Trash to Treasure

Sustainable Financing Options for Integrated Material Management Programs

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Contents

Preface

The aim of this report is two-fold: to provide recommendations for communities and local authorities on funding and operating integrated material management systems and to apply these recommendations to the specific case of the Onondaga County Resource Recovery Agency (OCRRA). As such, it is divided into two parts: one general, and one focused on OCRRA. The OCRRA section is intended as an example for other communities interested in using this report.

We present this report at a time when the solid waste industry terminology is changing. Whereas in the past "garbage" was taken to the "dump," most communities today take "solid waste" to a "landfill." The "incinerators" of the past are regulated and controlled "waste to energy" or "resource recovery" facilities of the present. It is likely that the industry will soon abandon the term "waste" in favor of "materials" or "resources." In this report we use the phrase "integrated waste management (IWM)" to describe multi-stakeholder systems. We use "sustainable materials management (SMM)" to refer to the paradigm shift towards reduction of waste through life-cycle analysis of all components of the waste stream. We use the terms "waste" and "materials" interchangeably in this report. We present more detailed definitions of all terms in the glossary.

Executive Summary

Integrated solid waste management (ISWM) systems are usually funded through tipping fees and electricity generation, in communities with Waste to Energy (WTE) facilities. Most ISWM systems have the goal of waste reduction, which creates a paradox of reducing revenue by meeting the mission of the organization. Onondaga County Resource Recovery Agency (OCRRA) is an example of an organization struggling with this paradox.

In an effort to provide recommendations to OCRRA and other communities and organizations with a similar dilemma, we provide a synthesis of research about successful financial structures and operational processes of ISWM. The information comes from expert interviews, case studies, and trade and scholarly literature.

Changing Paradigms
Environmentally conscious material management began to take shape in the 1970s with the creation of the EPA in response to a number environmental and health hazards caused largely by mismanagement of industrial processes. Today's practices are based on EPA's waste management hierarchy, which prioritizes reduction and reuse above recycling, composting, and energy recovery, with treatment and disposal as the options of last resort. The emergent concept of Sustainable Material Management (SMM) aims to take practices even further, where reductions in material use and toxicity occur at every phase of the product life cycle. The role played by local governments and authorities in supporting this transformation is essential.

Case Studies
We surveyed more than 20 communities around the US identifying them either as national leaders in ISWM or similar to Onondaga County due to their location in New York. We present 12 of the communities, with the national examples in Part 1 of the report and New York case studies in Part 2.

Communities Presented

National
- Palm Beach County, FL
- Lee County, FL
- Hennepin County, MN
- King County, WA
- City and County of Boulder, CO
- City of Portland, OR
- City and County of San Francisco, CA
- Alameda County, CA

New York State
- Tompkins County
- Oneida and Herkimer Counties
- Broome County
- Westchester County

Common Challenges
- Tension between waste reduction and revenue generation
- Competing disposal options
- Multi-jurisdictional coordination

- Pay as You Throw (PAYT) fee structures in multi-family residences

Best Practices
- Dedicated revenue stream for waste reduction
- Central coordinating agency
- Local level legislative support
- PAYT with embedded recycling and organics collection
- Linking contractor incentives to agency missions

Resources and Recommendations
In addition to providing a summary of our research findings, we present a guide for communities and local authorities, which includes a resource for carrying out a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. We also discuss a variety of funding models and the importance of collaborative governance in ISWM. The application of the SWOT analysis to OCRRA as well as a spreadsheet-based tool for projecting future cash flows are additional resources found in this report. Our recommendations for the solid waste management industry include the standardization of measurements for recycling and diversion and the placement of recovery facilities close to material sources.

OCRRA
OCRRA is a local level authority charged with managing solid waste in Onondaga County as well as with the reduction of waste and increased diversion. OCRRA operates a WTE facility which is major the source of both expenses and revenues for the Agency. By reducing waste, OCRRA inadvertently also reduces its revenues, while the expenses are largely fixed. Our recommendations for OCRRA are based on materials provided by the New York Department of Environmental Conservation (DEC) and a survey of other communities in New York.

Recommendations for OCRRA
- Renegotiate private sector contracts and improve profit sharing arrangements
- Establish a dedicated revenue source
- Develop fee-based services
- Enhance outreach and education to capitalize on organizational strengths
- Expand compost programs
- Pursue renewable energy designation for electricity produced at the WTE facility
- Explore the creation of "Friends of OCRRA", a non-profit organization able to raise private and public funds for OCRRA's waste reduction programs

Introduction

Society's impacts on the environment are increasing exponentially. In the last 50 years the world's population has extracted and consumed more materials and energy than it has in the rest of its history. While in 1900 41% of all materials used were renewable (e.g. agricultural, fishery, and forest products), this number decreased to 6% by 1995.[1] These rapid changes underscore the importance of establishing more sustainable practices in all areas of our society, and especially in material management. Sustainable Material Management (SMM), is the principle of meeting human needs in a way that minimizes material use and associated environmental impacts. Most often the financial obstacles are the greatest impediments to SMM implementation. This report draws on the philosophy of SMM but focuses on practical steps that address the realities faced by local level managers.

The purpose of this report is to provide industry stakeholders with information useful for making decisions about financing and operating an environmentally-sound material management system. In addition, it aims to provide recommendations specifically to the Onondaga County Resource Recovery Agency (OCRRA).

Sponsoring Organizations

This report is a product of a capstone project for the Master of Public Administration program at the Maxwell School of Syracuse University. In addition to OCRRA, this project was sponsored by the National Recycling Coalition (NRC) and the Environmental Finance Center of Syracuse University. The NRC is a national non-profit based in Washington, DC focused on eliminating waste and promoting sustainable economies. The Environmental Finance Center facilitates the development of sustainable and resilient communities across the EPA's second region. We provide mission statements of these organizations in the appendix.

Research Methodology

We collected data from a wide range of sources in three categories: expert interviews, community case studies, and publications, included academic journals, industry guides from the EPA and the New York Department of Environmental Conservation (DEC), and trade publications. We also collected information about OCRRA's operations by examining the Agency's annual reports, through numerous interviews with its staff, and through site visits to its Waste to Energy (WTE) facility and Ley Creek transfer station. We gathered information on other case studies through phone interviews as well as web-based content.

How to Use This Report

We divide the report into two parts. Part 1 provides detailed research findings from national case studies, expert interviews and the trade and academic literatures. It also provides recommendations for communities and local authorities as well as the solid waste industry in general. This section of the report can be used by managers to identify new opportunities and strategies for their operations.

Part 2 applies the research findings presented in Part 1 to OCRRA. After describing OCRRA's operation and New York State guidance on solid waste management, we present a number of case studies from New York State, assess OCRRA in operational and financial terms, and provide a number of recommendations. This section can be used by managers from other communities to compare their own operations to OCRRA's, and to see how the information of this report can be applied to a specific case.

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[1] "Sustainable materials management: The road ahead." 2009. U. S. Environmental Protection Agency Accessed May 18, 2011. Available at: http://www.epa.gov/osw/inforesources/pubs/vision2.pdf.

PART 1: INTEGRATED SOLID WASTE MANAGEMENT

Past Paradigm Shifts in Solid Waste Management

The present landscape of solid waste management did not emerge overnight. Throughout history there have been different ways communities deal with refuse and major shifts in thinking about solid waste management based on community attitudes and scientific knowledge. Understanding historical paradigm shifts in solid waste management informs viewpoints on current practices and gives insight as to how solid waste management will change in the future.

For most of recorded history solid waste management involved hauling garbage away from population centers and dumping it into an open-air pit or valley. However, as populations increased and the products people used became more advanced, so did the understanding of garbage. In 1842, Edwin Chadwick's *The Sanitary Report* first made the connection between garbage and communicable diseases and since then municipalities have been struggling to figure out how to properly dispose of their waste[2]. For most areas, the choice came down to two methods; burn it or bury it. The first incinerator in the U.S. was opened on Governor's Island in NY Harbor in 1885 and by 1914 there were close to 300 incinerators throughout the U.S.[3] Landfills and dumps expanded, and were used to fill in swamp and marshlands throughout the 1920s, waste was out of sight and out of mind.

However, as science and technology advanced during the 20th century questions began to be raised about how the chemicals and products of modern life were polluting the land, water and air. Disasters like the Cayuga River fire of 1969, which was due to high pollution levels, spurred public action and in 1970 the Environmental Protection Agency was established. The EPA consolidated federal research, monitoring and enforcement activities into a single agency with the mission to protect public health through safeguarding the water, air and land[4]. Along with the creation of the EPA were state government coordinating agencies, like NYS Department of Environmental Conservation.

In an effort to protect municipal water supplies, NYSDEC and the EPA began to close town-operated open-air dumps and created new regulations for safer, bottom-lined, large scale landfills[5]. With the traditional small-scale waste disposal system no longer available, municipalities searched for methods to begin to manage their waste while sharing disposal costs. Multi-jurisdictional government solid waste entities arose from this need to coordinate waste removal over a larger area. It was also during the 1970s and 80s where waste reduction plans emerged, primarily as a means to reduce landfill costs. WTE incineration became an attractive proposition for some municipalities, but public concerns about air quality stalled many of these projects.

A major shift came in 1988 with the Solid Waste Management Act in NYS[6], which sought to reduce the amount of waste landfilled through banning recyclable materials from landfills and

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[2] "The Sanitary Report, 1842." The Peel Web. Available at: www.historyhome.co.uk/peel/p-health/sanrep.htm
[3] "Recycling in the USA." Tufts Recycles. Available at: www.tufts.edu/tuftsrecycles/usstats.html
[4] "EPA History." U.S. Environmental Protection Agency. Available at: www.epa.gov/history/
[5] "Overview." OCRRA. Available at: www.ocrra.org/about_overview.asp
[6] "Recycling and Composting." Department of Environmental Conservation. Available at: www.dec.ny.gov/chemical/294.html

establishing recycling programs for paper, glass, some metals and plastics. By 1992 all municipalities in NYS were required to enact local recycling laws to ensure that waste was separated into recyclable, reusable and other components. Similar legislation was passed in other states during this time and in 1991 the U.S. government implemented a Federal Recycling mandate for all agencies.

Today's Waste Management

Waste Management Hierarchy

As solid waste management practices evolved in the latter part of the 20th century, practitioners and scholars formulated a schema of preferred approaches to SWM. The U.S. Environmental Protection Agency developed the hierarchy of preferred waste management approaches (depicted in figure 1 below) that serves as a guide to regulatory decision-making and as a heuristic tool for solid waste managers and the general public.[7] The most preferred waste management options appear as trapezoidal blocks at the top of an inverted triangle, and are intended to demonstrate that a greater volume of waste material can be captured by those actions than by waste management options towards the narrower base of the hierarchy triangle. In descending order from most to least preferred option, the hierarchy is: (1) source reduction and reuse, (2) recycling or composting, (3) combustion with energy recovery, and (4) treatment and disposal. The hierarchy also illustrates the decreasing availability of recoverable energy in waste materials when less preferable management options are employed.

