their website, as shown in Figure 3-3.

<sup>32</sup> Charleston County, SC – Commercial Food Waste Composting Program: <http://www.charlestoncounty.org/departments/environmental-management/compost-commercial-info.php>

<sup>33</sup> Hennepin County, MN – Organics Recycling Program: <http://www.hennepin.us/organics>

### – Organics composting haulers

#### Haulers that collect organics for composting in Hennepin County

Hauler	Contact / phone number	Commercial Residential Notes	
Republic Services	Anja Standly 952-946-5245 AStandly@republicservices.com	X	
Aspen Waste Systems	Tom Heuer 612-884-8000	X	
Eureka Recycling	Joanna Stone 651-222-7678	X	Commercial in Minneapolis only
Organic Disposal	Shelley Fahey 952-994-8987 952-443-2336	X	X Only in southwest Hennepin - currently in Minnetonka and Eden Prairie
Randy's Environmental Services	Dave Hepfl 763-972-4123	X	X
Sanimax - Organics	Andy Barnaal 651-451-6858	X	
Troje's Trash and Recycling	Jamie Brown 651-459-8223	X	
Vierkant Disposal	Gary Vierkant 612-922-2505		X Residential in Edina only
Vintage Waste Systems	Emilee Metcalf 952-472-0401	X	X
Waste Management	Dayna Karnick 952-882-2318	X	X

Figure 3-3. Hennepin Organics Composting Haulers

(source: <http://www.hennepin.us/business/recycling-hazardous-waste/organics-recycling>)

## Municipal Programs

### 1. City of Atlanta, GA

The City of Atlanta (Atlanta) established the Zero Waste Zones (ZWZ) program in 2009 with the assistance of Ms. Holly Elmore of Elemental Impact. The formal definition of a ZWZ is: a collective gathering of the community working together on changing current disposal methods of consumed products. This means that businesses partner with one another; these “zones” create route density for suppliers, and as a result, help control costs.



A ZWZ has a goal of diverting the *maximum* amount of recyclable items and organic matter from landfills. ZWZ participants pledge to implement, and maintain, the following criteria:

- Spent grease is collected for the production of bio-fuel.
- Common recyclables (cardboard, paper, glass, plastic and metals) are collected for recycling.
- Excess food is donated in accordance with the Good Samaritan Food Donation Act.
- Food residuals, from preparation and service, and excess food not compliant with the Food Donation Act are collected for composting or other approved destinations.

Atlanta has four ZWZs, located in the following areas:

- Downtown Atlanta
- Midtown Atlanta
- Hartsfield-Jackson Atlanta International Airport
- Buckhead<sup>34</sup>

The [ZWZ website](#) offers resources for participants and suppliers, such as this Participant Directory listing:<sup>35</sup>



Figure 3-4. Zero Waste Zone Participant Directory

<sup>34</sup> Buckhead is one of the Country’s largest urban mixed-use development areas. Buckhead is a prominent area of Atlanta, offering retail outlets, hotels, restaurants, and high-rise residential units to the citizens of Atlanta.

<sup>35</sup> Atlanta, GA – Zero Waste Zones: <http://www.zerowastezones.org/index.html>

## 2. City of Austin, TX

In December 2011, the City of Austin’s (Austin) City Council approved the Austin Resource Recovery Master Plan. This [Master Plan](#) lays the groundwork for Austin’s services and goals for the next 30 years and beyond.<sup>36</sup>



Austin’s Master Plan aims to reach zero waste by 2040. This will require the diversion of at least 90 percent of materials that are currently landfilled.

Austin’s [Universal Recycling Ordinance](#) (URO) aligns, and supports, Austin’s Zero Waste goal.<sup>37</sup> Austin’s URO requires property owners to ensure that tenants and employees have access to recycling.

Austin’s URO is a phased approach that has an organics component. The timeline for organics diversion is presented in Figure 3-5:

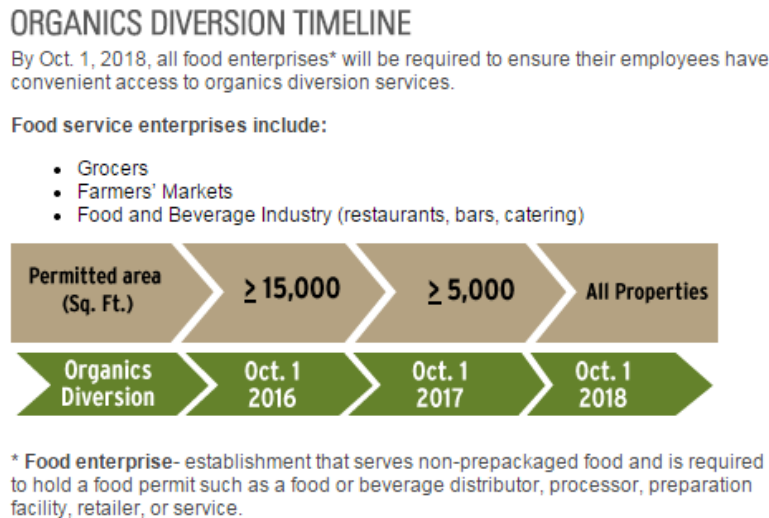


Figure 3-5. Austin’s URO Organics Diversion Timeline

## 3. City of Dana Point, CA

The City of Dana Point’s (Dana Point) commercial food waste program began as a pilot program in April 2010 in conjunction with eight other cities.<sup>38</sup> This initial pilot was funded by a \$400,000 grant from the Orange County Waste and Recycling Department. Businesses participating in the pilot program included, The Ritz-Carlton, Laguna, The St. Regis Monarch Beach, and Salt Creek Grille.



<sup>36</sup> Austin Resource Recovery Master Plan (2011) – [http://austintexas.gov/sites/default/files/files/Trash\\_and\\_Recycling/MasterPlan\\_Final\\_12.30.pdf](http://austintexas.gov/sites/default/files/files/Trash_and_Recycling/MasterPlan_Final_12.30.pdf)

<sup>37</sup> Austin, TX – Universal Recycling Ordinance: [https://www.municode.com/library/tx/austin/codes/code\\_of\\_ordinances?nodeld=TIT15UTRE\\_CH15-6SOWASE\\_ART5UNRE](https://www.municode.com/library/tx/austin/codes/code_of_ordinances?nodeld=TIT15UTRE_CH15-6SOWASE_ART5UNRE)

<sup>38</sup> Dana Point, CA – Commercial Food Waste Recycling Program: <http://www.danapoint.org/index.aspx?page=585>

The total amount of food waste diverted as part of the pilot program is shown below in Table 3-4.

**Table 3-4  
Food Waste Diverted in Dana Point Pilot Program**

Time Period	Amount (in tons)
April 5, 2010 - April 30, 2010	7.05
May 1, 2010 - May 31, 2010	14.05
June 1, 2010 - June 30, 2010	20.10
July 1, 2010 - July 31, 2010	31.74
August 1, 2010 - August 31, 2010	32.17
September 1, 2010 - September 30, 2010	28.41
October 1, 2010 - October 31, 2010	26.72
November 1, 2010 - November 30, 2010	20.28
December 1, 2010 - December 31, 2010	19.84
January 1, 2011 - January 31, 2011	20.29
February 1, 2011 - February 28, 2011	15.14
March 1, 2011 - March 31, 2011	17.80
April 1, 2011 - April 30, 2011	18.07
May 1, 2011 - May 31, 2011	22.66
June 1, 2011 - June 30, 2011	18.41
July 1, 2011 - July 31, 2011	21.63
August 1, 2011 - August 31, 2011	19.63
September 1, 2011 - September 30, 2011	19.84
October 1, 2011 - October 31, 2011	20.84
<b>Total Tons for Pilot Program</b>	<b>394.67</b>

As a result of the successful pilot program CR&R Environmental Services Incorporated (CR&R) offers food scrap collection services via 35-gallon (internal collection) and 64-gallon (external collection) carts for businesses in Dana Point and six surrounding communities. CR&R provides educational material and CR&R's Recycling Coordinator will assist in the training of employees to ensure minimal contamination of food waste.



Figure 3-6. Food Waste Collection Carts



#### 4. City of Davis, CA

The City of Davis (Davis) is currently proposing to expand its collection service to include organics<sup>39</sup>. This effort will increase Davis' overall diversion rate and will move Davis toward its ultimate waste reduction goal of 75 percent diversion by 2020. The preliminary timeline for Davis' program is presented in Table 3-5. It is currently anticipated that customers will not be charged an additional fee for this service outside of the initial cart purchase. However, this item is subject to change as Davis navigates the planning process.

Table 3-5  
City of Davis Organics Collection Time Line

Time Period	Activity
March – April 2015	Organics Program ordinance introduced to City Council
March – May 2015	Public Meetings
May 2015	Organics Program ordinance adopted
June 2015	Davis Waste Removal orders new carts and equipment
July or August 2016 <sup>(1)</sup>	Begin Organics Program

1. Contingent upon City Council approval for the program.

Table 3-6  
Program Details for Businesses

Non-restaurant commercial customers	Restaurants, grocery stores, etc.
One, 95-gallon Service 1x/week	One, 65-gallon cart Service 2x/week

The organic material generated as part of the Davis program will be collected by Davis Waste Removal (DWR) and will be processed via windrow composting at Napa Valley Recycling in Napa, California – approximately 40 miles away.

#### 5. City of Dubuque, IA

The City of Dubuque (Dubuque) has contracted with Full Circle Organics, LLC (Full Circle) to accept residential curbside and commercial food scraps for composting.<sup>40</sup> Full Circle has six locations in the Midwest United States. Dubuque's material is hauled to Full Circle's Farley, Iowa location (approximately 21 miles from Dubuque). The Farley, Iowa facility can process up to 39 tons of food residuals a day.



<sup>39</sup> This program will be offered to both commercial and residential customers.

<http://recycling.cityofdavis.org/organics-program>

<sup>40</sup> Dubuque, IA – Food scrap recycling program: <http://www.cityofdubuque.org/483/Food-Scrap-Recycling>

Businesses, institutions, and households can subscribe to this fee-based program.<sup>41</sup> The fee is added to the City’s utility bills. Larger cart options are available to institutions and businesses. These customers are instructed to call the Public Works Department to undergo a short waste assessment survey and obtain more information regarding pricing for this service.

## 6. City of Portland, OR

The City of Portland (Portland) has a goal to reduce waste and to raise the recycling rate to 75 percent by 2015. To help achieve this goal, Portland offers food waste recycling for residential and commercial customers.



To assist businesses with their environmental practices, Portland created [Sustainability at Work](#)<sup>42</sup> to offer free resources.<sup>43</sup> Sustainability at Work communicates changes, such as the newest “food-only composting” restriction so that businesses can easily stay apprised of the latest regulations.<sup>44</sup>

Details regarding Portland’s program:

- Every recycling and solid waste hauler is required to provide composting service, at the customer’s request.
- Composting, recycling, and solid waste rates for residential and commercial customers are not set by the City of Portland. Businesses negotiate these rates directly with a private hauler.
- Portland offers a listing of over 40 haulers on their [website](#).<sup>45</sup>

### *Fork it Over!*

[Fork it Over!](#) (FIO) is a program created by the Portland Metro department in 2004 (Portland State University – Community Environmental Services assumed the management of the program in 2012) designed to decrease food waste and hunger by increasing food donation efforts.<sup>46</sup> FIO promotes connections between food rescue agencies and food-generating businesses via web-based resources.



FIO has a “Match + Find” feature on their website that allows entities to select from various food types (e.g., fresh produce, prepared items, canned goods) and supplies a listing of available food rescue agencies within a close proximity of the searcher’s zip code.<sup>47</sup> The FIO

<sup>41</sup> Regular collection runs April-November. Winter collections are available by subscription or scheduled via a call-in service.

<sup>42</sup> Portland, OR – Sustainability at Work: <https://www.portlandoregon.gov/sustainabilityatwork/62152>

<sup>43</sup> Free resources include: posters and stickers to label containers for education, on-site training for staff, and talking points to communicate with to employees and customers

<sup>44</sup> Effective March 1, 2015, only food scraps are accepted in Portland’s business compost program. Items such as waxed or regular cardboard, compostable serviceware, paper towels, and other paper products are no longer accepted.

<sup>45</sup> Portland, OR – Permitted Commercial Haulers: <https://www.portlandoregon.gov/bps/43049?a=110895>

<sup>46</sup> Fork it Over!: <http://forkitover.org/about>

<sup>47</sup> Fork it Over! – Match + Find Tool: <http://forkitover.org/content/donors#-match+-find-tool>

program provides information and matching services for businesses within Clackamas, Multnomah, and Washington Counties.

# Match + Find

Always call ahead to confirm hours of operation, acceptable food types, and available services.

Match and Find
Select and Contact

- A [Central City Concern](#)  
 232 NW 6th Ave  
 Portland, OR 97209  
[Website](#)
- B [New Avenues for Youth](#)  
 1220 SW Columbia St  
 Portland, OR 97201  
[Website](#)
- C [Urban Gleaners](#)  
 15 SE 6th Ave  
 Portland, OR 97214  
[Website](#)
- D [Janus Youth Programs](#)  
 707 NE Couch  
 Portland, OR 97232  
[Website](#)
- E [All Saints Episcopal Church - Hot Meals](#)  
 4033 SE Woodstock  
 Portland, OR 97206  
[Website](#)
- F [Neighborhood House, Inc. Emergency Food](#)

- Bulk food items
- Commercially baked goods
- Dessert & sweets
- Fresh produce
- Meats (USDA-inspected)

- Canned & packaged items
- Dairy products & eggs
- Entrees & prepared items
- Frozen goods

Figure 3-7. Fork it Over!'s Match + Find Mapping Feature

## Businesses

### 1. Hilton San Diego Bayfront Hotel

The Hilton San Diego Bayfront Hotel (Hilton Bayfront) was the first hotel to participate in the City of San Diego's food scraps composting program in May 2010.<sup>48</sup> The Hilton Bayfront was enthusiastic to minimize its waste and had a record-breaking implementation time of only one month, including the training of over 100 staff members (most implementation processes take three to four months).