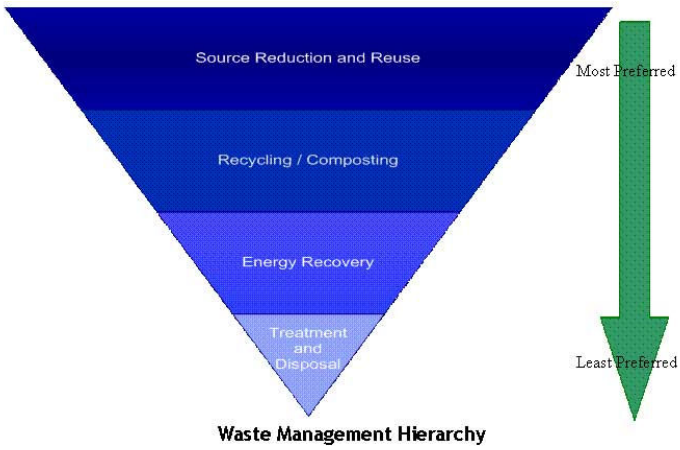

Figure 1. EPA waste management hierarchy: 1. Source reduction and reuse; 2. Recycling / Composting; 3. Energy Recovery; 4. Treatment and Disposal. Source: EPA: http://www.epa.gov/osw/homeland/hierarchy.htm.

Source reduction and reuse encompass practices such as product and packaging reuse and redesign, reduction of material use and organic materials management. Recycling encompasses the collection and processing of waste materials into raw materials that are remanufactured into new products. Recycling, like reuse, saves energy resources, lessens requirements for virgin materials and preserves limited land. Composting is the controlled degradation of biological material, the purpose of which is generally to produce a soil amendment, or fertilizer. Energy recovery from waste typically entails the combustion of materials at high temperatures to produce electricity or steam, though energy can also be recovered through the capture of gas produced by anaerobic digestion of waste material in landfills or digester units. Disposal typically consists of landfilling, with waste materials deposited into highly-regulated lined pits.

[7] "Enlarged Waste Management Hierarchy Image." U.S. Environmental Protection Agency. Accessed on June 4, 2011. Available at: http://www.epa.gov/osw/homeland/hierarchy.htm.

Common Waste Management Practices

States around the nation have adopted laws and formulated regulations informed by the EPA hierarchy framework. For example, New York State created such regulations 20 years ago, and has achieved substantial progress in managing a greater and greater share of its municipal solid waste (MSW) with more preferable management options.[8] Since the adoption of such rules, recycling volumes have shown a generally increasing trend from roughly 5.6 million tons per year in 1960 to over 60 million tons annually in 2009, representing 25.2% of total MSW tonnage in that year.[9] Composting represented a negligible component of the waste management tonnage until the 1990s. In 1990, the U.S. diverted 4.2 million tons of compostable material from the MSW waste stream, and by 2009, that figure had grown rapidly to 8.5% - 9% of the total MSW waste generation, or 20.8 million tons. In 2009, the

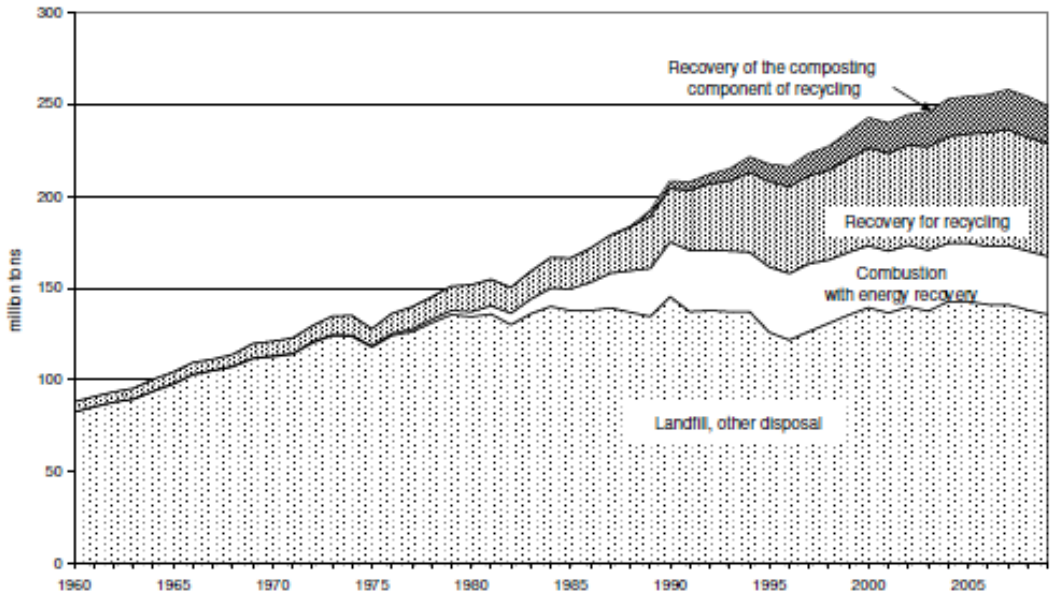

Figure 2. Change in composting, recycling, combustion and landfilling and other disposal of MSW, 1960-2009, in millions of tons. Source: EPA. (2010). Municipal solid waste in the United States: 2009

United States had a nationwide WTE combustion capacity of nearly 95,000 tons per day.[10] According to the EPA, in 2009, there were 87 WTE facilities in the United States, a decreased from 102 in the year 2000. Nearly half of them (40) are sited in the northeastern part of the country.[11] These facilities combusted approximately 29 million tons of MSW in 2009, up from 2.7 million in 1980 when modern waste to energy facilities were first being constructed in the United States, partially spurred by the oil shocks of the 1970s. There are debates currently underway about whether WTE generated energy should be considered renewable energy.

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[8] "Beyond waste: A sustainable materials management strategy for New York State." New York Department of Environmental Conservation. 2010. Available at: http://www.dec.ny.gov/chemical/41831.html.

[9] "Municipal Solid Waste in the United States: 2009 Facts and Figures." U. S. Environmental Protection Agency, Office of Solid Waste. 2010. Accessed May 30, 2011 Available at: http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2009rpt.pdf.

[10] Ibid.

[11] Ibid.

Integrated solid waste management (ISWM) systems in the U.S. comprise a common set of facilities and operations. Municipalities provide or contract for the curbside collection (often referred to as hauling) of residential and sometimes commercial garbage and recyclables from the waste generators (the households and businesses that generate the waste). Recyclables are generally collected by haulers in one of two ways: as either single stream, or dual stream. Single stream (or "fully commingled) collection allows waste generators to place all recyclable materials (such as paper, cardboard, plastic bottles, aluminum cans, etc.) into a single receptacle which is later put out for collection. Alternatively, dual stream recycling systems require generators to separate recyclable products into different bins. Generally, dual stream systems require the separation of paper products from containers made from plastic and glass. Recyclable materials that have been collected by haulers are taken to material recovery facilities (MRFs) where the recyclables are sorted into classes of materials and later prepared and bundled for sale on the recyclables market. Sorting at MRFs may be conducted by humans along conveyor belts, or by a series of mechanical sorting technologies including magnets, filters, and air currents. Garbage collected by haulers is generally delivered to transfer stations, where some sorting takes place (such as removal of hazardous wastes). Materials from the transfer station are loaded into larger hauling trucks or containers and are delivered to landfills, waste to energy (WTE) facilities, or to hazardous waste or recycling facilities.

In the United States, the collection of municipal solid waste is typically managed by local or county governments or by authorities or agencies acting under governmental auspices. Under federal and state legal mandates to manage waste materials in environmentally appropriate ways, governments built or contracted for the use of MRFs, transfer stations, WTE facilities and modern landfills. This change in management practices came at significant cost. To capture economies of scale and finance the costly ISWM system improvements, municipalities and counties often assert the right to control the flow of waste materials, directing them to facilities that handling the materials appropriately, and that capture some economic value (e.g. through removal and sale of recyclables, through combustion and electricity generation at WTE plants or through the collection of tip fees at landfills).

This control over the flow of waste materials is referred to as *flow control* and has been the subject of numerous lawsuits, a number of which have been heard before the U.S. Supreme Court. Flow control can take various forms. Flow control may be achieved through contracts or through the use of economic incentives. Alternatively, governments may mandate flow control or use municipal or municipally contracted collection of waste. The *Commerce Clause* of the U.S. Constitution gives the federal government power over interstate commerce and forbids most forms of trade restrictions between the states. When governments assert legal control over the flow of waste materials, some argue that this represents a violation of interstate commerce, because such materials could be transported over state lines for disposal or processing elsewhere. A recent decision from the U.S. Supreme Court in the *United Haulers v. Oneida-Herkimer Solid Waste Management Authority* case (2007) found that if governments had a "proper local government purpose" for directing solid waste to a public facility (such as a landfill or a WTE plant), than flow control did not violate the *Commerce Clause*. Proper purposes include environmental benefits that accrue from proper processing of materials. An earlier Supreme Court decision in 1994 (the *Carbone* case) found that flow control to a private facility by a local government was in violation of the *Commerce Clause*. Therefore, intrastate flow control to public facilities seem to be on sound legal footing, but it is unclear whether future challenges to flow control laws will continue to be supported by the Supreme Court. While MSW is often flow-controlled to publicly managed facilities, commercially generated waste and recyclables are often not flow-controlled.

As the case studies in later sections of the report reveal, the current landscape of waste management systems exhibits a great degree of heterogeneity, due to differing state, county and municipal laws and regulations, grandfather clauses, and differing availability of financing options, among other causes. Nevertheless, in many parts of the country, and particularly with regard to those solid waste organizations regarded as leaders, the EPA waste management hierarchy appears to be slowly reshaping the management of discarded materials.

The Future: Sustainable Materials Management

Definition

Sustainable Materials Management (SMM) is an approach to serving human needs by using resources most productively throughout their life cycles, generally minimizing both the amount of materials involved and the environmental impacts of their use.[12] Practices associated with this approach include: the reduction of materials extracted from the environment, the use of renewable materials, design that minimizes material use and toxicity while facilitating reprocessing at the end of the life cycle, and the conscientious consumption of products and services with the least environmental impact.

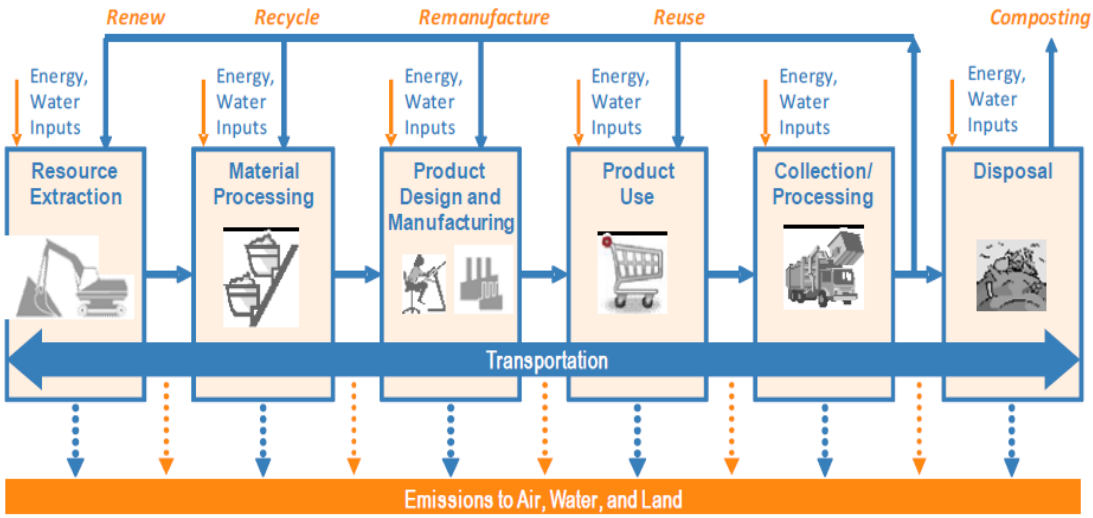

Figure 3. The material life-cycle is comprised of several stages, starting with extraction, and proceeding to disposal. At each state energy and other inputs are required, while emissions and other outputs occur. An ideal process would recover as much input as possible while minimizing harmful output. Source: EPA, Sustainable Material Management, 2009

Past, Present, and Future

EPA's hierarchy of waste management is in many ways the foundation for SMM. It places greatest preference on source reduction and reuse, followed by recycling/composting and energy recovery. Finally, treatment and disposal are the least preferred waste handling techniques.[13] The biggest difference between SMM and past practices is the view that discarded materials are not waste but rather resources. MSW systems are generally focused

[12] "Sustainable materials management: The road ahead." 2009. U. S. Environmental Protection Agency Accessed May 18, 2011. Available at: http://www.epa.gov/osw/inforesources/pubs/vision2.pdf.