The Hilton Bayfront is a supporter of source reduction followed by the donation of excess edible food. Excess inedible food is discarded into special containers, then taken to a compost dumpster outside of the hotel. The dumpster is picked up weekly by Allied Waste and transported to the Miramar Greenery at the Miramar Landfill (approximately 13 miles from the Hilton Bayfront). The Miramar Greenery accepts food waste generated at pre-approved commercial venues for a discounted tipping fee.

The Hilton Bayfront (and the other hotels participating in the food scraps composting program) have developed their own training tools, in addition to those provided by the City, such as videos and games. A testament to their training and diligence, the Hilton Bayfront has a one percent threshold for contamination in the food scrap stream.

The City's Annual Waste Reduction and Recycling Awards Program has recognized the Hilton Bayfront, and other participating hotels in the food scrap program, for their exemplary waste diversion rates.

## Going Green

**RECOGNITION**

- 2014 #1 in Sustainability for All Hilton Hotels in the U.S.
- 2014 Hospitality Energy Champion—SCGE
- 2014 City of San Diego Director's Recycling Award
- 2014 Green Business Network Member: Port of San Diego
- 2013 TripAdvisor Green Leader: Silver Level
- 2013 City of San Diego Director's Recycling Award
- 2013 Lodging Energy Efficiency Program Award
- 2012 City of San Diego Recycler of the Year
- 2011 Chairman's Award in Sustainability: Port of San Diego & Sempra
- 2011 City of San Diego Environmental Pioneer
- 2010 Green Key Program: Highest Rating of 5 Green Keys
- 2010 California Green Lodging Award – Leadership Level

**ENERGY USE**

- We have a current Energy Star score of #9.
- The hotel has been using multiple on-site renewable energy sources since its opening in 2008.
- Local utility SDG&E is currently providing 20.8% of electricity produced by on-site renewable energy.
- The hotel is targeting to become LEED registered for EB.
- Completed a comprehensive lighting retrofit program, reducing power as much as 70% in many areas.
- The hotel has upgraded our Building Automation system which will improve system programming to implement tighter controls of energy usage and while improving occupant comfort. This project will save enough electricity to power 108 typical homes and enough natural gas for 234 typical homes for a year.
- We have replaced existing conventional light switches to switches that have built-in occupancy sensors and a built-in LED night light in guest bedrooms. Sensors turn lights on when they detect occupancy and turn the lights off when no one is in the room. This project will save enough electricity to power 10 typical homes a year.
- We have also replaced our existing thermostats in guest rooms with thermostats that have a built-in occupancy sensor. When the room is vacant for extended periods of time, the control will adjust the room temperature setting to save energy while no one is in the room. When guests return to the room, the sensor will detect occupancy and return the temperature setting to the guest's preference. This initiative will conserve enough electricity to power 142 typical homes and enough natural gas for 9 typical homes for a year.
- We utilize a sustainability program to accurately measure and report on the hotel's energy consumption to allow us identify areas for improvement, this software tool can also be used to measure energy consumption of a particular event in the hotel and can provide a detailed report to our clients.

## Going Green

**ENVIRONMENTAL RESPONSIBLE PURCHASING**

Hotel cleaning products adhere to the following guidelines:

- Hotel uses automatic dishwashing detergent that alkali does not contain NTA (nitrilotriacetic acid) contain chlorine bleach.
- Hotel demonstrates that chlorinated chemicals a where there is no less toxic alternative and only amounts.
- Hotel uses non-phosphate, non-toxic, biodegradable concentrated liquid or powder cleaning products.
- Hotel seeks to replace hazardous substances with alternatives (e.g., cleaning supplies, detergents, a pesticides, etc).
- Purchases of products with VOC off-gassing not evaluated and lower VOC products are purchased.
- General Purpose Cleaning Products contain less by weight.
- Bathroom janitors contain a prescribed percentage of recycled content.
- Locally grown and organic options are offered for use.

**SUSTAINABLE PURCHASING**

- The hotel has a sustainable purchasing policy that can purchase that are within the building and site using including but not limited to: organic consumables (vegan, office and meeting supplies and guest room amenities, electronics, batteries, food, beverages and build Additionally, approved eco-friendly, biodegradable cleaning detergents and low VOC paints are used. Its environmentally responsible suppliers for all purchases.
- Locally grown organic options are offered in the rest using a "turn to local" approach.

**WATER EFFICIENCY**

- The hotel has permanently installed water meters that by data to total water use for the entire building and grounds. Consumption is tracked through LightStay.
- Water closets are currently at 1.4 gallons per flush.
- Urinals are currently at 1 gallon per flush.
- Showerheads are currently at 2.5 gallons per minute.
- Public lavatory, fountains and aerators are currently at minute.
- Private lavatory, fountains and aerators are currently at minute.

**WASTE MANAGEMENT**

- As of December 2012, the hotel's diversion rate is consistently in the 40 - 45% range. A goal of 75% is targeted for 2014.
- The hotel has a solid waste management policy in place that facilitates ongoing waste reduction, encourages high levels of both staff and guest participation in waste diversion efforts, provides staff training on recycling, composting, donating and reusing waste covers all the building waste streams, including recycling, composting, donating or reuse of food waste, grease, paper, cardboard, plastic, glass, metal, business, memory containing items, building materials and electronic equipment. Training has been provided for all team members. Guests are instructed to recycle through collateral and strategic placement of recycling receptacles throughout public space.
- The hotel has recently successfully negotiated an addendum to its collective bargaining agreement which added a guestroom recycling program for guests and room attendants at no additional cost.
- Housekeeping staff does not replace consumable amenities daily unless they are empty. Leftover amenity bottles are donated to a local charity.
- The hotel primarily uses glass or china.
- HD polyethylene (HD plastic) is used in any reuse in the hotel.
- Chalk supplies are used and paper supplies are required to consist of a prescribed percentage of post consumer material.
- Leftover food is offered to team members and also donated to a local food shelter.
- Hotel participates in a food waste composting program in conjunction with the City of San Diego and the Miramar Greenery.

**CLIENT BENEFITS**

- Our Light Stay Program allows us to provide our clients an accurate report of performance across multiple operational practices. The LightStay software effectively allows the measurement, identification and operational implementation of sustainability initiatives which, in turn, allows benchmarking/quantification of data and the impact of sustainable operations at the property level.
- The report can be customized to a group event allowing our clients to track their event's environmental impact, then allowing the hotel to work with each event to reduce the energy and resources used.

**ADDITIONAL ACTIVITIES**

- The hotel has a formal furniture repair policy, any damaged furniture from guest rooms or public spaces is brought to carpentry for repair, once fixed it is reused in the hotel or donated to relevant charities.
- All of the hotel's printers and copiers are defibrated to double sided printing to reduce the quantity of paper used in each department.
- Unused escalator banks are de-energized nightly to reduce power usage.
- Back of house areas are monitored nightly for usage and power turned off accordingly to reduce electricity consumption in the hotel.

One Park Blvd San Diego, CA 92101
   
 617.541.3333 | 619.475.2000
   
 www.hilton.com/san-diego-bayfront

<sup>48</sup> Food Waste Composting at San Diego Hotels, BioCycle – January 2014, Vol. 55, No.1, p. 28

## 2. BIOFerm Energy Systems, WI

Having installed over 400 biogas plants globally, BIOFerm Energy Systems (BIOFerm) is experienced in providing anaerobic digestion technology for waste management, and energy generation. BIOFerm is a Wisconsin-based, renewable company, specializing in:<sup>49</sup>



- **BIOFerm Dry Fermentation:** This system is different from traditional anaerobic digestion systems. Organic matter remains stationary and requires little additional liquid.
- **EUColino:** This is BIOFerm’s small-scale digester, boasting an impressive compact design, handling 1,000 – 6,000 tons of waste per year. The EUColino is a versatile option for a large range of operators such as:
  - Municipalities
  - Campuses
  - Wastewater treatment plants
  - Dairies
  - Breweries
- **COCCUS:** This is a complete-mix digester that processes large volumes of wet organic waste. Tank sizes start at 7,000 tons per year and can expand to meet project needs.
- **EUCO:** The EUCO is a horizontal plug-flow digester for input materials with high solids content (approximately 17 percent). EUCO should ideally be paired with COCCUS for processing waste from food processors, breweries, etc.



Figure 3-8. BIOFerm EUColino – Small Scale Digester

<sup>49</sup> BIOFerm Energy Systems – Anaerobic Digestion & Gas Upgrading Technology:  
<http://www.biofermenergy.com/anaerobic-digestion-technology/>

### 3. Maine Compost School

The Maine Compost Team (MCT) was formed in 1990 to address the growing concern regarding organics being landfilled. MCT's main purpose was to coordinate the information distribution among several state agencies.

As a result of the success of the MCT, the [Maine Compost School](#) (MCS) was founded in 1997.<sup>50</sup> MCS fills the void in teaching people who lack the necessary knowledge of how to compost successfully.



MCS is the nation's longest continually running compost education program, with 2015 marking MCS's 19<sup>th</sup> anniversary. MCS offers a weeklong training program (on a rotating schedule), at Highmoor Farm, a University of Maine research farm facility located in Monmouth, Maine. MCS's training program trains personnel to be qualified compost site operators. At the completion of the weeklong training, an optional certificate examination will be administered to requesting participants. Successful completion of the certificate exam awards the participant a "Certificate of Technical Ability." The class schedule for MCS is located on their website.<sup>51</sup> The cost of the program is \$525 and includes all instructional material, refreshments at breaks, lunches Monday through Friday, assorted publications, composting video series, and a field trip.

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<sup>50</sup> Maine Composting School: <http://composting.org/>

<sup>51</sup> Maine Composting School Events and School Calendar: <http://composting.org/events-school-calendar/>

#### 4. Rust Belt Riders Composting

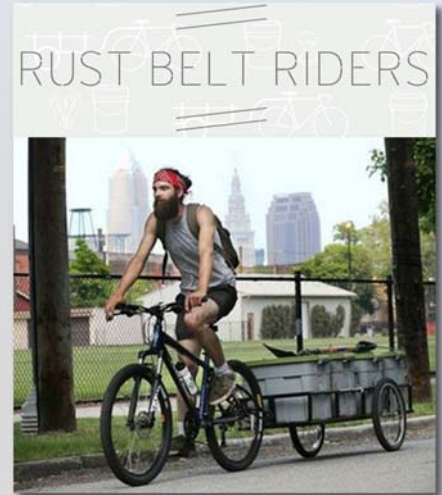
Rust Belt Riders Composting (Rust Belt Riders) is a new hauler located in Cleveland, Ohio. This sustainable hauler collects food scraps on a weekly basis from area homes, businesses, and schools by bicycles with custom-fit trailers for hauling the food scrap containers.<sup>52</sup>

Despite the small-scale operation of Rust Belt Riders, the four founders have collected in excess of 50,000 pounds of food scraps from 50 locations since they company's first pick-up in June 2014.<sup>53</sup>

Rust Belt Riders work with approximately ten community gardens and all the composting currently takes place at these gardens. Any excess compost produced that the gardens cannot use, is sold at farmer's markets.

Most recently, Rust Belt Riders was awarded \$20,000 from Social Enterprise Accelerator (SEA) of Northeast Ohio. Rust Belt Riders spent five months building their sales pitch for the grant. Co-founder Daniel Brown says the grant money will be instrumental in streamlining customer relations and their bill processing, in addition to purchasing more bikes and trailers.

Pricing for these services varies by the type of pick-up. Commercial clients, schools, coffee shops, business, and restaurants—are charged by the pound. Whereas, residential clients are charged a flat fee per pick-up.



<sup>52</sup> Customers leave their containers at an agreed upon location on their property (back door, driveway, lobby, etc.) All customers receive a container commensurate with the volume of compostable materials being collected.

<sup>53</sup> Bike-Riding Waste Haulers Gain Grant to Support Food Scrap Collection Efforts, Waste 360: [http://waste360.com/composting/bike-riding-waste-haulers-gain-grant-support-food-scrap-collection-efforts?NL=WST-08&Issue=WST-08\\_20150416\\_WST-08\\_622&sfvc4enews=42&cl=article\\_1&elqTrack=true](http://waste360.com/composting/bike-riding-waste-haulers-gain-grant-support-food-scrap-collection-efforts?NL=WST-08&Issue=WST-08_20150416_WST-08_622&sfvc4enews=42&cl=article_1&elqTrack=true)

## Other Entities

### 1. Ample Harvest

Ample Harvest.org Inc. (Ample Harvest) is a 501(c) charitable organization that was started by Mr. Gary Oppenheimer in 2009.<sup>54</sup> The Ample Harvest campaign is a true national effort that utilizes the resources of the internet to enable registered local food pantries to accept excess harvest from local growers.



Ample Harvest has been recognized by the United States White House as part of the [Let's Move! Program](#), in which First Lady Michelle Obama has challenged community leaders to make fresh produce available to at least 10,000 locations throughout America.<sup>55</sup>

### 2. Denver Food Rescue

Denver Food Rescue (DFR) is a non-profit organization that increases access to food in low-income areas.<sup>56</sup> DFR primarily re-routes food from grocery stores that would otherwise be discarded. DFR completes 75 percent of their deliveries with bicycles which allows them to focus on direct, and quick, redistribution. As a result, highly perishable fruits and vegetables are delivered in an expedited manner (typically within 24-48 hours). DFR has created Free Grocery Programs for Globeville, Elyria-Swansea, and Park Hill. These Free Grocery Programs serve about 50 families a week, providing each home with approximately a week's worth of food, mainly fresh produce.



As a result of the success DFR has had with the Free Grocery Programs, they have a "Food Rescue Ride" scheduled for August 29, 2015. This bicycle fundraising ride offers 15, 30, and 60-mile rides and funds raised will be used to create six new Free Grocery Programs with local communities in the Denver Metropolitan area. Each program will cost DFR approximately \$6,000 to fund new bicycle trailers, recruit delivery staff, and overall program organization.

<sup>54</sup> Ample Harvest.org, Inc.: <http://www.ampleharvest.org/index.php>

<sup>55</sup> Office of Faith-based and Neighborhood Partnerships: <https://www.whitehouse.gov/blog/2011/08/12/let-s-move-faith-and-communities-inspires-fresh-produce-100-food-pantries>

<sup>56</sup> Denver Food Rescue: <http://www.denverfoodrescue.org/>



### 3. Illinois Food Scrap Coalition

A group of over 150 members, including business, municipalities, county governments, universities, and non-profit organizations have joined the Illinois Food Scrap Coalition (IFSC) and want to promote food scrap composting in Illinois.



The mission statement of the Illinois Food Scrap Coalition is:<sup>57</sup>

*The Illinois Food Scrap Coalition (IFSC) is a group of solid waste agencies, counties, and community and government organizations dedicated to advancing food scrap composting in Illinois through program implementation, policy, and advocacy.*

The IFSC is dedicated to not only food scrap composting, but the implementation of new food scrap programs, policy development, education, outreach, and research to support food scrap composting. The IFSC houses a wealth of information for IFSC members and compost researchers alike.

A notable feature is the IFSC map of compost locations in Northeast Illinois, created by the IFSC GIS mapping subcommittee. This [IFSC interactive map](#) encompasses food scrap efforts in the seven-county Greater Chicago area.<sup>58</sup>

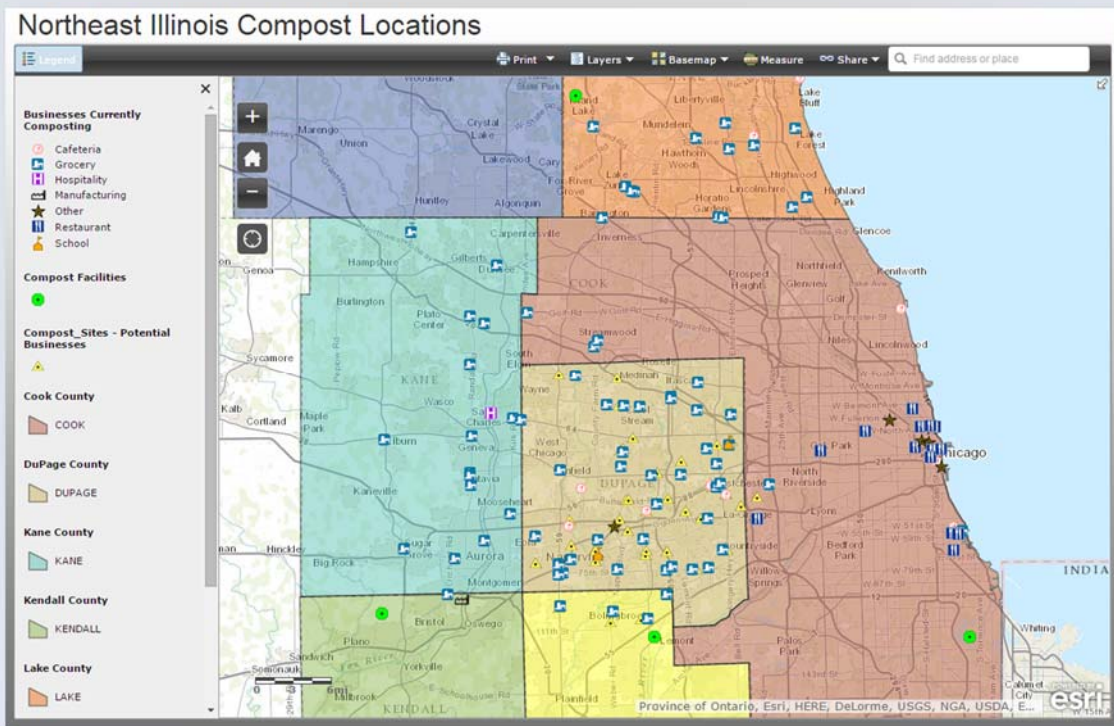


Figure 3-9. IFSC Northeast Illinois Compost Locations

<sup>57</sup> Illinois Food Scrap Coalition: <http://illinoiscomposts.org/ifsc-members/about-ifsc>

<sup>58</sup> Illinois Food Scrap Coalition – GIS Mapping:

<http://dupage.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=3a5936a077514821977c04bd689ec3c2>

As a further example of IFSC’s resources, they have a broad spectrum of business and restaurant education materials that can be used when starting a new program. Highlights of these materials are:

- **Spotlights:** Videos from restaurants that have developed food scrap diversion programs describe “what works” and “what will not work” regarding food scrap diversion.
- **EATS: A How To Guide:** This is IFSC’s brochure on how to implement a successful compost program.
- **FAQs:** Basic questions are addressed here.

The collage features several IFSC resources:

- Website Header:** Shows the IFSC logo and navigation links: Home, Forums, IFSC Members, Our Work.
- Business Composting Resources:** A page with the heading "Business Composting Resources" and text explaining the importance of efficiency in food service. It lists steps from the EPA:
  - Source Reduction/Prevention:** Preventing food waste before it is created.
  - Feeding People:** Donating fresh, wholesome food to those in need.
  - Feeding Animals:** Feeding safe, fresh food scraps to animals like pig farms.
  - Industrial Uses:** Rendering fats, oils, and grease and turning it into products or biofuel.
  - Composting:** Turning food waste into a valuable soil amendment.
  - Anaerobic Digestion:** Turning food waste into renewable energy and a valuable soil amendment.
- EATS: Compost Checklist Guide:** A brochure titled "EATS: Compost Checklist Guide Start a Successful Compost\* Program: For Quick Service, Fast Casual and Full Service Restaurants". It includes a checklist:
  - Engage Owners, Managers, and Staff:**
    - Get buy-in from **owners**.
    - Get buy-in from **managers**.
    - Get input from **staff**, especially those who are currently handling waste and recycling.
    - Find out who is **passionate** about composting and wants to **take the lead**.
  - Ask Questions (Do Research):**
    - Call your garbage and recycling service company. Ask the following questions:
      - What size **containers/bins** do you offer for indoor/outdoor food scrap collection?
      - How frequently** will the containers be picked up?
      - Will all containers (Landfill, Recycling, Compost) fit in the **current dumpster area**?
      - What is the **cost of the service**? Will this cost be offset by an equivalent decrease in garbage pickup frequency/cost?
      - When will a representative be available for a **walk-through** so I can assess how to set up a compost program for my business?
        - Additional Questions (if time allows):**
          - What types of **food items** are acceptable? Cooked food? Meat? Bones and shells?
          - What types of **non-food items** are acceptable? Napkins? Paper service ware? BPI certified compostable products?
          - What **compost related services** do you offer (indoor bins, signage, staff training, waste audits)?
          - Is using a specific type of **bin liner** (compostable bags) required?
          - Are there **other customers in the area** with a compost program?
  - Look up **We Compost** partners ([illinoiscomposts.org/we-compost/restaurants](http://illinoiscomposts.org/we-compost/restaurants)) and see who else is they are doing.

- Compost & Recycling Training for Restaurants:** A brochure with the IFSC logo and the title "Compost & Recycling Training for Restaurants". It includes the Spanish title "Basura y Reciclaje en los Restaurantes Instrucciones" and the website "Questions? Preguntas? [illinoiscomposts.org](http://illinoiscomposts.org)".

#### 4. Onondaga County Resource Recovery Agency, New York

The Onondaga County Resource Recovery Agency (OCRRA) is a non-profit waste management organization that manages the waste for the majority of the municipalities in Onondaga County, New York. OCRRA



operates two composting facilities, two transfer stations, and one waste-to-energy facility. OCRRA opened the Amboy facility in 1994 to compost yard trimmings and was later able to initiate a food scrap program in 2008 with the help of O2 Compost.<sup>59</sup> O2 Compost is a firm with over 50 years of compost consulting experience in the fields of environmental and civil engineering. O2 Compost has completed numerous composting projects ranging from assistance with implementing pilot programs to full-scale facility designs.<sup>60</sup>

In 2013, OCRRA completed a \$2.4 million retrofit to the Amboy facility, funded by OCRRA's operational and capital funds. This retrofit included enhanced odor controls, better leachate collection, and an 80-foot by 100-foot covered receiving area.

The Amboy facility participates in the US Composting Council's Seal of Testing Assurance (STA) program and produces over 35,000 CY of compost each year. This compost is sold in over 20 home improvement stores.

Forty-four businesses and institutions in the County utilize the program, and the facility receives approximately 6,000 commercial deliveries each year. The Amboy facility is permitted to accommodate 9,600 tons of food scraps and 48,000 CY/year of yard trimmings.

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<sup>59</sup> Onondaga County Resource Recovery Agency – Food Waste Composting: <https://ocrra.org/about-ocrra/services/food-waste-composting>

<sup>60</sup> O2Compost: - Compost Systems & Training: <http://www.o2compost.com/default.aspx>

## Interviews

The NewGen project team conducted a series of interviews with private processors, generators, and collectors of food waste, in addition to representatives from local governments and trade associations. Each conversation is summarized below, and a detailed contact sheet is presented in Appendix B.

Table 3-7  
NewGen Interview List

Generators	Collectors	Processors	Other
1. Ruggles Green	1. Liquid Environmental Solutions	1. Nature's Way	1. Pat Greer, Eco-Ology
2. Radical Eats	2. Nexus Disposal	2. New Earth	2. SMART Recycling of South Carolina, LLC
3. El Tiempo Cantina	3. Waste Management	3. Living Earth	3. Texas Restaurant Association
4. Hilton Americas-Houston	4. Tap, Inc.	4. Waste Management	4. Greater Houston Restaurant Association
5. Houston Food Bank	5. Little Joy Recycling		5. Feeding America
6. Sysco	6. City of Plano		
7. Whole Foods Market	7. City of Tucson		
8. University of Houston			

## Generators

### 1. Ruggles Green

Ruggles Green was formed in 2008 and is regarded as Houston's first certified green restaurant. Their five restaurants adhere to the strict guidelines of the Green Restaurant Association, and they are considered to be the first restaurant in Texas to be awarded a four star certification. In order to achieve a certification, a restaurant must show compliance in the core areas listed in the box below.



#### Green Restaurant Association Areas of Compliance

- Water Efficiency
- Waste Reduction and Recycling
- Sustainable Furnishings
- Sustainable Food
- Viable Energy Practices
- Chemical and Pollution Reduction

Ruggles Green incorporates environmentally sound principles into their daily operations. This includes both the quality of food that is served to customers, as well as the environmental programs that have been implemented. For instance, Ruggles Green is in the process of upgrading their two kilowatt solar array to five kilowatts, and have furthermore become the first restaurant in Houston to achieve 100 percent LED inside and outside. Additionally, Ruggles Green recycles all of their glass, paper, cardboard, plastic, and metal materials; the fry oil is also recycled and converted into biofuel.

Ruggles Green currently separates pre-consumer food waste, which is collected in 6 – 10 gallon containers that are sealed and stacked. The restaurant networks with local farmers who pick up this food waste for composting once a week. The process is such that the farmers will pick up the containers, transfer them to their compost facility, and return the empty containers back to the restaurant. Ruggles Green initially attempted to dispose of their food waste in 30-gallon containers; however, this proved to be too heavy for the farmers who were lifting the receptacles. Post-consumer food waste is currently landfilled because of the difficulty in handling the material and the educational barriers, liabilities, and higher contamination rates associated with composting post-consumer food waste. Additionally, the local farmers that the restaurant is currently partnering with prefer the pre-consumer food waste since it is typically less contaminated by inorganic materials.

**2. Radical Eats**

Radical Eats is located in the Montrose corridor of Houston and focuses on locally sourced cuisine.<sup>61</sup> This eatery currently uses private solid waste and recycling services. The restaurant does not currently generate much pre-consumer food waste, but would be interested in participating in a food waste program if one were made available. The owner is also familiar with other restaurants and associations in the area who may be interested in participating in a food waste program.



**3. El Tiempo Cantina**

El Tiempo Cantina currently operates seven locations in the Greater Houston area. The restaurant chain has been in operation for the past 55 years, and they have dedicated themselves to preparing authentic Tex Mex cuisine. They estimate that each location generates approximately 16 cubic yards of non-grease waste per week. The vast majority of the waste is attributed to cardboard and paper; El Tiempo’s waste stream is identified in Figure 3-10. Some of this material is recycled.



Currently, some grease is recycled by Metro Grease. South Waste pumps their grease traps.

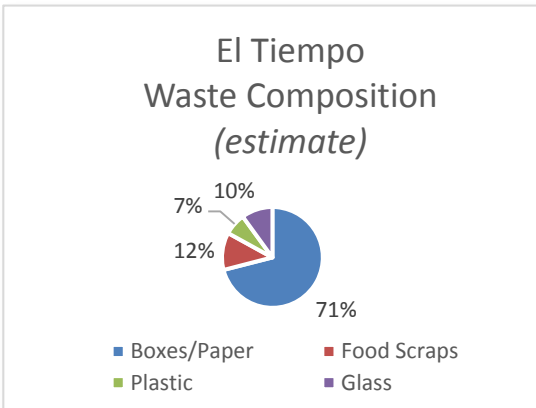


Figure 3-10. El Tiempo Waste Composition

**Although the restaurant chain does not currently participate in any food waste programs, they would consider participating in such a program if it were an economic and financial benefit.** At this time, the biggest barriers to implementation include a lack of internal resources to manage a successful program, and the uncertainty associated with solid waste fees and expenses.