[13] "Enlarged Waste Management Hierarchy Image." U.S. Environmental Protection Agency. Accessed on June 4, 2011. Available at: http://www.epa.gov/osw/homeland/hierarchy.htm.

on reduction of waste towards the end of the product's life, while SMM attempts to reduce waste at each stage in the product life cycle.

Implementation

Many communities have already begun to implement the principles of SMM. Here we highlight several ideas from our research and interviews with industry experts. The case study section of this report provides more detailed information on some of the most progressive communities in the nation.

Large and small scale composting is essential to achieving maximum waste reduction. In many communities organic materials make up more than half of the MSW stream. According to Jim Duke, of Caca Loco Compost in Colorado, the most efficient approach to composting is a collaborative system of smaller scale operations where large equipment is shared between entities. This lowers the capital costs and increases the convenience for material delivery in each location.[14] Yard waste, food scraps, and other organic materials can be mixed with biosolids from waste water treatment plants to make high quality compost.

PAYT is among the more successful waste reduction strategies. In many communities its implementation led to an increase in recycling rates by 50% to 100%.[15] Under this system subscribers pay an increasing rate for more waste collection, while recycling and compost pick-up are provided at no additional cost. Several draw backs of this approach are mentioned below, but its primary advantage is that it creates a *financial* incentive to reduce waste. This incentive can impact everything from purchase decisions to how well residents sort their waste.

For materials that cannot be reduced, recycled, or composted, incineration for electricity generation is generally a better alternative to landfilling. Even when compared to landfills with gas-to-energy technology, WTE plants can capture a higher percentage of the energy embodied in the materials. In the near future smaller scale incineration providing electricity on a neighborhood level may become more common.[16]

Perhaps the most important factor in the implementation of SMM is a shift in the responsibility that communities take for their discards. Whereas most people today have an "out of sight out of mind" mentality about waste, in the future they will have to understand what happens to the waste after it is discarded, as well as the cost of managing it. When the costs of management and recovery are transparent, a community is better able to decide what kind of system it wishes to have and how it wishes to fund it.

Urban Materials Mining

Implementing sustainable materials management requires a rethinking of the physical location of material processing facilities. Mineral processing facilities are often located close to mines where ore is extracted from the earth. Lumber mills are generally sited nearby a supply of timber. Significant benefits derive from that spatial proximity. For example, transportation costs –with their concomitant GHG emissions and capital investment requirements—are

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[14] Duke, Jim. Owner Caca Loco Compost. El Jebel, Colorado. Telephone interview conducted by Roman Yavich on May 24, 2011.

[15] Skumatz, Lisa. "Pay as You Throw." Colorado Municipalities. April 2008. pp. 33

[16] Barry, Mick. Consultant for Greenstar Recycling. Telephone interview conducted by Patrick Gaetjens on May 24, 2011.

minimized, local economies retain jobs and re-circulate money, and expertise is preserved in American communities.

Will Sagar of the Southeast Recycling Development Council (SERDC) believes that the milling model holds promise for sustainable materials management in the U.S.[17] Urban areas, Sagar explains, possess the most concentrated resource of the solid waste "ore," which serves as the feedstock for material recovery facilities, compost facilities, waste to energy facilities and landfills. The mining of the ore can be thought of as urban materials mining.

Much of the U.S. lacks recyclables processing capacity. Recyclables are often sent to China and other nations to be processed and resold to manufacturers. Yet many industries in the U.S. are reliant upon recycled material feedstock. In the southeastern U.S., Sagar says that the SERDC has identified 206 manufacturing facilities, such as carpet manufacturers, reliant upon reprocessed recyclable feedstock. Tom Rhoads, executive director of the OCRRA notes that the region surrounding Syracuse, NY is somewhat of an outlier in the northeastern United States in that it is home to a number of recyclable materials processing facilities, such as Solvay Paperboard.[18] Rhoads suggests that materials processing facilities are in short supply in the northeast. However, financing of ISWM facilities such as MRFs is a challenging proposition given the current state of the economy and other challenges present in the southeast.

Two trends in solid waste management signal a coming rise in domestic recycled material processing capacity. The first is the growing privatization of MSW operations, bringing to bear private sector investment resources. Second, some manufacturing firms are beginning to vertically integrate manufacturing operations with feedstock collection. As a result, some firms are seeking to acquire hauling rights for MSW, so as to be able to more reliably extract high quality recyclables for feedstock. Just as the greatest volume of recovered materials in the U.S. comes from the commercial sector[19] and drives recyclables markets, Sagar believes that economic incentives are driving business to invest in materials recovery. With rising populations, increased use of material in packaging and the national trend towards urbanization, it is likely that urban materials mining close to the source of MSW will gain greater prominence. Nevertheless, if a move to sustainable materials management is to take place, these economic incentives to capture recyclables ultimately come into tension with the need to decrease waste generation.

Innovative Ideas

Among the more innovative ideas we encountered in our research is a disposal and recovery ad valorem tax on all products at the time of purchase. A refund system, similar to the bottle bill in many states, would provide incentives for consumers to properly discard the material at the end of its useful life. The tax would discourage unnecessary consumption and provide incentives for proper disposal, while also providing a dedicated funding stream for sustainable waste management.

Another idea is to reuse hard-to-recycle materials, including plastics, in construction. Products, such as houses, built with these materials could be worth more at the end of their life, when

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[17] Sagar, Will. Telephone interview conducted by Matthew Isles on June 2, 2011.

[18] Rhoads, Tom. Personal communication on June 8, 2011.

[19] "Municipal Solid Waste in the United States: 2009 Facts and Figures." U. S. Environmental Protection Agency, Office of Solid Waste. 2010. Accessed May 30, 2011 Available at: http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2009rpt.pdf.

recycling technology is likely to be better, than they would be worth if constructed out of more easily degradable materials. In effect, this practice is similar to "mono-filling" where only one type of material is placed in a landfill. We recommend both of the above ideas to be investigated further in future research.

Ultimately, the most efficient system will reduce and recover materials to the point where the costs of the efforts equal their benefits in terms of energy use, environmental impact, health effects, etc. However, a key difficulty is that the benefits are often long-term and hard to quantify in dollar terms while the costs are usually obvious and immediate.

Obstacles

The number of obstacles to SMM implementation includes the low cost of land-filling relative to recovery. The *true* cost of land-filling would include the associated environmental damage and lost embodied energy and materials that are simply buried in the ground. Adjusting tipping fees to incorporate these costs is one strategy to level the playing field for SMM. Another common obstacle is the lack of end-users for recycled or recovered materials. This is the reason why most types of plastic are recyclable but most communities are only able to recycle #1, #2, and sometimes #5 plastic. Other types of plastic simply do not have any buyers or cannot be shipped in sufficient quantity due to their low density (e.g. Styrofoam).

Another important obstacle is the difficulty of implementing PAYT in multi-family residential complexes, where all residents use a common container to discard their waste. In this situation, charging each resident based on the amount of waste discarded is difficult. PAYT can also lead to increasing rates of illegal dumping and is often politically difficult to implement because most people are simply not used to paying for trash based on quantity. Because PAYT is one of the more successful waste reduction strategies overcoming these challenges should be a priority.

Conclusions about SMM

The transition to SMM is a gradual process and the most recent paradigm shift in waste management. The rapidly increasing pressure of human consumption on the environment necessitates a rapid transition to SMM and requires the support from all sectors of the economy and all stakeholders in the product life cycle.

Role of state and local governments

Solid waste management can be administered by a variety of entities—governments, nonprofits, public benefit corporations that are created by governments but operate independently. Independent entities—either public benefit corporations and nonprofits— that are not authorized to pass ordinances or change tax structures must work with the local government to achieve these goals. County and city governments can pass various types of ordinances. PAYT requirements, bans on certain products, and fees or taxes can all be mechanisms for local governments to direct solid waste management entities toward waste reduction goals and incentivize various stakeholders to work toward these goals as well. Some ordinances are more targeted toward haulers, others are more toward consumers.

Some of the more difficult and/or costly measures for waste reduction are more suited to implementation at the state level. For example, states can enact legislation that requires a certain percentage of the waste stream be diverted from the landfill, which allows for greater recycling and waste reduction measures than would be achieved without such an ordinance. This enables the solid waste management entities in the state to have a level playing field and achieve missions of waste reduction without the threat of losing competitive advantage to landfills in neighboring jurisdictions. This is exemplified by the California Integrated Waste

Management Act of 1989, which mandates 50% diversion rates for all cities and counties in the state. The penalty for failing to meet this goal is $10,000 a day in fines. This has enabled San Francisco to become a national leader in recycling rates.

National Case Studies

This section presents national case studies divided into two groups. In the first group are communities with WTE facilities, while communities without such facilities are in the second group. This distinction was made to facilitate information gather for communities such as Onondaga County and its solid waste authority, OCRRA, which may find it beneficial to study most similar cases first.

Table 1 summarizes the national case studies. Detailed descriptions of the case studies follow, with those having a WTE facility listed first.

Table 1. Summary of national case studies

National Case Studies Comparison									
	OCRRA	**Palm Beach County**	**Lee County**	**Hennepin County**	**King County**	**Boulder County**	**Portland, OR**	**San Francisco County**	**Alameda County**
Population	454,753	1,268,183	586,908	1,140,988	1,322,450	303,000	537,081	797,271	1,535,002
Diversion Rate	60%	31%	41%	45%	48.5%	23%	54.5%	77%	69%
Recycle									
single stream	X		X	X	X	X	X	X	X
profit sharing with MRF	X	X	X						
Compost									
yard waste	X	X	X	X	X	X	X	X	X
foodwaste		X		X	X	X	X	X	X
biosolids?		X	X						
WTE									
electricity revenue sharing	X	X	X	X					
county ownership	X	X	X	X					
Landfill									
public ownership		X	X		X				
methane recapture	X	X			X			X	X

Communities with WTE facilities

Solid Waste Authority of Palm Beach County, FL

Community Description
Population: 1,268,183
Median age: 43.5
Education: 31.3% BA+
Median household income: $53,538
Unemployment: 11.7%
Household types: total units - 634,413; owner occupied: 73.8%; rental: 26.2%
Recycling participation rate: 56%
Total diversion rate: 31% recycling (27% combustion, 39% landfilled)

Highlighted features
- Serves 38 municipalities & unincorporated territory
- Near 100% public ownership of ISWM system
- Credit system for hauler tip fees based on annual assessments
- MSW PAYT system rejected due to multi-jurisdictional legal complexity
- Landfill gas to energy powers a sludge drying & pelletizing plant
- 150 public recycling drop off sites, 6 transfer stations
- Advanced capacity payment power purchase agreement under review for new WTE facility

Ownership Arrangements and System Structure
The Solid Waste Authority (SWA) was formed in 1975 to serve Palm Beach County by a special act of the Florida State legislature. That act gave SWA authority to levy taxes to fund SWM programs and to manage county-wide waste. The SWA serves 38 municipalities and unincorporated territory. Palm Beach County has opted to build and maintain ownership of most of its ISWM system, with assets totaling greater than $1.13 billion in 2010, and liabilities of $709 million. The county faces current annual debt payments of between $50-$60 million per year, necessitating a reliable revenue stream to meet its obligations and maintain its high bond rating. Mark Eyeington, Chief Operating Officer of the SWA describes the SWA as, "a volume reduction system that generates revenues as a side product," and which saves landfill capacity.[20] This underscores that waste reduction and volume minimization are important for SWA.