Approximately 833 gallons of grease is disposed of per month for all locations.

<sup>61</sup> During the conduct of this study, Radical Eats closed their establishment. Their last day in operation was May 24, 2015.

#### 4. Hilton Americas-Houston

Directly connected to the George R. Brown Convention Center, Hilton Americas-Houston contains the city's largest number of guestrooms, ballrooms, and hotel meeting spaces. The Hotel boasts 1,200 guestrooms, 91,500 square feet of meeting space, two restaurants, lobby bar, coffee emporium, full service spa, and health club.



Hilton Americas-Houston is the first hotel in Texas to have achieved Green Seal<sup>62</sup> certification (Silver Level). In order to achieve this Green Seal status, the hotel must demonstrate sustainable practices in seven core areas, as described in the adjacent box.

Certification requires an initial evaluation as well as annual monitoring (conducted by Green Seal) to ensure compliance.

The hotel introduced their food composting operations in April 2008 and has continued

to operate and enhance their program since its inception. Most recently, Hilton Americas-Houston started a 60-day beta test of a new food waste processing machine<sup>63</sup>. This machine extracts all of the liquid water from the food waste during processing. The remaining food waste is deposited into the hotel's 15 cubic yard dumpster and is then hauled to Nature's Way Resources, in Conroe, while the "water composition" is directly discharged into the City of Houston's wastewater collection system. By utilizing this new extraction machine, the Houston hotel should save money due to fewer compactor pick-ups. Historically, the hotel needed up to two compactor pick-ups each month, at \$250-\$300 per pull.



At the conclusion of the 60-day beta test, Hilton Americas-Houston will have the opportunity to examine the results of the test, as well as the performance of the machine. The hotel will then make a decision as to whether it should procure the technology as part of the hotel's sustainability practices.

<sup>62</sup> Green Seal is an independent non-profit organization dedicated to safeguarding the environment by transforming the marketplace and promoting the manufacture, purchase, and use of environmentally responsible products and services.

<sup>63</sup> This beta test is in coordination with Waste Management, Inc., and the City of Houston Water Department. It commenced operation on May 16, 2015.

## 5. Houston Food Bank

The Houston Food Bank is the nation's largest food bank and is also a member of Feeding America. The organization warehouses food with the assistance of volunteers to sort, pack, and redistribute edible food to people in the community.

Approximately 73 million pounds of food are received on an annual basis, and the composition of food donation sources is identified in the pie chart.

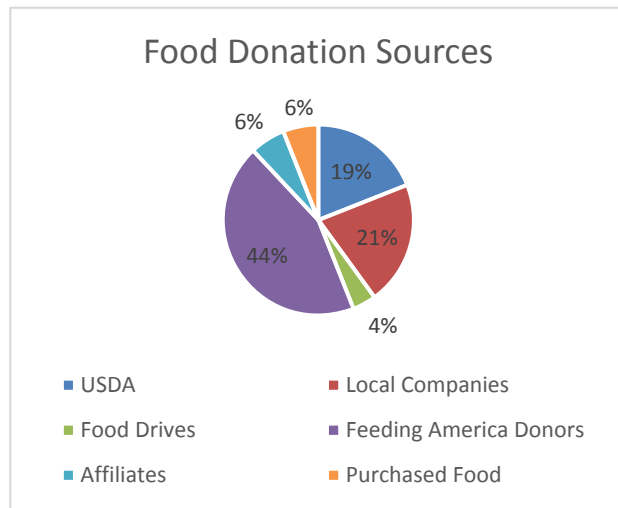


Figure 3-11. Food Donation Sources

Upwards to 87 percent of the food is distributed to food pantries, and the remaining is given to “Backpack Buddy and Kids Café,” soup kitchens, and meal sites. This totals approximately 50 million meals, annually. Donors are comprised primarily of grocery stores and other retailers, distributors, and other food industry sources. The largest manufacturing donor in the Greater Houston area is Frito-Lay, though most food manufacturing companies who donate to the food bank do so from out of state.

In addition to recycling cardboard, plastics, and wood pallets, a composting compactor is available on site for vegetative food waste. The food waste compactor is picked up by Global Waste, who then disposes of the material at a local compost facility. Furthermore, approximately one million pounds of meat that cannot be used for human consumption is delivered to the Rescue Bank annually, where it becomes available for animal shelters. This material is not spoiled, but for one reason or another, has become an open product that does not meet the compliance for human consumption.

Canned items or damaged product that cannot be distributed for human consumption are landfilled. The Houston Food Bank, in total, has approximately 20 pickups per month for their trash compactor, and it is estimated that approximately five percent of this waste composition is related to food waste. Although they do not currently have the staffing capabilities to manually extract food from canned goods that is no longer edible, the facility does see a benefit in composting the contents of the container, and recycling the physical cans if a processor could potentially provide this service.

## 6. Sysco

Sysco maintains a national hunger relief program aimed at eliminating childhood hunger and encouraging good nutrition in lower-income families. Since 2002, they have made significant financial donations, and have also contributed products to “No Kid Hungry” events in the community.



***Sysco adheres to a standard operating procedure which dictates which foods can be donated, and under what scenarios. In FY 2013, Sysco also made cash and in-kind donations to hunger relief organizations, including Feeding America. Sysco contributes approximately two semi-trailers per week to the Houston Food Bank.***

At Sysco’s California plant, the organization initially utilized a composting service for inedible waste, specifically liquid eggs, that were unable to be consumed by humans. This was discontinued due to leakage and odor issues, which could have quickly turned into a health code violation. The former hauler charged Sysco on a per-pick up basis for their 4 cubic yard sealed dumpster.

Sysco does not generate much pre-consumer waste in the Houston area, as there are not any formal Sysco affiliated food processing facilities in Texas.

***A large portion of food waste that cannot be donated to member food banks is in packaged containers that would typically be sold to consumers. This reflects Sysco’s largest challenge regarding food waste diversion; food waste that is in containers cannot be easily extracted and composted. Similar to the Houston Food Bank, the company does not have a dedicated staff member(s) to unpack food from these containers, so this material is landfilled.***

## 7. Whole Foods Market

Whole Foods Market honors environmental stewardship and has been reducing their impact on the earth’s resources via composting and other measures, including the reuse of materials, and recycling. They have recently pioneered a composting program where spoiled produce and other compostable waste that formerly went to landfills is now backhauled by their delivery trucks to regional facilities where it is turned into compost. This, in turn, is donated to community gardens, or sold in stores, which has reduced landfill waste by up to 75 percent.



Whole Foods Market is sub-divided into 12 regions across the United States. These regions strive to reduce waste based on each regions’ unique diversion characteristics. Whole Foods has 13 stores in the Greater Houston area, and including new stores, there will be a total of 47 in the entire Southwest region. One of the Houston area stores currently maintains a composting grinder on site, which turns the solidified food waste into a liquid waste. Several other stores are shipping out their food waste to the main distribution center in Austin to be composted as another means of food waste diversion.

***All edible food is donated to area donation centers, and food that is not edible for human consumption is donated to farmers. Composting food waste is the final option in Whole Foods’ food waste diversion hierarchy.***



## 8. University of Houston

The University of Houston's Office of Sustainability facilitates campus-wide sustainability efforts, collects sustainability data, manages the campus community garden, and educates the campus community about sustainability. The office works to improve sustainability annually through indicators set forth by the Association for Advancement of Sustainability in Higher Education, including waste diversion and minimization. In the spring semester, the University hosts an annual RecycleMania competition, in which participating college and university recycling programs educate their campuses about waste minimization and diversion and compete against each other by reporting their waste and recycling data.



The University currently utilizes single-stream recycling on campus and also composts in the garden. The composting program is limited to food waste coming from the office of sustainability staff, produce for a nutrition workshop class and items from the garden. The garden staff are looking to receive feedstock from other sources. University staff are also exploring the possibility of composting in the dining halls. However, they do face challenges in obtaining funding and staff support for waste minimization projects.

## Collectors

### 1. Liquid Environmental Solutions (LES)

Liquid Environmental Solutions recycles the following forms of liquid and environmental waste: grease traps, cooking oil, food waste, grit traps, wastewaters, and “liquefied” food waste. In total, there are 29 branch collection and service locations throughout the United States, with one located in the Greater Houston area. LES services a variety of customers in the Houston area, which include but are not limited to, large food manufacturers, grocery stores, and college institutions; restaurants have not historically been as involved in this model of collection due to the cost structure. Most customers have approached LES to promote sustainability missions and reduce disposal costs.



In order to break down food waste, a food liquefying system is installed onsite for LES customers. This system is able to transform bulk food into a liquefied food waste, which is then converted into energy or used for composting. All types of food can be disposed of in this system, including vegetables, dairy, and meat. This machine reduces ten pounds of food into a one gallon container, which can significantly reduce transportation and disposal costs; it is also effective at diverting food waste from landfills. The machine weighs approximately 1,000 pounds and is able to process one ton per hour. Typically, the tank is emptied once per week via 18-wheeler tanker trucks. They currently dispose of some food waste at composting sites within the H-GAC planning region, and the material is highly desired by composting sites authorized to accept it because the watery mixture accelerates the composting process.

LES is currently evaluating what their future business plans will be with regard to the collection of food waste in a liquefied format.

### 2. Nexus Disposal

Nexus Disposal is a mid-sized collection company located in the City of Houston. They operate front load collection trucks as well as roll-off container trucks. They provide some limited food waste collection to certain customers; however, one of their challenges is the lack of route density which makes it inefficient and therefore more costly. Due to the lack of route density, they use a flat-bed truck with a lift on the back to pick up the containers with food waste, that are then taken to a composting facility in the Houston area. Due to the lack of efficiency, they charge a premium for food waste collection service over traditional solid waste collection service. Nexus Disposal expressed interested in participating in collecting more food waste accounts if the “route density issue” could be solved.

### 3. Waste Management (WM)

At a national level, Waste Management, currently offers food waste collection services and accepts many biodegradable foodstuffs, including vegetables, fruits, eggshells, and other items that vary by community. WM only provides food waste collection services to a limited base of customers in the H-GAC region as it is a more costly service than traditional solid waste collection service. The cost of collection, including long-hauling food waste to WM’s



composting site in Alvin, TX and routine dumpster cleaning, typically exceeds the cost for traditional solid waste collection by WM.

Some grocery stores and large pre-consumer producers are utilizing the food waste collection service from WM. Historically, WM has also taken food waste from large hotels. However, hotels are challenging for two reasons - the large volume of food waste that is generated on a weekly basis, and the contamination issues that are present in post-consumer waste. In one example, WM collected food waste from a hotel three times per week. After each pull, WM would have to clean the dumpsters to prevent vectors. Ultimately, this process became cost prohibitive for that particular hotel.

#### 4. Tap, Inc. (Formerly Big K Environmental)

Tap, Inc. has been in the solid waste industry for 25 years and primarily hauls liquid waste to wastewater treatment plants. They do not specifically collect food waste. Most of the trucks they utilize are tanker trucks. If they are able to collect food waste cost effectively, they would be open to partnering in the collection of commercial food waste in the H-GAC planning region.



#### 5. Little Joy Recycling

Little Joy Recycling currently operates a small scale recycling collection operation. They have developed a niche service where they design and provide companies a recycling service that fits their specific needs. Many companies are interested in recycling, but are unable to for a variety of reasons. Little Joy provides a service that is designed to meet each customer's unique recycling needs. Little Joy currently collects mixed glass, mixed paper, all plastics, cardboard, metal, aluminum, and all electronics.



Little Joy commented that there has been interest in food waste collection from their customers; however, it has not been offered as a service yet because clients have not been able to produce a consistent amount of waste to make the program cost effective. In the event that the program could prove cost effective, the company is expanding into the commercial food waste collection business.

## 6. City of Plano

The City of Plano (Plano) provides businesses in Plano the opportunity to divert their excess food scraps from their waste stream.



Plano's program started in 2000 via a grant from the North Central Texas Council of Governments. Plano successfully retrofitted a side load collection truck by enhancing the seal and making adjustments to the paddle arm. Plano's collection truck can routinely handle a collection container weight of 250 pounds per stop without incident.

### Plano's organics program includes:

- Complete training of staff (custodial and internal)
- Collection carts (96-gallon), posters, and labels
- Collection and transportation of the material
- On-site assessment and waste audit
- Ongoing assistance as needed

In 2006, Plano's program peaked with 120 stops. However, with this growth came an unwanted side effect-- contamination. Through trial and error, Plano removed all schools and 25 businesses from the program in 2009. As a testament to the amount of contamination that was being produced, the overall program realized only a 10 percent decrease in food waste collected after the decrease in specific customers.



After the food scrap material is collected by Plano, it is hauled to the City's compost site located at the North Texas Municipal Water District's (NTMWD) landfill. The processing facility produces a variety of materials including mulch, compost, and topdressing. These materials are marketed under the name of Texas Pure.

A key factor to the success of Plano's program has been to establish training programs and to ensure that food scrap champions are located on-site for the businesses participating in the program. Taking every precaution to minimize contamination is crucial.

The price range for Plano's commercial organics program is \$15 – \$75 per month depending on the number of carts and the frequency of pick-ups. The pricing options are discussed with the generator during the on-site assessment and waste audit provided by the City of Plano.

## 7. City of Tucson

The City of Tucson's (Tucson) food waste diversion program began with a student composting organization, Compost Cats, at the University of Arizona. The organization partnered with the City zoo, and began using animal waste to compost along with food scraps generated on campus. The project arose out of concern regarding the amount of food going into local landfills in a state with little rainfall and a need for better soil fertility. The program then expanded beyond campus to begin serving businesses in Tucson, as the City of Tucson agreed to partially fund the program because it views composting as a strategy for extending the life of its landfill.



For the original pilot program, the City's Environmental Services Department (ESD) collected food waste from 16 Compost Cats' customers in the Tucson city limits and collections were limited to two days per week. The program has since grown to include 35 customers, and as demand grew, additional collection days were added. The monthly fee for this service is \$40 per

month for twice a week collection, although fees are subject to change depending on the frequency of pick up. Recently, the City of Tucson has announced that they will expand regular service to include even more grocery stores, restaurants, food service businesses, and other commercial customers in Tucson.

The City of Tucson noted the following challenges and highlights associated with their program:

- Food waste is heavier than regular solid waste due to the increased water content. ***The 96-gallon carts filled with food waste proved to be much too heavy for their side-load trucks.*** The weight of the containers also eroded the seals on the wheels, and the customers quickly had issues with leakage. Additionally, the side-load truck did not have clearance in the narrow alleys on campus.
- ***Because food waste is acidic, the City also implemented the use of plastic dumpsters that were 3 cubic yards in size for some customers.*** As a result, they are now using both front and side-load vehicles for collection.
- ***It is critical to have an educational component as part of the program.*** Education must thoroughly explain where contamination occurs, steps the customer can take to mitigate the risk of contamination, and how contamination affects the composting product.
- ESD has had issues with outside contamination with some of their customers, especially those without a locked container. There have also been a few incidents where food waste was stolen.
- ***ESD is taking vegetative food waste, in addition to eggshells. Meat and dairy are currently prohibited.***

## Processors

### 1. Nature's Way

Nature's Way Resources operates a 42-acre composting facility on the east side of I-45 at FM 1488 in Conroe, Texas. The active composting process is located on approximately 26 acres of that site



including about 15 acres dedicated to intensive compost production. Nature's Way employs static-pile processing exclusively, requiring about six to seven months for active composting and another five to six months for curing and post-processing. The facility is authorized to operate under a Notification-tier, with special authorization to accept food residuals including meat and animal products. They accept dairy tank wash-down and beverages among other feedstocks. Their facility has space available for potential expansion.



Nature's Way accepts some material from "Produce Row."<sup>64</sup> In the past, the company processed post-consumer food residuals with compostable serveware from a federal detention center in Houston as a pilot. Walmart hauled food residuals to the facility until recently. Nature's Way provides specifications to generators of food residuals with whom they do business, but they do not conduct training.

**Management stated that many restaurants and other generators have contacted Nature's Way asking whether they will take their food residuals. However, the greatest impediment to their ability to accept this material is a lack of haulers who are able to collect from restaurants because of a lack of route density.** They noted Ikea as one generator who has contacted Nature's Way, but lacks a hauler. Management noted that an important operational factor is the need for water in their compost process. During the 2011 drought, Nature's Way had to pump over four million gallons of water from their private water well.

**Nature's Way management mentioned the Exxon campus in The Woodlands, four miles from their site, as a potential source of food residuals with high enough density possibly to make collection and hauling feasible.** This campus is on 385 acres of land and will have some 10,000 employees on site per day.<sup>65</sup>

<sup>64</sup> Produce Row is located just south of the Brays Bayou and west of the Gulf Freeway, and is a central distribution area where produce is brought in by rail and truck and then distributed to restaurants, grocery stores, and other customers.

<sup>65</sup> (Houston Business Journal and Houston Chronicle)

## 2. New Earth

New Earth currently operates two Registration-tier sites including one near Conroe approximately five miles east of IH-45 on TX-105. The company is currently developing a site in Waller County that will have both a Notification-tier operation and a Registration-tier operation, side by side. The new property is approximately five miles north of I-10 on FM 2855. Both the existing facility near Conroe and the new facility near Katy (will) have the capability to accept food waste.



The Conroe facility is on 40 acres of land surrounded by commercial, light industrial and residential land use. The operation is a combination of static pile and turned windrow processing, followed by curing. The entire process requires approximately three months for material processed in windrows, and three to four months for material actively managed in turned static piles. New Earth products meet Seal of Testing Approval (STA) standards and are approved for unrestricted use. The company markets over 85 different products including compost, mulch and various blends. The Conroe facility includes an extensive odor neutralization system in addition to processes designed to minimize odors by management of



feedstock delivery and blending, positive drainage, aerated treatment lagoons, and maintenance of proper operational parameters such as oxygen availability, C/N ratio, porosity. All products meet disinfection standards as defined in the Clean Water Act Appendix B, commonly referred to as Process to Further Reduce Pathogens (PFRP). The management actively involves the neighbors in odor monitoring and reporting.

The Conroe facility accepts vegetative material, biosolids, and food residuals. It currently processes food residuals from large food manufacturers at the rate of two to three roll-off containers per week, as well as feedstocks from the Houston Food Bank which is delivered in emulsified form. In the past, the facility accepted four end-dump loads of emulsified food residuals per day from a large retailer. Management states that they can accept an additional 400 tons weekly of food residuals at Conroe without jeopardizing operational parameters or product standards.

The Katy facilities, referred to as Grand Parkway, will process food residuals along with biosolids and various vegetative feedstocks. That operation will employ the same processing techniques and odor control practices as the existing Conroe facility. The Grand Parkway operation will be located on a 111-acre site surrounded by agricultural land, with one very small residential area adjacent to an unutilized portion of the property. Management states that they will be capable of accepting up to 800 tons per week of food residuals at Grand Parkway.

New Earth has expressed an interest in the past in accepting feedstocks from specific Pre- and Post- Consumer generators in Houston; however, at that time the generators were not willing to pay for transportation or disposal and were not willing to monitor or control contamination. The company is willing to accept more food waste and considers Pre-consumer generators to be their greatest opportunity for growth if these obstacles can be overcome. New Earth works extensively with independent waste haulers who do not own landfills that would consider landfill diversion a feasible option. In their experience those haulers which own a landfill are not incentivized to divert as this would remove revenue from the landfill. New Earth would consider purchasing special containers under certain circumstances; however, they are not willing to purchase trucks or provide food residual collection services at this time.

### 3. Living Earth

Living Earth (LETCO) operates 11 mulch and compost sites in the Houston area, ranging in location from The Woodlands, TX in the north to Iowa Colony, TX in the south, and from Katy West, TX in the west to a Living Earth site located at the Republic McCarty Road landfill in the east. All are currently Exempt-tier facilities and process vegetative feedstocks using static pile techniques. No food residuals containing meat, dairy or animal fats are currently authorized at these facilities. Active composting typically requires about three to four months plus additional time for curing and post-processing.



Cutten Road is currently the largest Living Earth facility and currently processes pre-consumer vegetative food residuals. Cutten Road and Iowa Colony are the most conducive to expansion. The Beltway 8 facility, on approximately ten acres of land, currently processes approximately three loads per day of food residuals, mostly from Produce Row. The Beltway 8 facility will begin accepting food residuals collected by the City of Houston soon, which will bring that facility to its operational capacity for such materials. The Crawford Road facility has accepted tea residuals and is currently processing brewery waste, the only feedstock that Living Earth collects directly. Living Earth collected and processed food residuals from Whole Foods but does not currently do so. The LETCO operation located at the McCarty Road Landfill accepts

food residuals from large institutions. The company is seeking authorization from TCEQ to accept meat at this facility as a pilot program. There is space available at this facility to expand operations pending approval by the landfill owner, Republic Waste.



The company does not currently accept liquid wastes or post-consumer foods due to odors associated with managing these types of feedstocks at the Company's infield locations close to businesses and neighborhoods. They receive vegetative food residuals on a contract basis based on individually negotiated tip fees.

Living Earth management will consider upgrading selected facilities to Notification tier, on a case-by-case basis. They will also consider providing collection services for highly beneficial feedstocks.

#### **4. Waste Management (WM)**

Waste Management opened a composting facility in Alvin, TX, in 2010, which sits adjacent to their Coastal Plains Landfill. This site primarily receives green waste for mulching, but they are also permitted to take in fish, dairy, meat, and vegetative waste. WM would gladly accept more food waste at their composting site, but due to location and travel distance they have not seen a huge demand by customers to utilize the site for that purpose.



## Other Entities

### 1. Pat Greer, Eco-Ology

Ms. Pat Greer hosts a radio program with Dr. HC Clark that airs every Tuesday in the afternoon on KPFT and is dedicated to individuals involved in environmental action, ecology in the community, social justice, and health related topics. Ms. Greer also has a firm handle on the composting efforts currently taking place in the community.



Ms. Greer and the NewGen project team discussed partnering together to perform media outreach related to the commercial food waste collection. This will take place in September and include a series of interviews regarding various topics.

Ms. Greer also operates a kitchen that features locally sourced foods that is prepared and sold at a farmers market, storefront retail, and wholesale to other restaurants. Her kitchen and staff currently compost onsite.

### 2. Gary Bilbro, SMART Recycling of South Carolina, LLC

SMART Recycling is an organic waste hauling company that specializes in food waste diversion. Their goal is to divert as much organic waste as possible from the waste stream that is currently being landfilled. They presently work with local restaurants, grocery stores, schools, or any commercial producers with waste in excess of 200 pounds per week. The company provides a comprehensive training program, and they have found that their average contamination rates are 0.4 percent, which is attributed to small plastics. Many competitors fall somewhere in the five to ten percent range.



According to Mr. Bilbro, contamination is simple to curtail. It is critical to train those directly involved in separating waste, which includes the backhouse and wait staff. The vast majority of restaurants enrolled in the SMART program have been able to reduce their overall waste stream by over 50 percent. The operation currently uses roll-off and side-load trucks; for customers not utilizing roll-off dumpsters, 64-gallon carts are used. SMART operates primarily in South Carolina but has ambitious growth plans, including expanding into Texas.

### ***How Much Food Waste Can You Collect?***

As mentioned in this report, route density is a key factor to maintaining an affordable and efficient food waste collection operation. Another critical factor is determining how much food waste one can collect. A key variable that makes food waste collection more difficult is the weight of the food waste. Since many foods constitute 60 to 80 percent water by weight they are very heavy to collect. Many businesses will use 32-gallon and 64-gallon solid waste carts because the weight of a 96-gallon cart filled with food waste is too heavy for the arm of a side-loader truck to pick up. It is not uncommon for 96-gallon carts to weigh 200 pounds or more, when filled with food waste. Due to the unique handling requirements to collect food waste, the carts are not as efficient as a typical automated residential solid waste collection route. If a food waste collection route can collect 20 to 30 carts per hour; 200 to 300 in a ten-hour day, that would be considered by many to be an efficient route.

### **3. Texas Restaurant Association (TRA)**

The Texas Restaurant Association was initially formed to assist in addressing health code issues and maintaining sanitary environments at restaurants. The restaurant industry is currently the second-largest employer in the state. According to the Texas Restaurant Association CEO, three of the trends in the restaurant industry are: 1) a focus on sustainability, 2) buying local, and 3) reducing food packaging. Restaurants are typically known for operating with narrow profit margins. Therefore any increase in costs for diversion of food waste and/or increases in oversight from a health department standpoint will not be viewed favorably.



As a rule of thumb, labor is typically 25 to 30 percent of all expenses and food costs range between 25 to 40 percent of all costs. There are also occupancy-related costs, like rent, utilities, and advertising. If restaurants can be financially incentivized to divert food waste by reducing traditional waste collection costs, then there will be a push to adopt food waste reduction measures.<sup>66</sup>

### **4. Greater Houston Restaurant Association (GHRA)**

The Greater Houston Restaurant Association (GHRA) is a chapter of the Texas Restaurant Association (TRA). The executive director at GHRA was able to provide the NewGen project team with a list of restaurant contacts in the Houston area, which assisted in the research component of this study. Challenges of a potential commercial food waste program in the Houston area were highlighted during the interview and include the following obstacles:



- the restaurant industry operates on a slim profit margin;
- health code regulations;
- inherent opposition to more paper work; and
- increased oversight.

<sup>66</sup> <http://www.statesman.com/news/business/texas-restaurant-association-ceo-eating-out-has-be/nS9yB/>. November 24, 2014.

## 5. Feeding America

Feeding America is a network of the nation's largest domestic hunger-relief organizations. This nationwide network of food banks provides more than 3.3 billion meals annually to communities in the United States through food pantries and meal programs. The nonprofit network is comprised of 200 food banks and 60,000 food pantries and secures donations from national food and grocery manufacturers, retailers, shippers, packers and growers, in addition to government agencies and other organizations. These donations are then distributed to food pantries and meal programs that serve those at risk of hunger.



***The goal of Feeding America is to keep food fit for human consumption out of the landfill.*** In a recent example, the organization's efforts were able to acquire food that had been recalled due to labeling errors (e.g. there were no health risks posed to the individuals consuming these products). This effort resulted in 82 truckloads of mislabeled product being relabeled, then re-distributed to individuals who were without food. The organization also provides food for animal feed lots if the food is not able to be applied towards human consumption, but is still edible for animals.

The primary drivers behind a successful food bank program lie in the availability of financial and personnel resources. A "food sourcer" is an essential position within each of the 200 food banks because this individual develops and manages relationships with potential donors. This staff member develops food resources for those at risk of hunger (e.g., Whole Foods, HEB, restaurants, etc.). Additionally, education in the community is necessary so that citizens are educated about how the food bank functions, how it impacts the community and how community involvement is critical to the success of the local food bank.

## Section 4 FINDINGS

Based on the research completed by NewGen’s project team, we were able to identify some key trends with regard to successful food waste diversion activities throughout the United States, as well as within Texas and the Houston-Galveston Area Council (H-GAC) planning region. In addition, the project team was able to identify some of the key challenges, as well as opportunities that exist within the H-GAC planning region when it comes to considering how to expand, and build upon those commercial food waste diversion activities which are already occurring within the region.