SWA owns one WTE facility, and will soon break ground on another, larger facility. SWA owns 6 transfer stations, a woody waste recycling facility, a ferrous metal processing facility, a modular in-vessel compost facility, a sludge drying and pelletizing facility, one Class 1[21] and one Class 3 landfill with capacity through 2024, and dual stream recovered material processing facilities for commercial and residential recyclables. The WTE facility and the residential MRF are operated by contracted firms, while other facilities are operated by county employees. In 2009, the woody waste facility received over 209,041 tons of yard waste which was either composted, used as WTE fuel or mulched. The compost facility processes yard waste and waste-water treatment plant sludge in 36 bays which are turned daily and produce compost in a 14 day cycle. The facility generates 60,000 tons of saleable compost per year.

[20] Eyeington, Mark. Director of Solid Waste Authority, Palm Beach County, Fl. Telephone interview conducted by Matthew Isles on June 3, 2011.
[21] A Class 1 landfill is also known as a "double-lined" landfill because it is lined with multiple layers of lining materials intended to prevent leachate from escaping the landfill and contaminating groundwater. Class 1 landfills may accept special categories of waste such as WTE ash and sludge, which may not be placed in Class 3 landfills which feature less lining material.

SWA relies upon economic flow control and provides collection in unincorporated areas of the county to both residential and commercial waste generators, while municipalities contract for collections of MSW. Collection of recyclables is dual stream, which saves SWA expense at the processing stage, according to Eyeington.

WTE Specifics

The SWA currently operates a roughly 20 year-old refuse-derived fuel (RDF) WTE facility that typically processes 870,000 tons per year at roughly $35 per ton – a higher volume than its built capacity of 2,000 tons per day. This facility was recently refurbished at a cost of $200 million. Generated electricity is sold to Florida Power and Electric. In 2009, the facility processed 858,511 tons of MSW, diverting 525,829 tons from the County landfill. In the process, SWA recovered 34,993 tons of metal for subsequent sale, and enough generated electricity for its operations and roughly 30,000 homes.

The authority will be soon begin constructing a new mass-burn WTE facility which will process an average of 3,000 tons per day or roughly 1 million tons per year at an expected processing cost of $20 per ton. By adding the second WTE plant, the county could reduce its annual landfill tonnage by 90% and extend the life of the county landfill to 2048, in addition to producing electricity and recovered metal sales. The SWA will grow into the facility, at first directing some of the County's woody waste and compostable material to the facility, and later using that processing capacity for the expected growth in MSW.

Two types of power purchasing agreement (PPA) dominate in Florida: market PPAs, and energy plus capacity PPAs. The existing WTE plant uses the later PPA arrangement, guaranteeing 42 MW per hour to Florida Power and Light (FPL), and using the balance of its generation for WTE plant operations. The SWA will likely sign an "advanced capacity payment" with FPL for its new facility. This would commit SWA to a capacity delivery, but payment for some of the power would take place in advance of facility construction. This early infusion of financing would assist SWA with the up-front costs of constructing the plant and would shrink debt and related interest costs.

Financial Arrangements and Revenue Streams

Fee Structure: The SWA assesses a fixed curbside collection fee or a containerized fee on county residents on their tax form. Annual curbside rates are currently: single family: $166; multi-family (2-4) units: $94; multi-family >4 units: $94 and mobile homes: $159. Container collection assessments for residential units without curbside pick-up range from $46 to $146 per anum. Haulers bid on five year contracts for each of the SWA's 11 service areas. The SWA sets annual assessments based on the winning hauler bids. Contractors are limited to 55% of county service volume based on number of households. Hauler tip fees include $42/ton for trash, $40/ton for construction and demolition (C&D) waste, $25 per ton of vegetation, $42 per ton of recycling residue, $190/ton of tires and other fees for special waste, animals, trailers and automobiles. SWA gives haulers credits for a given tonnage of waste based on non-ad valorem assessment payments. Once a hauler exceeds these credits, tip fees of $42 per ton are assessed. Commercial accounts in the county use PAYT pricing, collected through haulers. However, the county has rejected county-wide PAYT system for its residential collections because each municipality in the county would need to institute the structure. Eyeington judged that to be a politically challenging proposition. In addition, county officials feel that the service assessment provides a more reliable stream of revenue to meet its debt obligations.

Revenue sources: Annual service assessments typically cover roughly 75% of operating expenses, tip fees roughly 8-10%, and the SWA's existing WTE facility roughly 13%. Assessments for waste disposal are levied for all improved properties, and collection fees are

levied for residential properties in unincorporated areas. In 2009, assessments brought in $164,120,637, $18,563,877 came from tip fees, $29,133,626 from electric generation, and $2,611,735 in interest income. The SWA MRFs generated a combined $16.5 million in revenue from the sale of recyclables. Other sources of revenue include interest income, sludge disposal fees, property lease revenue, compost sales, franchise hauler fees, grant funds and permit application fees.

Revenue Sharing: The SWA pays a service fee to facility operators at the WTE facility and to haulers. The WTE facility operator receives a contracted fee, while the SWA receives revenue from the sale of ferrous and non-ferrous metal, and electricity. To incentivize commercial recycling, SWA offers a share of the recycling sales revenues for delivery of clean loads of cardboard and white ledger to the Authority's commercial materials recycling facility. Municipal governments receive a 50% share of the sale value of recyclables delivered to the SWA.

Expenses: Operating expenses for the SWA include contract payments to plant operators, personnel costs, insurance premiums, depreciation and amortization (D&A), franchise hauler contract payments, as well as program, repair and maintenance costs. Non-operating expenses include debt payments and interest expense on county debt. In 2009 SWA faced $38,428,209 in contract payments for plant operations, $33,069,715 in personnel costs, $24,396,773 in D&A, $40,533,823 in hauler contracts and $30,584,035 in other operating expenses, as well as $14,002,833 in interest payments. WTE processing costs for the current facility are roughly $35 per ton, while processing costs at the second WTE facility are expected to be roughly $20 per ton. Composting operations are expensive for the county and are a money loser, typically costing $5 million per year, while only generating $250,000 in revenue. In practice the County gives away much of its compost, but maintains the program as a service to the community and because of the broader environmental benefits produced by the composting operation.

Operational Best Practices

SWA manages a successful ISWM system under county ownership while maintaining competitive rates, and conducting long term planning extending 50 years into future. Each aspect of the ISWM system –its landfill, transfer station, WTE facility, recycling program and public education operations- have been recognized for achievement at the national level. The SWA has also won awards for the conversion of landfills to park and recreation lands. Low landfill tip fees in the surrounding counties make competitive rates essential. The SWA works to keep customer costs stable by regularly expanding or improving its operations in order to avoid a scenario where assessment rates drop significantly, but later must be raised to pay for upgrades. Such swings in price could engender customer dissatisfaction and threaten SWA's model. Methane captured from SWA's landfill powers sludge dryers applied to waste water treatment plant sludge, resulting in an 84% sludge mass reduction. Once dry, pelletized-sludge is used as a fertilizer amendment. This system integrates benefits from recycling, composting and conversion of landfill greenhouse gases (GHGs) to a fuel source. The system of 6 transfer stations provides for convenient drop off of solid waste, recycling, yard waste and household hazardous waste. SWA also coordinates over 150 public recycling drop off centers. The SWA has maintained its high bond rating by demonstrating sound management and the ability to secure capital and pay off debt. By constructing a second WTE facility, the SWA will greatly enhance its volume reduction efforts aimed at preserving landfill space. SWA performs roughly 1,200 free waste audits for commercial businesses each year to determine the quantity of recyclables materials being disposed, and to provide recommendations and information about achieving cost reduction and recycling program implementation. SWA tracks CO_2 equivalent savings closely, and is currently exploring carbon credit options.

Collaborative Governance

SWA collaborates with public and private sector organizations in many aspects of its operations. While the SWA is the sole owner of most of its system facilities, the SWA owns the sludge pelletizing plant with the county waste water treatment authority in a 70%-30% ownership arrangement. SWA partners with county municipalities and unincorporated territories through inter-local agreements. These agreements set the terms of the delivery of MSW, recyclables and household hazardous waste to SWA facilities. Additionally, the agreements require that cities and the SWA encourage recycling, while the SWA must provide recycling containers. The agreements establish the revenue share of recyclables sales between the county and the municipalities. Commercial firms delivering clean loads of corrugated cardboard and white ledger to the SWA also receive a revenue share.

Contact Information

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Solid Waste Division, Lee County, FL

Community Description
Population: 586,908
Median age: 45.2
Education: 21.1% has BA or more
Median household income: $50,863
Unemployment: 11.2%
Average household size: 2.31
Participation rate: 100%
Total diversion rate: 41%

Highlighted Features
- Construction and demolition recycle station
- WTE Recycle
- Compost of only horticulture material (excludes food waste)
- Local mandatory recycling ordinance
- Collaborative partnership with Hendry County
- 100% county ownership

Current Material Management System
All of the facilities in the integrated system are county owned: WTE facility, ash monofill, two transfer stations, a MRF, and the new Construction Demolition Recycle Center. The Solid Waste Division has inter-local agreements with its municipalities and the unincorporated areas of Lee County. The Solid Waste Division not only works within Lee but also has a cross-county agreement with Hendry County to pick up only their trash in exchange for siting Lee's monofill for WTE ash (an "ash for trash" arrangement). The MRF is located in the town of Fort Myers.

WTE has been classified at the state level as recycling. The WTE plant recycles all ferrous and non-ferrous materials and convert all steam produced in the plant into electricity to sell. The county recently opened a C&D plant in order to aid in achieving the state's target of 75% recycling. The representative says mostly everything can be recycled however insulation, drywall and other toxic materials that cannot be recycled are used as alternative daily cover.

The WTE facility recently expanded to add a third burner, considering the County's growing population, the entire facility was imported from Japan because a product as large as this one was not available in America. The electricity generated is sold to Tampa Bay Seminole Electric. It abides by the EPA's New Source Performance Standards. The yearly cost to residents is $225 paid through the trash fee described above used in the County.

Financial Arrangements
Lee County enjoys very high revenues because of the ownership structure in the County. Currently, it owns all of the facilities and contracts operation to private entities. It uses a tipping fee structure to collect yard-waste, paper shred, tires and other materials. The residents are charged for solid waste services through the property tax. The county keeps its gate fee at reasonable per ton cost and uses a fixed disposal assessment which covers fixed costs to operate based on generation of waste. Similar to Palm Beach County, the solid waste division has an interesting contract with haulers who collect waste from commercial entities. The contract charges business owners for waste based on the square footage of the property. This charge goes on the business' tax bill. The haulers then charge the businesses for the cans they pick up from the business. The collection charge is based on the weight of the can

so if the cans are under filled, the commercial hauler must return the difference to the County. This is called the true-up disposal rate.