1. **The environmental, economic, and social benefits that occur in the diversion of food waste from landfills are innumerable.** The food recovery hierarchy illustrated below prioritizes actions organizations can take to prevent and minimize food waste.

*Throughout the course of the project team’s research and interviews, the following hierarchy was constantly found to be used as a planning tool by local governments, businesses and non-profit entities in making sure that excess food was used in the most beneficial manner.*

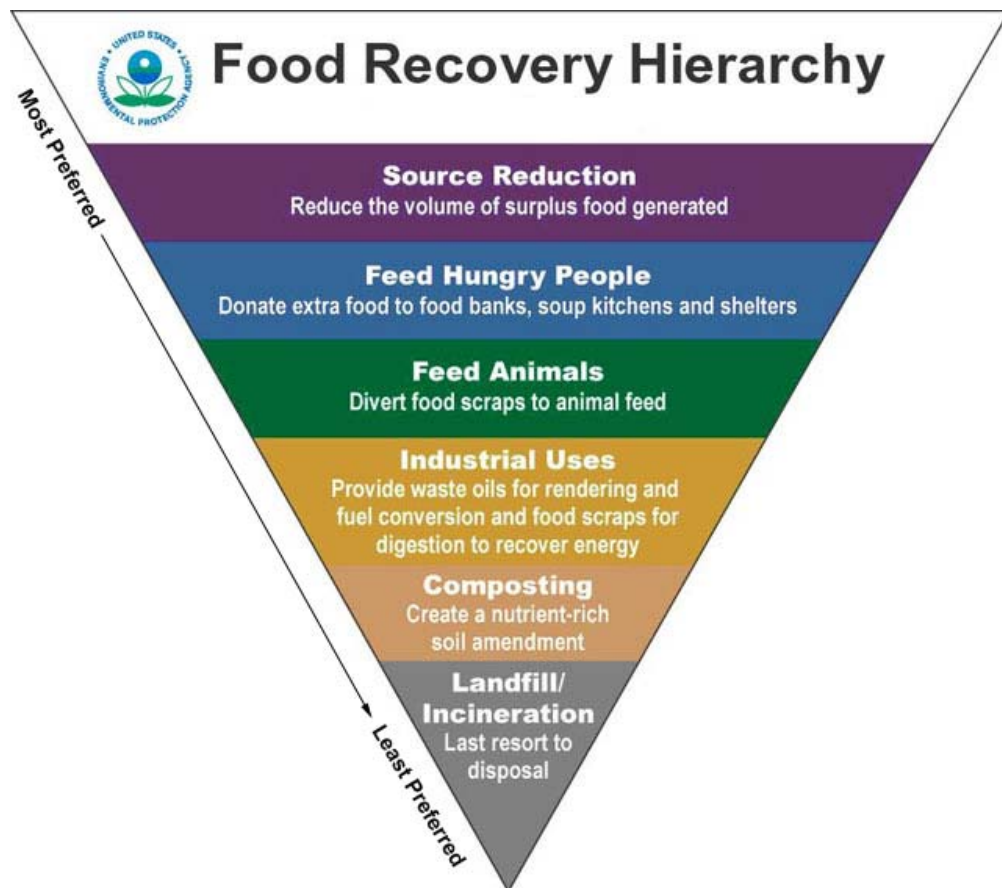


Figure 4-1. EPA Food Recovery Hierarchy  
(source: EPA - <http://www.epa.gov/foodrecovery/>)

- ***Procuring food for food banks, food pantries, food rescue programs, and other organizations is the foremost priority in food waste diversion.*** According to the U.S. Department of Agriculture, nearly 14 percent of American households do not obtain enough food to live sustainable lifestyles. By redirecting unspoiled food from the landfill to citizens in need, an organization is able to support its local community, reduce its environmental impact, and save money.
  - *Non-perishable and unspoiled perishable food can generally be donated to local food banks, soup kitchens, pantries, and shelters.* Typically, food bank donors include large manufacturers, supermarkets, wholesalers, farmers, food brokers, and organized food drives.
  - *There are several resources available to assist in locating a local food bank or food rescue program in the H-GAC area.* Feeding America, for example, is a national network of food banks that is the largest charitable hunger relief organization in America. Feeding America works with nearly 200 network affiliated food banks and approximately 50,000 charitable agencies.<sup>67</sup>
- ***Providing food waste for animal feed lots is considered to be the second highest priority in the food recovery hierarchy.*** Although regulations can vary among states regarding the types of food discards that can be used to feed animals, diverting food to feed animals has a positive economic effect. If the excess food provided excludes animal products, federal laws or regulations do not apply, although there may be state laws that regulate such materials. In the event that the surplus food contains meat or animal byproducts, converting food into feed for hogs is regulated by the Federal Swine Health Protection Act (PL 96 468), which requires that all such food must be boiled before being fed to hogs and that facilities must be registered with either the USDA or the chief agricultural or animal health official in the state in which the facility is located.
- ***Liquid fats and solid meat products are materials that should be diverted from landfills and the sanitary sewer system.*** The application of fat, oil, and grease can be converted into fuel, specifically biodiesel, or used in cosmetics, soap, and other products.
- ***Composting, the process of turning food waste into a nutrient-rich soil amendment, has been identified as the next priority in the food recovery hierarchy.*** For commercial food generators, composting food scraps has the ability to reduce waste collection and disposal costs. Although some food generators are able to compost on-site, other resources exist to help food waste generators find commercial composting facilities located near them.
- ***Anaerobic digestion is the last prioritized diversion method.*** This is a process in which microorganisms break down organic material in the absence of oxygen. Anaerobic digestion produces biogas, which is comprised mostly of methane and carbon dioxide, and can be used as an energy source; this process also produces a solid residual that can be land applied or composted. (Due to the capital costs associated with this technology, in most cases it is generally cost prohibitive in areas where the landfill tipping fees are low, such as in Texas.)

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<sup>67</sup> The Houston Food Bank is the largest food bank in the United States and is a member of Feeding America. The Houston Food Bank can be contacted at 713.223.3700 or <http://www.houstonfoodbank.org/>.

- 2. Houston area compost processors have significant excess capacity to accept additional food waste.** In visiting with the three largest composters in the H-GAC region we found that all of them have excess capacity to accept additional food waste. All three processors explained the benefits of having food waste - the food waste provides nitrogen which accelerates the composting process; and, since food is made up of, by most estimates, approximately 60 percent to 80 percent water, the additional water provided by the food reduces the need for the composters to add as much water during the compost process.<sup>68</sup> All of them expressed a desire to obtain more food feedstocks. Certain processors are only able to accept vegetative food waste, while some of the processors will also accept meat, fat and dairy byproducts. Pre-consumer food waste is overwhelmingly preferred because post-consumer food waste typically requires ongoing training and effort to reduce contamination to acceptable levels for composters.

*The estimated excess capacity and new capacity coming on line in the H-GAC region should be able to accept at a minimum an additional 85,000 to 95,000 tons per year of food waste.*

- 3. Some grocery stores and commercial food processors in the H-GAC region are currently active in food waste diversion.** Several commercial entities already donate excess, edible food to local area food banks and pantries, and some are also actively diverting food waste to composting facilities in the event that it is not fit for human consumption.
- 4. Increased awareness and education regarding TAC Title 30, Chapter 332, which outlines the requirements for composting, is important.** The Texas Commission on Environmental Quality (TCEQ) regulates composting facilities in four tiers based on the type of feedstocks processed. The highest tier requires a **Permit** and allows mixed solid waste among other more difficult feedstocks. The next highest tier is a **Registration**, which is allowed to accept biosolids among other feedstocks. **Notification**-tier facilities can accept any food waste. The lowest tier is the **Exempt** tier which can accept any vegetative material including vegetative food waste, but not meat, fats or dairy products.

Source separated food residuals, whether vegetative or non-vegetative, can be processed at composting facilities at the Permit, Registration, and Notification tiers. Each Registration or Notification for a specific facility contains language describing which feedstocks are authorized at that site, so any given facility may prohibit certain types of feedstocks based on the specific language in its authorization. The presence or any amount of mixed solid waste in compost feedstocks necessitates that the composting facility be authorized at the Permit tier; therefore, it is important to maintain the quality of the feedstocks and minimize contaminants.

- 5. One of the biggest barriers to a more active commercial food waste program is the lack of food waste collection companies in the H-GAC region.** Currently, some national solid waste collection companies provide limited collection services concerning food waste. However, due to low route densities, collection via these major haulers is not actively promoted as a service to its customers and oftentimes results in a higher rate versus if standard solid waste collection service is being provided. Additionally, there are a handful of smaller collection companies that provide a food waste collection service. However,

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<sup>68</sup> The amount of water used during the composting process should not be under-estimated. In conversations with one composter, during 2011, which was a very dry year, they had to pump over four million gallons of water from their well to facilitate the composting process.

they experience similar route-density challenges and do not actively promote the service unless the customer is willing to pay a premium.

- 6. Building designs/layouts at some commercial businesses (primarily restaurants) present challenges because some locations have limited room for food waste collection containers, or existing enclosure laws make it difficult to create room for additional carts.** NewGen has found this to be an issue for some communities considering the expansion of commercial recycling and/or food waste diversion programs. Some cities have addressed the issue by passage of an ordinance requiring that room be set aside for additional containers prior to permitting new construction. Some restaurants have addressed it with increased frequency of food waste collection and/or revisiting their waste stream to determine whether food waste containers can potentially reduce the number of solid waste carts or dumpsters that are on-site. This is oftentimes one of the challenges that can be addressed, but requires a thorough assessment of current collection processes. Too many times it is used as an excuse to opt out of certain diversion activities without thoroughly exploring options that can result in a viable solution.
- 7. The NewGen project team found that restaurants are not typically large generators of pre-consumer food waste.** Pre-consumer food waste at a restaurant is any waste generated during the preparation of the food in the kitchen. Pre-consumer waste occurs from over-purchasing, spoilage, contamination, and food preparation, (e.g., vegetables and meat trimmings). In visiting with a number of restaurants it was not unusual for a restaurant to generate less than a 60 or 90 gallon cart of pre-consumer food waste per day.
- 8. Most compost processors are hesitant to accept post-consumer food waste due to contamination issues.** Where the vast majority of food waste occurs in restaurants is on the post-consumer side. Post-consumer food in restaurants refers to the waste generated after the customer has finished his meal. This is the leftover food that was uneaten, however, it may be contaminated with plastic service ware, soda cans, Styrofoam, film plastic, etc. Unless a restaurant is extremely diligent in training their staff to sort these materials, contamination in the food waste set out by the restaurant then becomes a contamination issue for the composting facility.
- 9. Many businesses who already participate in a food waste program do so because of their dedication to sustainable practices.** In order to motivate other commercial businesses to recycle organics there needs to be an economic incentive to divert this material. To encourage more businesses to divert food waste requires low composting processing fees, competitive collection rates (vs. traditional solid waste collection) and room for the food waste collection containers.



- 10. Successful commercial food waste collection programs require on-going education.** On-going communication, dialogue and education are critical amongst the generators, collectors, and processors of food waste. If there is a breakdown between any of these parties, contamination can become an issue that can adversely impact the success of food waste collection programs. In addition, within each of these three entities it is essential that on-going and effective education/communication is occurring and that management at each of these types of entities is ensuring that their workers are doing their part to ensure a high quality food waste product (without contaminants) is being ultimately provided to the processing facility.
- 11. The development of any successful and vibrant food waste diversion program is driven by three primary factors: 1) the quality and quantity of material that a generator has to dispose of; 2) the cost to collect and transport the material; 3) and, the differential between disposal fees at landfills versus processing fees at composting sites.** To have a successful and vibrant food waste diversion program within the H-GAC planning region, all three of these factors must be thoroughly addressed.

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## Section 5 RECOMMENDATIONS

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Based on the Research and Interviews that are summarized in Section 3, a summary of NewGen project team's Findings were developed and provided in Section 4. Based on the interviews, research, and findings, Section 5 then provides a series of Recommendations that the NewGen project team would recommend be considered for implementation. Since there are numerous recommendations provided, they have been separated into Short-Term (first 12 months), Mid-Term (13 months to 36 months) and Long-Term (37 months and longer).

### Short-Term (first twelve months)

- 1. H-GAC to host a quarterly commercial food waste roundtable, utilizing the Action Plan (Section 6) as a guide for the meetings.**<sup>69</sup> By convening a committee, or focus group, of interested partners concerning food waste, the group would identify and map a process to address the short-term, as well as mid- and long-term recommendations described in this section and the Action Plan (Section 6). This roundtable would address the key issues concerning the generation, collection, and processing of food waste in the H-GAC region in order to have a dynamic food waste diversion program.<sup>70</sup> Initially, in the first year, this group would most likely focus on education, meeting with city health departments, meeting with large commercial food waste generators, as well as discussing how to address the cost of collection (increasing route density, etc.).
- 2. Coordinate education and outreach. This would include the development of training materials for generators of food waste.** Development of educational materials and social media to reach the different audiences will be critical. While some of the materials would in all likelihood be developed by H-GAC, NewGen would envision the Houston Restaurant Association, Texas Restaurant Association, Grocery Manufacturers Association and a variety of local governments taking proactive roles in getting the word out on how to divert food waste from landfills. The development of a consistent and methodical messaging will be critical to the success of this program.
- 3. Clarify materials accepted by compost processors (may include a meeting with TCEQ).** Prior to beginning to increase the stream of materials that are provided to composting facilities, it is critical to identify which existing and planned regional facilities can accept which food-waste components, and whether any are willing and able to upgrade their authorizations to accept meat, fats and dairy product waste. Once that issue is addressed, then a strategy on the foodstocks to pursue can be finalized.