The county's innovative MRF contract is of note. The county owns the building and the processing equipment but contracts with Re-Community to maintain and operate the facility. The county and MRF operator have a 70/30 profit share agreement. However, if the county's system diverts more than 60,000 tons to the MRF in a year, the county's share of the profit increases to a 78/22 split. Lee County is in the process of distributing 64 gallon recycling carts to residences. The expectation is that this new collection tool will allow the county to enjoy the more favorable profit share more regularly. The county financed the totes through a $22 fee tacked onto hauler contracts in the franchise area. Interestingly, pick up days are separate for recyclables and waste to avoid contamination.

Operational Best Practices

The State of Florida has increased its recycling rate mandate to 75% by 2020 which Lee County has already attained. The county attributes its success to a county ordinance requiring commercial entities to recycle that includes a system of monthly penalties until they are in compliance. Businesses are required to recycle the material they produce the most of. For example, an office building must recycle paper, whereas restaurants and bars must recycle plastic, glass, and aluminum. Restaurants and bars end up recycling cardboard as well because it's cheaper to have it picked up as a recyclable.

The composting program is exclusively for horticulture material. Food waste is not included because of the difficulty with hot weather and collection. The program brings in $1.7 million annually. Sludge from the waste water treatment is combined with the horticulture waste from the nearby farms. Demand for the resulting compost is high, with a market that includes sales to individuals and large-scale farmers.

Emory Smith, Director of Recycling, explains that the most successful outreach tool is the Division's annual calendar, which highlights SWM programs, county school schedules, holiday collection changes, and general information about how to dispose of materials.

Collaborative Governance

Lee County works with Hendry County to collect their waste and process it at the Waste to Energy plant. In exchange they have a monofill for ash. Their contract is for 20 years giving them a lower rate for sending their trash to the plant.

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Solid Waste Management of Hennepin County, MN

Community Description
Population: 1,152,425
Median age: 37.2
Education: 43.7% BA+
Median household income: $61,387
Unemployment: 4.9%
Average household size: 2.36
Total diversion rate: 45% (includes C&D and compost)

Highlighted features:
- Designated revenue source
- Waste abatement grants
- Subsidized organics program
- WTE outreach

Current Material Management System
Hennepin County manages transfer and disposal of approximately 1.5 million tons of solid waste collected annually within its jurisdiction, which includes Minneapolis and its suburban areas. Minneapolis residents receive curbside collection arranged by the city, while other county residents contract directly with private haulers. The county decided to abandon flow control after a recent law suit, but contracts with haulers to ensure a sufficient amount of trash is going to the county's WTE facility, Hennepin Energy Recovery Center (HERC), which is operated by Covanta. In 2009, a steam line was built between the facility and the downtown district heating system. Construction costs were split between the county and the steam company.

HERC alone cannot process all the county's garbage so a portion of MSW is hauled to private landfills in the area. To reduce the amount MSW getting landfilled (540 thousand tons in 2010), the county resumed sending solid waste to a private refuse-derived fuel facility, where trash is processed into biomass fuel that is combusted to generate electricity. Additionally, the county is petitioning to change the permitted capacity of the WTE plant raised from 365 thousand tons per year to its actual operating capacity of 442 thousand tons per year.

The four MRFs in the county are privately owned and operated. The two major collection companies, Allied and WM, each have their own MRF where they process their collected recyclables. Curbside collection of source-separated organics (SSO) exists in eight municipalities and some Minneapolis neighborhoods, usually as an "opt in" service available for a fee. About 5,000 households (out of a total of 350,000) participate in this service. SSO collection has rolled out more significantly in the county's schools and businesses.

Integrated solid waste management is housed within the county's Environmental Services Department (ESD), which directly manages the county's land and water conservation, contaminated lands cleanup, commercial and household hazardous waste, and environmental education and outreach programs.

Financial Arrangements
Hennepin County assesses a solid waste management fee that feeds a solid waste enterprise fund. The fund covers programs such as waste reduction and reuse, recycling, tree waste management, and management of problem materials and household hazardous waste. The fee is tacked onto waste generators' monthly garbage bill from their private hauler (or city utility bill for Minneapolis residents). The county fee is assessed as a percentage of the total collection and disposal bill; 9% for residents and 14.5% for commercial generators. A typical

single family resident pays $21.38 per month total to their hauler. A separate ad valorem Solid Waste Fee was added onto property tax statements until 2011, when it was eliminated along with 22% decrease in the ESD's budget. The decreased was mostly due to the completion of payments on two facilities and half of the debt payments on the HERC plant in 2010.

Fee structure: Although haulers are mandated by state law to employ a volume-based fee structure, in most areas the difference in fees for different sized containers is so small that there is negligible financial incentive for generators to reduce waste. The county charges contracted haulers a $45 per ton tipping fee at its transfer stations. The availability of private landfills around the county keep tip fees close to the market rate. Before the decision to give up flow control, the county charged more than twice this amount at $95 per ton.

The county's Brooklyn Park transfer facility accepts source-separated organics for tipping fee of $15 per ton – one third the tipping fee for other garbage. In addition to reduced tipping fees, Hennepin employs tax incentives to increase participation in the program. The State tax and county fee levied on normal residential and commercial waste are waved for source-separated organic waste. Hennepin also handles the transfer of organics to a commercial composting facility, minimizing the extra burden on haulers. The county's SSO operations are heavily subsidized. The actual cost of transport and disposal of organics at the private compost site is approximately $42 per ton.

This incentive structure is intended to motivate haulers to accommodate and encourage SSO among their customers. The system has been especially effective in promoting SSO collection for the commercial sector and in schools. Curbside SSO has been slower to catch on because most of the costs for haulers come from the collection stage and even large tipping subsidies are not enough to make it profitable for haulers to take on the costs of orchestrating curbside collection.

Revenue sources: System revenues come primarily from the Solid Waste Management Fee on generators' garbage bills and tipping fees at the County's transfer stations. Electricity and steam sales from the HERC facility provide additional revenue. Covanta shares a third of electricity and steam revenue with the county. The HERC facility also qualifies for renewable energy credits in Minnesota, but according to Randy Kiser, the county's Supervising Environmentalist, there is currently not a market for them.

Operational Best Practices

Waste Abatement Incentive Fund: Hennepin County sets aside $300 thousand per year for a Waste Abatement Incentive Fund that provides grants to public entities and all K-12 schools. Grants supply seed funding for waste reduction programs and have been used primarily to initiate food waste collection programs. For schools, an abatement grant can cover the initial cost of new containers, outreach materials, and educational activities. The grants allow schools to keep new collection programs cost-neutral while they renegotiate haulers contracts that incorporate the reduced cost of organics disposal. In recent years, the fund has supported the start-up of organics recycling programs in over one hundred schools and a handful municipalities. The program has been the subject of a great deal of media coverage and attention from public officials.

WTE promotion: The county makes special efforts to facilitate awareness among Hennepin residents about the HERC resource recovery facility, particularly because of its location in downtown Minneapolis. This summer during the annual Northern Spark Art Festival, the HERC facility will become a piece of art itself, supporting a giant outdoor video projection on the facility's downtown-facing wall. Artist Christopher Baker's "Waste Not" project includes a brilliant display of images and video that highlight the process of turning trash into electricity

and steam. The installation is also meant to raise awareness about of energy consumption and waste generation, visually displaying what Minneapolitans are throwing away, how much waste is produced every hour, and how much energy is generated from that waste. These visual representations will actually be driven by a computer model that continuously draws on the latest data from city agencies, the Census Bureau, and Covanta to generate the display.

Collaborative Governance

The Hennepin County system is highly decentralized and completely privatized, apart from WTE ownership. Paul Kroening, supervisor of the Waste Reduction & Recycling Unit, describes that this structure reduces the county's financial obligations, but leaves it with little control for achieving waste reduction goals. Kroening explains that the result is a system that is completely reliant on waste generators, collectors, municipalities, and the county working as a team.

Without the authority to set collection standards throughout its municipalities, the county has employed some innovative methods to incentivize cities and private haulers to get on board with county waste reduction goals. The county has made grants available to its municipalities to, in turn, incentivize haulers to take on curbside organics collection. In one municipality, county grant funds provide haulers with $25 for every new organics customer, intended to cover the cost of the collection bin.

Contact Information

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Communities Without WTE Facilities

Solid Waste Division of King County, WA

Community Description
Population*: 1,322,450
Median age: 37.1
Education: 40% BA+
Median household income: $66,400
Unemployment: 7.9%
Average household size: 2.39
Curbside recycling participation: 87%
Total diversion rate*: 48.5 (includes C&D, compost)

* Does not include Seattle and Milton

Highlighted features:
- Opt-in curbside food waste
- PAYT by bin size
- Single-stream recycling
- Municipal pilot studies
- Attention to messaging
- Public-private partners

Current Material Management System
The King County Solid Waste Division (KCSWD) manages the transfer and disposal of solid waste generated in 37 of its 39 municipalities (Seattle is not included) and the County's unincorporated areas. Municipalities contract with private contractors for residential curbside collection, with a few exceptions where residents are responsible for finding their own contractor. Curbside collection includes trash and comingled recyclable pick up. Curbside yard waste collection is also available to almost all county residents (on an opt-in basis in most municipalities) and includes all food scraps and food-soiled papers. At this time about 50% of households are taking advantage of yard waste collection.

Interlocal agreements mandate that haulers bring MSW to one of the County's eight transfer stations. Transfer stations also accept trash, yard waste, and recyclables from businesses and residents. The County does not have a resource recovery facility and disposes of 825,000 to 1,000,000 tons of waste annually in its 920-acre Cedar Hills Regional Landfill. The two major collection companies, Allied and WM, each own and operate their own MRF where they process their collected recyclables and recyclables from other haulers as well. Recycling rates vary between cities, most falling between 30 to 40 percent (not including organics). Non-residential recycling has been growing steadily in recent years, reaching 62% in 2009.

Financial Arrangements
Fee structure: In almost all municipalities, residents pay collection fees directly to their haulers. Municipalities set residential collection rates and pay a service fee to the haulers. Haulers use a PAYT system for commercial and residential customers. Residents can choose between three container sizes, with a reduced fee for smaller containers. The fees for recycling and organics collection are flat and include the costs of containers. The fee structure incentivizes residents to reduce their garbage and increase recycling and separating organics. In eight municipalities, organics fees are embedded in the garbage collection fee. A County study observed that the average pounds of garbage per household in these cities were 17%

below the rest of King County. Two cities, Renton and Kent, recently renegotiated hauler contracts and restructured collection rates so that residents who drop to a smaller garbage can size and add curbside organics collection can save money by doing so. Financially incentivizing this kind of decision-making is the goal of other municipalities once their hauler contracts are up for renegotiation. The new contract in Renton is unique because the City directly pays haulers' tipping fees to the County (usually a requirement of haulers) as well as a service fee for collection. Linda Knight, Renton's Solid Waste Coordinator, explains that this has been a money saver because by paying the County directly, the City avoids the mark-up from the hauler middleman on disposal fees. Knight believes it is only a matter of time before other municipalities adopt this structure.

Revenue sources: The County's transfer and disposal system is an enterprise fund dependent on revenue from tipping fees, which comprise 90.5% of the Division's revenue. Beyond funding operations, a portion of tipping revenue is transferred annually into the landfill reserve fund, which finances the development of new sections of the current landfill, facility improvements, and post-closure landfill maintenance. Another portion of tipping revenue is combined with bond proceeds into a construction fund for capital projects. The remaining 9.5% of revenue comes from fees for hazardous waste management, grants, C&D surcharge, sales of recyclables, and interest.