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<sup>69</sup> It might be beneficial for H-GAC to consider whether the Houston Area Research Center might be an organization interested in participating in the roundtable. They were mentioned to the NewGen project team during the interview phase of this study. They are a largely grant funded research organization, and receive some funding from Exxon (see Recommendation #14), amongst other organizations.

<sup>70</sup> The reader should keep in mind that a dynamic food waste diversion program will adhere to the U.S. EPA Food Recovery Hierarchy and include feeding hungry people prior to focusing on composting.

4. **Discuss with compost processors the potential consideration for a tiered rate structure for incoming food waste.** The NewGen project team would recommend that consideration of a tiered rate structure for certain types of food waste be considered so as to incentivize the diversion of these materials from landfills. Food wastes high in liquid content, or provided via tanker truck may warrant a discount based on their potential beneficial water content, which can reduce the amount of water required during the composting process.
5. **Focus initial food waste diversion efforts on commercial food processors, wholesale food distributors, and retail grocery stores.** The largest generators of pre-consumer food waste are food processors and retail grocery stores. Based on the size of the facility, generation of two to five tons per week or more of food waste is common for many of these facilities. At five tons per week, if 100 new facilities were identified that could divert their food waste, that would equate to 26,000 tons of food waste diverted from landfills.<sup>71</sup> NewGen believes this is a very achievable goal.<sup>72</sup>

There are a number of trade associations such as the Grocery Manufacturers Association, and the Texas Food Council (a part of the Texas Retailers Association), that should be contacted that could potentially assist in identifying large generators of commercial food waste who may be interested in organics recycling or donation, that are not yet involved.

6. **Pursue food waste on Produce Row.** The project team had an opportunity to tour “Produce Row” which is located at 3144 Produce Row, Houston, Texas 77023. This is a large distribution center for produce that is distributed to restaurants and grocery stores throughout the H-GAC region. This distribution center is served by both rail and truck. Some food waste generated at Produce Row is already being diverted to composting facilities in the H-GAC region. However, NewGen believes there is much more material that can be diverted from this facility – both potentially for consumption, as well as for composting -- that is currently being landfilled.
7. **Pursue liquid food processors, or companies that create a liquid food waste byproduct.** The NewGen project team found several commercial food processors that are currently transferring liquid food waste, via tanker truck to various composting facilities in the H-GAC region. NewGen would recommend that research be done to see if additional food waste processors that are currently discharging liquefied food waste into the wastewater collection system (and most likely being surcharged) would consider hauling their liquid waste to composting facilities. This liquid material is beneficial in that it reduces the amount of water required during the composting process for operations requiring large amounts of additional process water.
8. **Follow up with collection companies who currently collect solid waste or recyclables and research whether they would consider expanding their collection services to include the collection of food waste.** During the course of this study several smaller collection companies have expressed interest in expanding their services to collect food waste, assuming that it was feasible.

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<sup>71</sup> 5 tons per week \* 52 weeks = 260 tons per year; 260 tons per year \* 100 facilities = 26,000 tons per year.

<sup>72</sup> As an example, Whole Foods has 13 stores in the Houston metropolitan area.

Another option would be for cities in the H-GAC region that have their own solid waste collection vehicles to collect commercial food waste, similar to municipally operated commercial food waste collection operations in Plano, Texas and Tucson, Arizona.

- 9. Identify compost processing facilities with crush pads that would enable the extraction of food and beverages from containers.** There are potential opportunities to create a commercial food waste collection program with certain distributors of food that currently landfill pallets of food that has expired or been damaged and cannot be resold or provided to food banks. Both the Houston Food Bank and Sysco find themselves with food that must be landfilled because they do not have a process to extract the food or beverage from the containers in a cost effective manner. If a composting facility in the H-GAC region had a crush pad then the food could be extracted from the containers. Decontainerization may be accomplished without sophisticated crushing pads but with higher labor costs, or it may be accomplished with more sophisticated paved pads with drains and tanks. More sophisticated pads can cost upwards of \$100,000 or more.
- 10. Examine Hilton Americas-Houston – “beta results”.** The Hilton Americas-Houston hotel has been diverting their food waste for composting since 2008 (see Section 3 for more information). They have implemented and are testing on a 60-day trial basis using a machine that extracts all of the liquid from the food waste so the food waste can then be placed in a compactor and sent to a compost facility, while the liquid is discharged into the wastewater system. NewGen would recommend that H-GAC closely monitor the success of this program as this may be a potential approach for other large hotels to utilize.
- 11. Begin development of a GIS database of food waste generators, collectors and processors in the H-GAC planning region.** NewGen would recommend that the H-GAC GIS Department begin to develop a database of the generators, collectors and processors within the H-GAC region. Oftentimes the mapping of these facilities will begin to identify potential areas within the H-GAC region – restaurants, large retail areas, etc. that could be targeted for the collection of food waste from large food waste generators that are strategically located within hauling distances to composting facilities that accept food waste.
- 12. Develop a database to track generators, collectors and processors of food waste – location, volumes, frequency, etc.** NewGen recommends that H-GAC begins to develop a database of the food waste being diverted either for consumption or for composting. Identifying the generators and where they are located (see the prior recommendation, #11) would help in developing route densities, as well as allow H-GAC to begin tracking the tonnage of foodstocks being diverted for consumption or composting.<sup>73</sup>
- 13. Coordinate with the Cities of Houston and Sugar Land’s Departments of Health (regarding the requirements for food donations).** There has been a great deal of conversation regarding what can or cannot be provided to homeless shelters, etc. Much of the discussion has centered on anecdotal comments concerning the City of Houston’s Health Department. We would recommend that an individual from either or both of these cities’ health departments be invited to participate in the roundtable, or at least provide

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<sup>73</sup> Due to the sensitivity of this information, this data may need to be gathered by a 3<sup>rd</sup> party and aggregated and retained in a proprietary database that would not be maintained by H-GAC, so as to ensure confidentiality. This database could then be updated annually to determine the growth in food waste that is being diverted from landfills.

comment to the roundtable. Once the definitive criteria are finalized concerning the provision of donated food to shelters, etc., a precedent can then be established that can be documented and used to better leverage this resource to feed people in need.

Listed below is an excerpt from the City of Houston's regulations concerning food donations.

The current Houston food ordinance requirements regarding food donations ([Section 20-21.5\(k\)](#)) are:<sup>74</sup>

- Packaged food must have the manufacturer's complete labeling to be considered for donation.
- Prepared foods must be labeled with the name of the food, preparation date, and the source of the food.
- Prepared foods may be donated if the following criteria are met:
  - The food has been kept at the approved temperature (135 °F) during "hot holding" and has subsequently been refrigerated.
  - The recipient has the appropriate facilities to meet the transportation, storage, and reheating requirements.
  - At the time of donation, the food must be at, or below, 41°F and the food is protected from contamination.

### Mid-Term (13 months to 36 months)

**14. Explore opportunities with Exxon Corporate Campus.** Exxon is developing a corporate campus in The Woodlands that will be the future home for 10,000 to 12,000 employees. Exxon has championed sustainability in the development of this new campus. NewGen would strongly encourage H-GAC to explore options in which some of the composting facilities located in close proximity to this corporate campus be potential resources to divert food waste from the campus.

**15. Coordinate food waste diversion programs with restaurants.** During the first year of this action plan, NewGen would recommend that the roundtable focus on the large commercial generators, and also begin discussions with the compost facilities and collection companies to ensure the compost processing facilities are ready to accept food waste from restaurants (i.e., pre-consumer only, or post-consumer also) and collection companies are ready to collect the food waste. We envision the pursuit of restaurants (and only select ones that are highly motivated to participate) beginning gradually during the second year of this action plan and then grow incrementally over the remainder of the five-year plan.

**16. Explore food waste diversion to farms.** Only one hog farm was identified, and several chicken farms, so while they can be explored as an option for diverting food waste, this is not a high priority task.

**17. Develop model ordinances for use by local governments to incentivize or mandate food waste diversion from landfills by selected generators or haulers.** NewGen would recommend a model ordinance be drafted that would be made available to local

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<sup>74</sup> Houston, Texas, Code of Ordinances, Chapter 20 – Food and Drugs:  
[https://library.municode.com/HTML/10123/level4/COOR\\_CH20FODR\\_ARTIIFOESGE\\_DIV1GE.html#COOR\\_CH20FODR\\_ARTIIFOESGE\\_DIV1GE\\_S20-21.5FODISE](https://library.municode.com/HTML/10123/level4/COOR_CH20FODR_ARTIIFOESGE_DIV1GE.html#COOR_CH20FODR_ARTIIFOESGE_DIV1GE_S20-21.5FODISE)

governments that would like to incentivize and/or mandate that food waste be collected separately from waste that is being landfilled.

### **Long Term (37 months and longer)**

- 18. Undertake a feasibility study near Produce Row to determine whether there is a suitable site in the area to develop a new food waste composting facility.** Produce Row is comprised of an array of wholesale produce distributors that generate food waste. In fact, some distributors are already hauling roll-offs with food waste to local composting facilities. It would thus be an advantageous siting opportunity, specifically as it relates to less expensive collection and hauling costs.

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## **Section 6 ACTION PLAN**

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Section 6 provides a detailed layout of the timing of the various recommendations that were addressed in Section 5 Recommendations. This timeline shows what the NewGen project team believes to be the priorities, and the associated timing, with regard to increasing the commercial food waste diversion activities within the H-GAC planning region.

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### Houston-Galveston Area Council Commerical Food Waste Collection 5-Year Action Plan

	Year 1				Year 2				Year 3				Year 4				Year 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	<b>Short-Term</b>				<b>Mid-Term</b>				<b>Long-Term</b>											
<u>Short-Term</u>																				
1 Host quarterly commercial food waste roundtable	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2 Coordinate Education and outreach, including development of training materials for generators			◆		◆	📄														
3 Clarify materials accepted by compost processors	◆	◆		📄																
4 Discuss the potential for a tiered rate structure for incoming food waste		◆	◆	📄																
5 Focus initial food waste diversion efforts on commercial food processors, distributors, and grocery stores	◆				◆			◆												
6 Pursue food waste with entities located on Produce Row		◆		◆																
7 Pursue liquid food processors		◆			◆															
8 Follow up with collection companies regarding expanding their services to include food waste		◆		◆			◆													
9 Identify compost processing facilities with crush pads				◆																
10 Examine Hilton Americas-Houston "beta results"	◆																			
11 Begin development of a GIS database of food waste generators, collectors, and processors	◆			📄				🗄️				🗄️				🗄️				🗄️
12 Develop a database to track generators, collectors, and processors - locations, volumes, etc.	◆			📄				🗄️				🗄️				🗄️				🗄️
13 Coordinate with the departments of health regarding food donations "health requirements"		◆	◆	◆																
<u>Mid-Term</u>																				
14 Explore opportunities with Exxon Corporate Campus					◆															
15 Coordinate food waste diversion programs with restaurants					◆															
16 Explore food waste diversion to farms					◆															
17 Develop model ordinances for use by local governments regarding food waste diversion					◆															
<u>Long-Term</u>																				
18 Undertake a compost processing site feasibility study near Produce Row					◆								◆							

**Legend:**

- ◆ = Meeting
- 📄 = Primary Focus
- = Ongoing, but not a primary focus
- 📄 = Document generated regarding a conclusion/agreement/materials developed/other
- 🗄️ = Update database/records

## **Appendix A**

### **CONTACTS FOR PROJECT RESEARCH**

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This appendix contains a listing of entities researched.