King County began gas-to-energy operations at their landfill in 2009, providing gas to the grid via an existing pipeline adjacent to the landfill. The gas-to-energy facility is owned and operated by Bio Energy, LLC. KCSWD expects to earn a minimum of $1 million annually through its contract with Bio Energy. In addition, KCSWD retains the rights to carbon offset revenues from the facility. The Division anticipates that they can earn $500 thousand per year from the sale of emissions credits.

Expenses: KCSWD spent $94.5 million in 2010. 30% of their expenditures are administrative, followed by 17% on transfer operations and 14.5% on transport operations. Transfer payments from tipping revenue into other funds represents 10.5% of total expenditures. Remaining expenses are rent, debt service, and landfill gas and waste water management.

Operational Best Practices

Simple messaging: King County emphasizes the principal of "zero waste of resources," or avoiding the disposal of materials with economic value, in all of its outreach and education efforts. The key feature of King County's waste reduction efforts is its focus on simple, practicable messages embedded in the "zero waste" ideal. According to Gerty Coville, recycling project manager, the County has had success in changing behaviors through focusing on these easy-to-digest messages. For example, an early campaign targeted the "low hanging fruit" goal of getting pizza boxes and food-soiled paper towels into the yard waste container. Now the County is pushing residents to put compost containers on their countertops and purchase compostable bags to collect all food scraps. The overall goal of waste reduction outreach is to get people to think about their waste practically as three piles (garbage, recyclables, compostables), rather than trying to get residents to subscribe to a "zero waste" ideal.

Municipal test beds: King County incorporates the results of municipal pilot programs into their county-wide standards. These standards are implemented through County ordinances and when municipalities renegotiate collection contracts. For example, in 2007 King County partnered with the City of Renton to evaluate customer response and potential waste diversion impacts of every-other-week (EOW) garbage, recycling and yard waste plus food waste collection. One municipality saw EoW collection of all three bins, while another maintained weekly yard/food waste collection with EoW garbage and recyclables collection.

The study indicated that both new schedules were satisfactory to residents without environmental hazards associated with the incorporation of food waste or an EoW collection schedule. Now opt-in curbside food/yard waste collection is available across the county. A collection of municipalities adopted the every-other-week pick up for garbage and recyclables based on the study results, and have enjoyed reduced collection costs, neighborhood traffic, and vehicle emissions.
Since the spread of curbside organics collection, two cities have renegotiated hauler contracts so that residents save money when they opt-in to curbside organics collection while simultaneously reducing their garbage bin size. This is the goal integration of curbside organics and PAYT that the county will encourage as other municipalities are up for renegotiation. The City of Renton renegotiated hauler contracts so the city pays haulers' tip fees directly to the county, eliminating the middle man. These successful programs are expected to be adopted by other municipalities.

Public-Private Partners
This year King County engaged in an effective private sector partnership in their efforts to encourage people to put food waste into yard waste collection bins, or, more importantly, to get food waste collection tools into people's hands. The County dedicated a portion of its media funds towards advertising for a local drug and grocery chain for a month. County advertisements directed residents to the chain during a month where compostable bags and countertop organics containers were being sold at a deep 20% discount. The stores were equipped with County education materials and staffed on weekends by a County composting volunteer to outreach and answer questions.

Drawing on another natural private ally, the county further stepped up its compostable materials outreach by coordinating organics messaging with haulers. Hauler and County interests are aligned on this issues, since haulers benefits from food/year waste collection sign-ups.

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Eco-cycle and the City and County of Boulder, CO

Community Description
Population: 292,000
Median age: 29
Education: 56% BA +
Median household income: $66,760
Unemployment: 6.9%
Average household size: 2.47
Curbside participation rate: 90%
Total diversion rate: 23%

Highlighted features:
- Curbside pick-up, including organic
- PAYT
- Center for Hard to Recycle Materials
- Local level ordinance
- Trash tax
- Collaborative governance

Current Material Management System
Private haulers collect all residential discards from the curb with single stream recycling and composting. The City and County together sponsor a yard waste and organic drop-off site administered by a major private sector company. The public sector entities contract with the local non-profit Eco-Cycle to operate the county-owned MRF and a number of recycling drop-off locations. Eco-Cycle also provides recycling collection to 800 local businesses, operates the Center for Hard to Recycle Materials (CHaRM), and provides a range of educational programs to the community. A portion of the C&D stream is diverted and refurbished and sold by another non-profit, Center for Resource Conservation (CRC). Boulder County does not have a landfill, and discarded materials are transported to private and public landfills in neighboring counties. While glass is recycled locally at a beer company, most other materials are sold to national and international buyers.

Financial Arrangements
Customers pay directly to private haulers. Residential curbside charges include the collection of recyclables and organic materials. A City ordinance requires haulers to charge per volume of discards (PAYT). In addition, a city "trash tax" is charged of all haulers per residence serviced ($3.50) and per cubic yard collected ($0.85) from commercial accounts. This tax is generally passed on the customer by the hauler as a line item on the waste collection bill. In 2010 this tax generated $1.8 million for the City of Boulder's waste-reduction programs. As might be expected, the trash tax was politically difficult to implement. One of the reasons behind its passage was Eco-Cycle's door to door campaign in support of the measure.

Eco-Cycle has an annual budget of approximately $5 million, making it one of the largest material management non-profits in the country. Approximately 90% of this budget comes from revenue on recycling services they provide to businesses, municipalities, and the county. It provides CHaRM services under a fee schedule. A 10% mark-up on the cost of the services goes towards educational programs ($500K/year).

Operational Best Practices
With a mission focused on "zero waste" Eco-Cycle is a champion for "discard management." This nonprofit also serves as the central node of control for system

management and inter-organizational collaboration. Strong community outreach efforts, coupled with zero-waste events and zero-waste consulting packages provided to area businesses, keeps the pressure on the community to take responsibility for its discards.

CHaRM is one of the first centers of its kind in the country, collecting everything from foam to bike parts and shoes, electronics, printer cartridges, and yoga mats. A new item is added every year. The curbside collection program in Boulder was one of the first in the country when it was started in 1976 by Eco-Cycle. "Block leaders" volunteered for Eco-Cycle to educate other residents about the program and to this day Eco-Cycle has an "army" of more than 800 volunteers. The program recently expanded to collect organic materials.
The PAYT ordinance, which requires the cost of collection to double for residents with two waste bins instead of one, increased the number of people subscribing to one bin from 23% to 50%. Recycling bins are provided at no additional cost. Because haulers collect only the waste placed in bins, the ordinance resulted in more conscientious sorting of recyclables out of the waste stream and most likely a reduction in waste in general. Both the City and County have zero waste ordinances with recycling service and PAYT requirements imposed on the licensed haulers. Both ordinances are provided in the appendix.

Collaborative Governance
While the number of organizations involved in material management in Boulder County make effective administration a challenge, Eric Lombardi, Eco-Cycle's Executive Director, says that the first step is to understand that the public and nonprofit sector organizations share a common goal of waste reduction. Having an organization independent of the public sector willing to take innovative steps and the associated risks is an asset in moving this community toward sustainable material management and its goal of zero waste.

In 2010 the City purchased a property to house all essential recycling services and offices for Eco-Cycle and CRC in the same location. Geographic proximity will further increase collaboration.

Persisting Challenge
Landfill tipping fees are extremely low in this part of Colorado ($12/ton) due to the high availability of land. This fact increases the financial challenge of diversion.

Contact Information

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Solid Waste and Recycling Division of Portland, OR

Community Description
Population: 545,140 (39% Metro waste processed)
Median age: 45.2
Education: 32.6%
Average household size: 2.30
Unemployment: 8.8%
Median household income: $40,146
Recycling participation rate: 80%
Total diversion rate: 54.5%

Highlighted Practices
- Multiple alternative waste programs
- Collaborative governance
- Regional solid waste management plan
- Franchise areas
- Mandatory commercial recycling ordinance

Current Material Management System
Portland works as part of the Metro-wide Regional Solid Waste Management Plan. The purpose of the Plan is to work with the local governments to ensure they are achieving the recycling and recovery goals for the region. The City of Portland's Solid Waste and Recycling Division lies within the Office of Sustainable Development of the City government. Local governments must comply with the state laws such as the "Opportunity to Recycle," which mandates that waste reduction and recycling programs are implemented throughout the state. Along with the City of Portland, the Metro government oversees solid waste management in three counties: Multnomah, Clackamas and Washington.

The City Council merged the Solid Waste and Recycling Division with the Energy Office, the Green Building Initiative, and Sustainable Portland Commission under the Office of Sustainable Development. The system allows the City to centralize its operations, merging visions of differing departments under one goal for the City.

The City of Portland is divided into 31 franchise districts that collect waste and recycling from homes and two cooperative recycling districts that provide recycling service to homes. Sixty companies with city permits haul waste and recycling from businesses, with an additional 27 companies collecting only recyclables from businesses. The residential trash pick-up is weekly with the option to collect once per month using a 32 gallon container. There are different can sizes provided by haulers including options for multiplex communities. The city provides two recycling bins for paper and containers, with glass separated by placing the items in a paper bag. There is also pick-up for used motor oil if placed in a proper container. The hauler is required to haul MSW to a Metro facility, the recyclables to a City-approved facility. Later, in 1996 City Council required all businesses and multifamily complexes to recycle.

Portland's commercial recycling collection system is not franchised. The commercial sector has open and competitive garbage and recycling collection system that allows commercial customers to choose among 64 permitted haulers in the city and negotiate rates for service. Portland garbage haulers are required to offer recycling collection for the most common recyclables. There are also independent recyclers that specialize in various recyclables. The City of Portland is the only city in the metro region that has mandatory

recycling requirements for the commercial and construction and demolition waste streams.

Financial Arrangements
Portland has two main funding streams. The first is a residential franchise fee set at 5% of haulers' gross revenue. A commercial tonnage fee is assessed based on how much waste is disposed. There is a new proposal for budget year 2010-2011 to raise the franchise fee rate to $7.25, representing 9% of the cost for haulers. Haulers bill the customers directly, usually on a bi-monthly basis according to the rates set by the city for garbage, recycling, and yard debris, plus any of the other waste pick-up services.

Revenues: Every year the City of Portland's Bureau of Planning and Sustainability conducts a rate study wherein they review the true costs of providing solid waste services to residents. The mission of this endeavor has four elements: 1) to have uniform solid waste, recycling, and yard debris collection services; 2) to show the true costs of providing this service; 3) to allow for accommodation to specific needs of the residents; and 4) to incentivize recycling and reduce solid waste generation.

The Franchise Agreement: The franchise agreement between the city and the haulers covers the grantees allowable expenses, operating margin, and projected pass through expenses. The system now includes a uniform rate paid by all residents. The city calculates a composite weighted average costs using the financial information from haulers.

Operational Best Practices
The City of Portland is the only city in the metro region that has mandatory recycling requirements for the commercial and construction and demolition waste streams. As part of this system they have started campaigns to promote businesses who are doing a good job of recycling. The "Go Blue" campaign and the "BlueWorks" recognition and awards program are two examples of the support the city provides to commercial entities. The city also looks for innovative ways to keep glass separate from the paper. New rules have been adopted so that commercial and multifamily complexes maintain glass separate from other recyclables. A main part of outreach and education efforts is the Metro's Trash Hotline where residents can call in with any questions concerning recycling and waste. Composite of efforts in Portland have led to an impressive diversion rate of 54.5%. Portland has a food waste program that is still under development but they consider this program to be the major contributor to increasing the diversion rate in forthcoming years.

Collaborative Governance
Portland enjoys a strong relationship with the regional government, Metro, as well as the Oregon Department of Environmental Quality. The Office of Sustainable Development staff work directly with Metro on the Regional Solid Waste Management Plan while also working on regional policy development through Metro's work groups. These include construction and demolition, organics, commercial recovery and local government recycling coordinators.

Aside from their relationship with the Metro government, Portland City Council appoints citizens to the Portland Utility Review Board (PURB), another example of the collaborative nature of this system. PURB reviews and sets the rates for collection each year.

Contact Information

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City and County of San Francisco, CA

Community Description
Population: 797,271
Median age: 38.2
Education: BA+: 51.1%
Median household income: $70,040
Unemployment: 9.5%
Household size: 2.41
Household types: Total units: 358,380; rental: 201,175; owner occupied: 123,010
Total diversion rate: 77%

Highlighted features
- 100% diversion goal by 2020
- Contracted monopoly ISWM services akin to regulated utility
- Weekly meetings with service provider
- Collection rates set by DPW every 5 years with triggers for rate review
- Profit incentive targets for recycling partner
- Mandatory recycling and composting for residents, apartment building owners, food establishments and event organizers
- Successful curbside food waste program
- Weekly 3-bin PAYT collection service: recycling, compost, garbage
- S.F. Department of the Environment consults with S.F. DPW on sustainability
- Surcharge for future impacts from landfilling

Ownership Arrangements and System Structure
The City and County of San Francisco maintains one of the most aggressive materials management programs in the nation. San Francisco contracts with Recology, Inc. for the management of all elements of its ISWM system. Jack Macy, Commercial Zero Waste Coordinator of the S.F. Department of the Environment describes the system as a contracted monopoly service arrangement, and suggests an analogy to a regulated utility. The S.F. Department of Public Works (DPW) manages the contracts with Recology. The DPW, with the Department of the Environment, oversees the setting of waste services rates every five years. The DPW also sets recycling targets for Recology.

Recology provides weekly volume-based collection services for MSW using a city-mandated three bin system for garbage, composting and single-stream recycling. Owners or managers of rental or condo units, in addition to food establishments and event organizers are required to maintain a three bin disposal system. Recology manages and owns MRFs and transfer stations in the city but does not own a landfill. S.F. contracts for landfill disposal, with 85% of its waste currently directed to the Waste Management Altamont landfill, 55 miles east of the city. The balance of landfilled materials are sent to 12 other area landfills. San Francisco's contract at the Altamont landfill expires in 2014, and the city is exploring an agreement with a landfill in Dixon, 65 miles to the northwest. Waste would be trucked 12 miles to Oakland and then taken by rail to Dixon. Private haulers of C&D waste must be registered with the City and County and must deliver C&D waste to a registered facility which must be able to divert at least 65% of the material from landfill. This C&D program is mandated by an county ordinance (which appears in the appendix), and is among the first of its kind. However, S.F.'s peninsular geography renders the county more easily suited to this and other materials management ordinances.

Due in part to the distance and expense required to landfill its garbage, S.F. has been impelled to aggressively advance increased waste reduction, recycling and composting

programs. A strong civic recycling culture and a progressive legal regime have also pushed the city to achieve high diversion rates. The City and County's 2020 goal is an 100% diversion rate. It surpassed its 2010 goal of a 75% diversion rate, hitting 77% in that year (67% recycling, 7% composting, 3% alternative daily cover[22] which under California regulations is considered diversion). To meet its ambitious waste reduction and recycling targets, S.F. City and County have passed a series of waste reduction and diversion laws, including the Construction and Demolition Debris Recovery Ordinance of 2006, the Green Building Ordinance of 2007, the Food Service Waste Reduction Ordinance of 2007, and the Universal Recycling Ordinance of 2009. These ordinances combined with the civic material management culture have successfully pushed S.F. 's goals forward. For example, food scraps from S.F. residents and over 5,000 restaurants send over 600 tons per day to its composting facility.

WTE Specifics

The county does not use waste-to-energy plants as a part of its IWM program. As in Alameda County to the East, Jack Macy believes that air quality regulations in California, environmental lobbies opposed to WTE, and lack of space make it unlikely that San Francisco will look to WTE for the foreseeable future. A ballot initiative in the 1990s on the construction of a WTE plant was defeated due to strong local opposition.

Financial Arrangements and Revenue Streams

Fee Structure: A county board sets MSW disposal rates for 5 year periods, allowing for an inflation adjustment, and for a review process under certain triggering circumstances. Rates are carefully set to incentivize recycling and composting by city residents and by Recology as well. Residents pay collection fees according to the size of their trash bin. Residential compost and recycling programs are financed with the trash collection fees. These fees support grants to county non-profits, as well as staffing, consulting costs, toxics reduction goals, and program outreach and education.

The current residential monthly fee for weekly 32 gallon garbage pick-up is $27.55; compost and recycling are collected at no additional cost. Haulers charge additional fees for disposal volumes in excess of bin capacity: $27.55 for up to 32 additional gallons. The County incentivizes waste reduction by allowing residents a shift to 20 gallon garbage bin size with an associated 23% cost reduction to $21.21 per month. Low income residents may qualify for reduced collection rates of $20.66 per month for 32 gallon bins and $15.91 per month for 20 gallon bins. Bulky pick up is provided free twice per year for single family homes and once for apartment buildings, while additional pick-ups are available for a fee. Commercial customers of Recology pay monthly garbage, recycling and compost fees based on cart size. Additionally, a distance and elevation charge cover hauling expenses. A special reserve 1.3% surcharge, funds from which are held in a separate city account, is also assessed to provide funds for possible future environmental costs related to landfill disposal. Commercial customers are also incentivized to recycle through the offer of a recycling discount. The county also encourages reuse and donations of used materials such as furniture to Goodwill and other locations, through its online "Ecofinder" on the S.F. Department of the Environment website. Other tools, such as an online commercial rate calculator (see webpage screen capture in the appendix) and informational YouTube videos enhance the website and promote understanding of the ISWM system.

Tip fees at the Recology transfer station include a $140.76 per ton fee for general refuse and concrete, and a $150.76 fee for certified C&D waste. The transfer station offers free disposal of batteries, fluorescent tubes, TVs, computer monitors, and laptops to encourage proper

[22] Alternative daily cover is material approved for use at landfills to cover over materials deposited in the landfill on a given day, in place of soil, which is the standard daily cover material.

disposal. The household hazardous waste facility offers limited free drop-offs to residents of the City and County showing proof of residency.

Revenue sources: Collection fees for MSW provide 94% of the revenues and fund solid waste programs and expenses. Detailed revenue and expense information were not made available by Macy, nor could they be located in various financial reports. Some such information may be proprietary to Recology, but S.F. could further improve its www.sfenvironment.org website by making such financial data more readily available to the public.

Revenue Sharing: S.F. sets recycling targets with Recology and provides Recology with incentives on 4 specific waste reduction and recycling targets each year. Each target, if met, provides Recology with an additional ½% profit, therefore up to 2% additional profits can be made. These funds are placed into a special fund account.

Expenses: Expenses include program costs, landfill costs and service contract costs, technical assistance, grants, waste audits and public outreach and education. Additional expense information could not be obtained.

Operational Best Practices

San Francisco has been a pioneer in many areas of materials management. Its composting program was the first of its scale in the nation and continues to set performance standards, aided by mandatory composting program serving businesses, multi-, and single family residences. Plant trimmings, soiled paper, food scraps, and other compostable materials are accepted for the composting program. This law is indicative of political support in the S.F. Board of Supervisors and Mayor's office for strong local materials management legislation which forces program managers to find creative waste reduction and diversion strategies. The multi-family recycling and composting collections program have been a success to date, and Recology and the city work together to increase participation and diversion with the program.

The City and County asserts that its regulated monopoly relationship with Recology gives it substantial leverage while avoiding some of the overhead and asset burdens faced by programs that own elements of their SWM system. Recology attempts to stay in good graces of residents because residents have influence over the rate setting process.

Collaborative Governance

The S.F. Department of the Environment works as a consultant to the Department of Public Works with respect to waste management policies and programs. Macy claims that this arrangement has been very effective and has helped to integrate waste management goals with broader environmental goals of the city.

San Francisco collaborates with private sector waste management firms in the collection, transfer, marketing and disposal of solid waste and recyclables. S.F. considers its relationship with Recology to be strong. Recology is the parent company of two firms which have held hauling contracts with the City and County for nearly 100 years. S.F. officials meet with Recology management on a weekly basis to review performance and processes. S.F. Environment and Recology collaboratively provide free consultation, container labels, signage, educational materials, tenant outreach, web tools and other assistance to improve recycling and composting compliance and increase waste reduction in buildings and at public events.

Contact Information

www.sfenvironment.org; (415) 355-3700; Jack Macy, Commercial Zero Waste Coordinator

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Stopwaste.org of Alameda County, CA Case Study

Community Description
Population: 1,535,002
Median age: 36.1
Education: BA+: 39.9%
Median household income: $68,863
Unemployment: 11.7%
Household size: 2.74
Household types: 563,011 units
Recycling participation rate: ~75%
Total diversion rate: 69%

Highlighted features
- Joint powers authority serving 14 municipalities, unincorporated territory, and two sanitary districts
- "Import mitigation fees" for out-of-county waste used for road repairs, land acquisition and for reduction and recycling education and outreach programs
- 50-50 revenue share with municipalities for select tip fees
- Successful curbside food scrap and compost collection program
- County owns land permitted for a landfill as leverage with private landfills

Ownership Arrangements and System Structure
StopWaste.Org is a joint powers authority[23] comprised of the Alameda County Recycling Board and the Alameda County Waste Management Authority which together serve 14 municipalities, unincorporated territory, and two sanitary districts. Each municipality contracts for or provides hauling services for its residents. The integrated solid waste management system overseen by StopWaste.Org includes numerous facilities. Stopwaste relies upon five privately owned transfer stations and one owned by the City of Berkeley. Stopwaste sends the county's MSW to two privately owned landfills, Altamont and Vasco Road, while individual and commercial waste haulers may use landfills elsewhere. California law requires capture and flaring of landfill methane as a minimum management practice. Altamont captures methane for electricity and natural gas production, and Vasco Road is installing gas to energy capacity. The county owns land permitted for a landfill but has not yet exercised the option to construct it, instead relying upon that option to gain leverage with private landfills in contract negotiations. Municipal recyclables hauling is single stream and mechanically collected. Mechanical single stream collection was adopted in part to reduce workers compensation claims. Hauling is principally managed through franchise agreements and contracts with Republic Services, Waste Management of Alameda County and Allied Industries. Contracts generally include a fixed price agreement with a clause for extraordinary rate review. A non-profit in Berkeley operates that city's dual stream collections, using an unusual split single bin collections system. Alameda County offers organics collections including residential and commercial food waste collection in most municipalities. Glass, organics, wood and compost products are typically sold locally, while Stopwaste benefits from the strong export market for recyclables on the West coast.