Entity	State	Website	POC	Email	Phone
<b>State Programs</b>					
California Department of Resources Recycling and Recovery	CA	<a href="http://www.calrecycle.ca.gov/Recycle/Commercial/Organics/">http://www.calrecycle.ca.gov/Recycle/Commercial/Organics/</a>	Diana Rivera, Materials Management Section	<a href="mailto:Diana.Rivera@CalRecycle.ca.gov">Diana.Rivera@CalRecycle.ca.gov</a>	(916) 324-1727
Connecticut Dept. of Energy & Environmental Protection	CT	<a href="http://www.ct.gov/deep/cwp/view.asp?a=2718&amp;q=325344&amp;deepNav_GID=1645%20">http://www.ct.gov/deep/cwp/view.asp?a=2718&amp;q=325344&amp;deepNav_GID=1645%20</a>	K.C. Alexander, DEEP Recycling Program	<a href="mailto:kathy.alexander@ct.gov">kathy.alexander@ct.gov</a>	(860) 424-3239
Maine Department of Environmental Protection	ME	<a href="http://www.maine.gov/dep/sustainability/compost/overview.html">http://www.maine.gov/dep/sustainability/compost/overview.html</a>	George MacDonald, Recycling	<a href="mailto:george.macdonald@maine.gov">george.macdonald@maine.gov</a>	(207) 287-2870
Massachusetts Department of Environmental Protection	MA	<a href="http://www.mass.gov/eea/agencies/massdep/recycle/reduce/food-waste-ban.html">http://www.mass.gov/eea/agencies/massdep/recycle/reduce/food-waste-ban.html</a>	MassDEP Headquarters		(617) 292-5500
New Hampshire DES	NH	<a href="http://des.nh.gov/programs/index.htm">http://des.nh.gov/programs/index.htm</a>	Douglas Kemp, Facility Operations   Compliance & Reporting	<a href="mailto:douglas.kemp@des.nh.gov">douglas.kemp@des.nh.gov</a>	(603) 271-0674
New Jersey DEP	NJ	<a href="http://www.nj.gov/dep/dshw/recycling/planning.htm">http://www.nj.gov/dep/dshw/recycling/planning.htm</a>	Bob Goodwin, Supervisor	<a href="mailto:Robert.Goodwin@dep.state.nj.us">Robert.Goodwin@dep.state.nj.us</a>	(609) 984-3438
New York State DEC	NY	<a href="http://www.dec.ny.gov/">http://www.dec.ny.gov/</a>	Gary Feinland, Environmental Program Specialist	<a href="mailto:gafeinla@gw.dec.state.ny.us">gafeinla@gw.dec.state.ny.us</a>	(518) 402-8706
Vermont Agency of Natural Resources	VT	<a href="http://www.anr.state.vt.us/dec/wastediv/solid/act148.htm">http://www.anr.state.vt.us/dec/wastediv/solid/act148.htm</a>	Josh Kelly, Planning & Implementation	<a href="mailto:josh.kelly@state.vt.us">josh.kelly@state.vt.us</a>	(802) 522-5897
<b>County Programs</b>					
Charleston County	SC	<a href="http://www.charlestoncounty.org/departments/environmental-management/compost-commercial-info.php">http://www.charlestoncounty.org/departments/environmental-management/compost-commercial-info.php</a>	Environmental Management	<a href="mailto:recycle@charlestoncounty.org">recycle@charlestoncounty.org</a>	(843) 720-7111
Hennepin County	MN	<a href="http://www.hennepin.us/business/recycling-hazardous-waste/organics-recycling">http://www.hennepin.us/business/recycling-hazardous-waste/organics-recycling</a>	Recycling and Hazardous Waste	<a href="mailto:Environment@hennepin.us">Environment@hennepin.us</a>	(612) 348-3777
<b>Municipal Programs</b>					
Atlanta, City of	GA	<a href="http://www.atlantaga.gov/index.aspx?page=493">http://www.atlantaga.gov/index.aspx?page=493</a>	<i>See Elemental Impact</i>		
Elemental Impact	GA	<a href="http://www.elementalimpact.org/">http://www.elementalimpact.org/</a>	Holly Elmore, Ei Founder & CEO	<a href="mailto:holly@elementalimpact.org">holly@elementalimpact.org</a>	(404)261-4690
Austin, City of		<a href="https://austintexas.gov/uro">https://austintexas.gov/uro</a>	Austin Resource Recovery		(512) 974-9727
Dana Point, City of	CA	<a href="http://www.danapoint.org/index.aspx?page=585">http://www.danapoint.org/index.aspx?page=585</a>	Gail Enriquez, Public Works & Engineering	<a href="mailto:genriquez@danapoint.org">genriquez@danapoint.org</a>	(949) 248-3500
Davis, City of	CA	<a href="http://recycling.cityofdavis.org/businesses/commercial-food-scrap-collection">http://recycling.cityofdavis.org/businesses/commercial-food-scrap-collection</a>	Jennifer Gilbert, Conservation Coordinator	<a href="mailto:JGilbert@cityofdavis.org">JGilbert@cityofdavis.org</a>	(530) 757-5688
Dubuque, City of	IA	<a href="http://www.cityofdubuque.org/483/Food-Scrap-Recycling">http://www.cityofdubuque.org/483/Food-Scrap-Recycling</a>	Public Works		(563) 589-4250
Portland, City of	OR	<a href="https://www.portlandoregon.gov/sustainabilityatwork/64745">https://www.portlandoregon.gov/sustainabilityatwork/64745</a>	Sustainability at Work	<a href="mailto:sustainabilityatwork@portlandoregon.gov">sustainabilityatwork@portlandoregon.gov</a>	(503) 823-7037
<b>Other Entities</b>					
Ample Harvest		<a href="http://www.ampleharvest.org/index.php">http://www.ampleharvest.org/index.php</a>		<a href="mailto:info@ampleharvest.org">info@ampleharvest.org</a>	
Denver Food Rescue		<a href="http://www.denverfoodrescue.org/">http://www.denverfoodrescue.org/</a>		<a href="mailto:info@denverfoodrescue.org">info@denverfoodrescue.org</a>	(720) 675-7337
Illinois Food Scrap Coalition	IL	<a href="http://illinoiscomposts.org/">http://illinoiscomposts.org/</a>	<i>See Seven Generations Ahead</i>	<a href="mailto:illinoiscomposts@gmail.com">illinoiscomposts@gmail.com</a>	
Seven Generations Ahead	IL	<a href="https://sevengenerationsahead.org/">https://sevengenerationsahead.org/</a>	Gary Cuneen, Founding Executive Director	<a href="mailto:gary@sevengenerationsahead.org">gary@sevengenerationsahead.org</a>	(708) 660-9909
Onondaga County Resource Recovery Agency	NY	<a href="http://ocrra.org/">http://ocrra.org/</a>	Main Office	<a href="mailto:info@ocrra.org">info@ocrra.org</a>	(315) 453-2866
<b>Businesses</b>					
Hilton San Diego Bayfront Hotel	CA	<a href="http://www.hiltonsandiegobayfront.com/">http://www.hiltonsandiegobayfront.com/</a>	Front Office	<a href="mailto:SANCC-Front_Office_Managers@hilton.com">SANCC-Front_Office_Managers@hilton.com</a>	(619) 564-3333
BIOFerm Energy Systems	WI	<a href="http://www.biofermenergy.com/">http://www.biofermenergy.com/</a>	North American Contact	<a href="mailto:info@biofermenergy.com">info@biofermenergy.com</a>	(608) 467-5523
Maine Compost School	ME	<a href="http://composting.org/">http://composting.org/</a>			(207) 592-0455
Rust Belt Riders Composting	OH	<a href="http://rustbelttriderscomposting.com/">http://rustbelttriderscomposting.com/</a>		<a href="mailto:rustbelttriders@gmail.com">rustbelttriders@gmail.com</a>	

## **Appendix B**

### **CONTACTS FOR PROJECT INTERVIEWS**

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This appendix contains a listing of entities that the NewGen project team interviewed as part of this study.

Entity	Entity Type	Website	POC	Email	Phone
Ruggles Green	Generator	<a href="http://www.rugglesgreen.com/">http://www.rugglesgreen.com/</a>	Lydia Green, Marketing Director	<a href="mailto:Lydia.s@rugglesgreen.com">Lydia.s@rugglesgreen.com</a>	(281) 235-9271 (Lydia S.)
			Federico Marques, Owner	<a href="mailto:Federico.m@rugglesgreen.com">Federico.m@rugglesgreen.com</a>	
Radical Eats	Generator	<a href="http://www.radicaleats.com/">http://www.radicaleats.com/</a>	Staci Davis, Chef/Owner	<a href="mailto:radicalstaci@gmail.com">radicalstaci@gmail.com</a>	(281) 222-7647
El Tiempo Cantina	Generator	<a href="http://www.eltiempocantina.com/">http://www.eltiempocantina.com/</a>	James Kelleher, Marketing Director	<a href="mailto:james@eltiempocantina.com">james@eltiempocantina.com</a>	(713) 807-8100
Texas Restaurant Association	Other	<a href="http://www.restaurantville.com/">http://www.restaurantville.com/</a>	Richie Jackson, CEO	<a href="mailto:richie@tramail.org">richie@tramail.org</a>	(512) 457-4100
Greater Houston Restaurant Association	Other	<a href="http://ghra.com/">http://ghra.com/</a>	Melissa Stewart, Executive Director	<a href="mailto:mstewart@ghra.com">mstewart@ghra.com</a>	(713) 802-1200
Feeding America	Other	<a href="http://www.feedingamerica.org/">http://www.feedingamerica.org/</a>	Mitzi Baum, Managing Director	<a href="mailto:mbaum@feedingamerica.com">mbaum@feedingamerica.com</a>	(312) 925-8701
Houston Food Bank	Generator	<a href="http://www.houstonfoodbank.org/">http://www.houstonfoodbank.org/</a>	Lynn Davis, Director of Facilities, Safety, and Quality Control	<a href="mailto:ldavis@houstonfoodbank.org">ldavis@houstonfoodbank.org</a>	(832) 527-8705 (Eugene P.)
			Eugene Provost, Facilities Engineer	<a href="mailto:eprovoat@houstonfoodbank.org">eprovoat@houstonfoodbank.org</a>	
Hilton Americas - Houston	Generator	<a href="http://www3.hilton.com/en/hotels/texas/hilton-americas-houston-HOUVCVHH/index.html">http://www3.hilton.com/en/hotels/texas/hilton-americas-houston-HOUVCVHH/index.html</a>	Jay Bush, Director of Food & Beverage	<a href="mailto:jay_bush@hilton.com">jay_bush@hilton.com</a>	(713) 739-8000
Sysco	Generator	<a href="http://www.sysco.com/">http://www.sysco.com/</a>	Yale Lary, Quality/Food Safety/Animal Welfare Manager	<a href="mailto:Lary.Yale@corp.sysco.com">Lary.Yale@corp.sysco.com</a>	(281) 584-2819 (Yale L.)
			Sarah Garcia, QA Analyst (Donations)	<a href="mailto:Sarah.Olson@wholefoods.com">Sarah.Olson@wholefoods.com</a>	
Whole Foods Market	Generator	<a href="http://www.wholefoodsmarket.com/">http://www.wholefoodsmarket.com/</a>	Sarah Olson, Sustainability Associate Coordinator	<a href="mailto:Sarah.Olson@wholefoods.com">Sarah.Olson@wholefoods.com</a>	(512) 391-8400, ext.417
University of Houston	Generator	<a href="http://www.uh.edu/af-auxiliary-services/sustainability/">http://www.uh.edu/af-auxiliary-services/sustainability/</a>	Sarah Kelly, Sustainability Program Manager	<a href="mailto:smkelly5@Central.UH.EDU">smkelly5@Central.UH.EDU</a>	(832) 842-9051
Liquid Environmental Solutions	Collector	<a href="https://www.liquidenviro.com/">https://www.liquidenviro.com/</a>	Peter Stant, National Organic Recycling Manager	<a href="mailto:Peter.Stant@liquidenviro.com">Peter.Stant@liquidenviro.com</a>	(617) 418-5746
Nexus Disposal, LLC	Collector	<a href="http://www.tucsonaz.gov/environmental-services">http://www.tucsonaz.gov/environmental-services</a>	Steven Zapata, Director of Operations	<a href="mailto:texantrashman@yahoo.com">texantrashman@yahoo.com</a>	(713) 966-9090
Waste Management	Collector/Processor	<a href="https://www.wm.com/">https://www.wm.com/</a>	Chuck Rivette, Director Market Planning and Project Development	<a href="mailto:crivette@wm.com">crivette@wm.com</a>	(713) 253-4497
Tap, Inc.	Collector	<a href="http://www.tapinc.com/">http://www.tapinc.com/</a>	Tom Page, Owner	<a href="mailto:tompape@tapinc.com">tompape@tapinc.com</a>	(713) 594-4900
Little Joy Recycling	Collector		David Fernandez, Owner	<a href="mailto:littlejoyrecycling@gmail.com">littlejoyrecycling@gmail.com</a>	(713) 412-1668
Plano, City of	Collector	<a href="http://www.plano.gov/711/Commercial-Waste-Recycling">http://www.plano.gov/711/Commercial-Waste-Recycling</a>	Christopher Day, Commercial Recycling Supervisor	<a href="mailto:Christopherd@plano.gov">Christopherd@plano.gov</a>	(972) 742-0413
Tucson, City of	Collector	<a href="http://www.tucsonaz.gov/environmental-services">http://www.tucsonaz.gov/environmental-services</a>	Sherri Ludlam, City Environmental Scientist	<a href="mailto:sherri.ludlam@tucsonaz.gov">sherri.ludlam@tucsonaz.gov</a>	(520) 837-3800
Nature's Way	Processor	<a href="http://www.natureswayresources.com/">http://www.natureswayresources.com/</a>	John Ferguson, President	<a href="mailto:jcfergus@ix.netcom.com">jcfergus@ix.netcom.com</a>	(936) 273-1200
New Earth	Processor	<a href="http://www.newearthcompost.com/">http://www.newearthcompost.com/</a>	Clayton Leonard, President	<a href="mailto:cleonard@newearthcompost.com">cleonard@newearthcompost.com</a>	(210) 661-5180
Living Earth	Processor	<a href="http://livingearth.net/">http://livingearth.net/</a>	Mark Rose, President	<a href="mailto:mrose@letcogroup.com">mrose@letcogroup.com</a>	(972) 506-8575
Eco-Ology	Other	<a href="http://eco-ology.org/">http://eco-ology.org/</a>	Pat Greer	<a href="mailto:yavapat@sbcglobal.net">yavapat@sbcglobal.net</a>	(713) 443-5421
SMART Recycling	Collector	<a href="http://www.smartrecyclingsc.com/home.html">http://www.smartrecyclingsc.com/home.html</a>	Gary Bilbro	<a href="mailto:garyb@smartrecyclingsc.com">garyb@smartrecyclingsc.com</a>	(843) 834-7681

## **Appendix C**

### **FOOD WASTE RESOURCES**

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This appendix contains a listing of beneficial food waste resources to help organizations establish or enhance their food waste diversion programs.



Resource	Website/Location
Environmental Protection Agency   Food Waste Assessment Tools	<a href="http://www.epa.gov/foodrecovery/tools/">http://www.epa.gov/foodrecovery/tools/</a>
Environmental Protection Agency   Reducing Wasted Food & Packaging Toolkit	<a href="http://www.epa.gov/region9/organics/foodtool/">http://www.epa.gov/region9/organics/foodtool/</a>
Illinois Food Scrap Coalition   Restaurant Toolkit	<a href="http://illinoiscomposts.org/our-work/restaurant-toolkit">http://illinoiscomposts.org/our-work/restaurant-toolkit</a>
U.S. Composting Council	<a href="http://compostingcouncil.org/">http://compostingcouncil.org/</a>
Food Waste Reduction Alliance	<a href="http://www.foodwastealliance.org/">http://www.foodwastealliance.org/</a>
BioCycle Article   "Food Waste Collection Innovations"	<a href="http://www.biocycle.net/2014/07/15/food-waste-collection-innovations/">http://www.biocycle.net/2014/07/15/food-waste-collection-innovations/</a>