WTE Specifics
The county does not use WTE plants as a part of its ISWM program. Instead, it depends upon ambitious recycling and diversion performance to reduce landfilling. A County ballot initiative, Measure D, passed in 1990 by wide margins. Among its provisions is a prohibition on WTE

[23] A joint powers authority allows public authorities such as utility districts to operate collectively.

facilities from being constructed in unincorporated territories of the county. Tom Padia, Source Reduction and Recycling Director at Stopwaste.org, asserted that air quality regulations in California and environmental lobbies opposed to WTE make it unlikely that Alameda County will utilize WTE for the foreseeable future.[24]

Financial Arrangements and Revenue Streams

Fee Structure: Each municipality contracts with haulers for residential service, or provides service itself. Residents typically receive a quarterly or monthly bill from service providers and also pay county solid waste fees. Each municipality in the county offers different collections rates. Oakland, for example, uses two franchise haulers for its recycling and garbage disposal. Single-family pricing is based on bin volume, and additional fees apply for extra bags, for yard trimmings and food scraps, and include a service fee. Multi-family apartment complexes of five units or more use a graduated cost structure, in which prices per bin rise with increases in the number of units, and with the total number of bins collected. Discounted rates are available to low income senior citizens. Additional fees are charged for bulky pick up service. Municipalities and haulers collaborate to educate citizens about collection services. Oakland commercial rates are based on frequency of pick up and the volume of the container. County ballot Measure D (1990), established a tip fee surcharge of $8.23 per ton of municipal solid waste. These measure D revenues are split 50-50 by StopWaste and municipalities to fund SWM programs. Landfill waste shipped to Alameda County from San Francisco faces a $5.75 per ton fee; while other out-of-county waste faces a $4.53 importation fee. According to Padia, the legal rationale behind these fees assessed to out-of-county waste by Stopwaste (which does not own the landfills) is that Alameda County permitted landfills in the county under the assumption that they would serve Alameda County waste generators. However, when the landfills began allowing waste from outside the county, Alameda County and Stopwaste were essentially losing an economic benefit, thereby entitling the county to a surcharge. StopWaste assesses an additional $4.34 SWM fee on all waste tonnage, and a $2.15 per ton fee for household hazardous waste processing is collected and turned over to the county Environmental Health Division.

Revenue sources: Tipping fees are the major revenue source for Stopwaste.org in addition to interest revenue, and fund its waste reduction, recycling, and other programs and services. Import mitigation fees supplement County tip fees. Other sources of revenue include recyclables sales, interest, grants, grazing and wind power leases on the County's undeveloped landfill property. The recession and shifts in the recycling economy have hit the county hard. To further diversify its revenue stream the county is considering additional service fees and special materials fees.

Revenue Sharing: StopWaste shares revenue from Measure D tip fees in a 50-50 share with municipalities. The fee for household hazardous waste is turned over to the Alameda County Environmental Health Department. Private MRFs in the County keep revenues from recyclables sales.

Expenses: Stopwaste operation costs include labor, market development assistance, business waste prevention, the Green Business program, media and outreach, planning, organics technical assistance, "Bay-Friendly" landscaping and gardening programs, compost and worm bin distribution programs, school garden, compost and recycling education programs, household hazardous waste and other programs.

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[24] "American Fact Finder" U.S. Census. Available at: http://factfinder.census.gov.

Operational Best Practices
Stopwaste and its member municipalities have adopted a 75% diversion goal, and offer civic green building programs, environmentally preferable purchasing and "Bay friendly" landscaping and gardening programs. Municipalities including Oakland have produced zero waste plans which inform SWM programs in addition to other city activities. Stopwaste achieved a 69% diversion rate in 2010, slightly below its target of 75%. Padia notes that the agency seems to have reached a temporary plateau in its diversion rate expansion program. Import mitigation fees assessed to out-of-county waste are used for road repairs, land acquisition and for reduction and recycling education and outreach programs. Stopwaste maintains its landfill land as leverage against price manipulation by landfill operators, and leases the undeveloped land for wind power generation and grazing. Stopwaste offers grant funding to local non-profits, and coordinated business waste-prevention program. The county offers master composting training, and funds composting programs in county schools. The compost bin distribution program and food scrap collection program outreach has measurably reduced waste stream volume.[25] A residential and commercial food waste collections system is offered by most municipalities.

California's system of calculating diversion rates is somewhat unusual and makes comparisons with other jurisdictions difficult. In 1990, every jurisdiction in the state calculated all landfilling, recycling and waste prevention, yielding the total waste generation, which serves as the base year for diversion rate calculations. This base figure is modified with a formula that includes population increases, taxable sales, and the state of the economy in order to derive current annual waste diversion.

Collaborative Governance
Stopwaste.org coordinates with the member municipalities, unincorporated territories, sanitary districts, and service providers to manage solid waste in the County. The county maintains partnerships and exchanges with other counties in the region. Stopwaste works closely with municipalities in establishing its county integrated waste management plan.

Contact Information
www.stopwaste.org; (510) 891-6500; Tom Padia, Recycling Director

References
Padia, Tom. Source Reduction and Recycling Director, Stopwaste.org. Telephone interview conducted by Matthew Isles on May 27, 2011.

"Complete rates for residences and businesses." City of Oakland, Department of Public Works. Accessed on June 5, 2011. Available at: http://www2.oaklandnet.com/oakca/groups/pwa/documents/report/oak026043.pdf

"Alameda County Integrated Waste Management Plan." Alameda County Waste Management Authority. 2011. Available at: http://stopwaste.org/docs/coiwmp_revised_1-2011.pdf.

"Annual Budget, Fiscal Year 2010-2011." Stopwaste.org. 2011. Available at: http://stopwaste.org/docs/2010-11budget-adopted-web.pdf.

[25] Padia, Tom. Source Reduction and Recycling Director, Stopwaste.org. Telephone interview conducted by Matthew Isles on May 27, 2011.

Solid Waste Division of Tompkins County, NY

Community Description
Population: 101,583
Median age: 28.3
Education: 47.5% BA +
Median household income: $48,537
Unemployment: 5.4%
Average household size: 2.32
Total diversion rate: 60%

Highlighted features
- PAYT
- Annual Solid Waste Fee
- Public-Private Partnerships

Current Material Management System
Tompkins County owns and operates a combined MRF/Transfer Station within the county and contracts out garbage hauling to a variety of private haulers based throughout the county. In the early 1990s the County discovered it would be cheaper to export trash rather than go through the process siting a new landfill. With the help of Skumatz Economic Research Associates, a PAYT system was enacted with the goal of reducing the waste stream over the long run. In order to make this change, Tompkins County Solid Waste sought enabling legislation from the county government and New York State to charge an annual solid waste fee, which forms the base for the PAYT system.

Financial Arrangements
Tompkins County Solid Waste Division has an annual budget of approximately $6.2M, the majority of which (46%) comes from the annual household waste removal fee of $56. This fee covers all programs and waste removal. For waste removal, the county licenses several private haulers, while the cities of Ithaca and the village of Cayuga operate their own hauling service. Non-recyclable materials are taken out of county to Seneca Meadows landfill in Waterloo, NY. Aside from the annual fee, residents are charged on a PAYT model, involving trash tags where 1 tag= 20 lbs. of waste. As Tompkins County is a rural county, some residents drop off their own refuse at the MRF/transfer station. These residents are charged an annual disposal coupon fee by their vehicle type ($8 for sedans, $14 for minivans, trucks, SUVs) and then under the PAYT system, they purchase a punch card (5 punches= $12) where 1 punch is good for a 35 pound garbage can/bag. For residents and commercial haulers who have larger loads, Tompkins County also offers a sliding fee scale based on weight. A load up to 333lbs is charged $14, 334-666lbs is charged $28, 666-999lbs is charged $42 and a load of 1 ton or more being charged $85. There are a variety of PAYT fee structures in Tompkins County, from punch cards for resident transfer station drop offs to a permit based system for residents and business who utilize the joint MRF/transfer station.

Operational Best Practices
The PAYT system, although a bit complex, does cover all residents and businesses equitably. An annual fee helps smooth fluctuations in the recyclables market, and allows Tompkins to fund its education and outreach programs. Additionally, Tompkins County Solid Waste Services is required to keep a fund balance of 10% of budget, which also assists in cushioning against market trends. An updated solid waste master plan is forthcoming and is intended to help keep the organization motivated to achieve its goal of pushing its diversion rate to 75% within 10 years and up to 85% in 20 years.

Collaborative Governance
Tompkins County has created diverse public-private partnerships geared towards reducing the waste stream. With local businesses they implemented a ReBusiness Partnership, in which the county partners with business in order to help reduce their waste and costs of disposal, providing free marketing/advertising to businesses that follow waste reduction practices. A Finger Lakes Buy Green website was created in conjunction with local retailers and so residents and businesses would be able to gain information on local, environmentally sound products and practices for their home, office or yards. The county also established a non-profit building materials reclamation warehouse company, Significant Elements. They have also partnered with Cornell University's Cooperative Extension in composting program and have several community education and electronics reclamation programs.

Contact Information
Tompkins County Solid Waste Management Division
122 Commercial Ave
Ithaca, NY 14850
(607) 273-6632
http://www.recycletompkins.org/

Finger Lakes Buy Green Available at: www.fingerlakesbuygreen.org

Significant Elements Building Salvage Warehouse. Available at: www.significantelements.org/

ReBusiness Partnership Program Available at: www.recycletompkins.org/editorstree/view/2

Summary of National Case Study Findings

The case studies reviewed in this report provide an idea of the breadth of contemporary practices for financing and operating integrated solid waste management systems. The systems are each structured around the unique demographic, legal, geographic, and legislative characteristics of their communities. However, across a variety of contexts, many waste management operations come up against common challenges. Likewise, there are a number of common opportunities that have led to success among diverse waste management systems

Common Challenges

Tension between waste reduction and revenue generation

A majority of communities support their waste reduction activities with volume-based revenue from waste management. In other words, progress towards a mission of reducing the waste stream relies on the continued flow of the very same waste stream. This dependency creates a fundamental tension between an agency's mission-oriented efforts and its desire to remain financially healthy. Designing financing strategies that produce revenue while improve recycling rates or reduce waste generation is a universal challenge for integrated systems.

Competing disposal options

Because most waste management financing hinges on revenues from tipping fees, waste management agencies must charge enough to support their operations and programs, while considering competition from other disposal or recycling facilities with lower fees. Striking this balance is a challenge for communities across the board. Attracting materials to county facilities is especially difficult in geographic regions where land (and subsequently landfilling) is cheap. Flow control ordinances can help address this challenge, but are not a silver bullet. A move to establish flow control for waste or recyclables could be met with resistance from haulers and other private entities operating in a previously unregulated system. Or, as in Hennepin County, existing flow control with above-market tip fees could be challenged through expensive lawsuits from private hauling contractors.

The availability of competing disposal options also poses a direct threat to a system's diversion goals. When there are cheap disposal alternatives nearby, it becomes much more difficult for an integrated system to incentivize diversion through reduced tip fees for recyclables or organics. This is the situation in Boulder County, where the high availability of land keeps private landfill tip fees extremely low, increasing the challenge of financing diversion incentives.

Multi-jurisdictional coordination

Multi-jurisdictional entities face a substantial set of challenges in coordinating and optimizing operational efficiency. Attempts to coordinate must work with a web of overlapping financial relationships across multiple municipalities and contractors. In many case studies, for example, PAYT systems are only enacted in some of the municipalities where these agencies serve. Inconsistencies like this can cause confusion and result in noncompliance with solid waste management processes within a given municipality. Regional education campaigns are challenged in these systems to outreach in a way that is meaningful across jurisdictional differences without providing misinformation to some residents.

Common Successes

Dedicated revenue stream for waste reduction

Among the variety of financing structures employed by communities, the most successful mechanisms for financing waste reduction efforts involve a specific revenue stream dedicated to that mission. Many waste management arrangements rely heavily on tipping fees to finance all operations. However, the consistency of tip revenue is always uncertain due to the influence of external factors, such as the availability of waste or the existence of competing disposal options. A recent and significant example is the financial downturn in 2008. Waste generation dipped along with the economy, leaving many tip-dependent communities in the red. Accordingly, it is beneficial for communities to diversify revenue so that ongoing activities that are not tied directly to fluctuations in garbage – like education, outreach, and waste reduction programs – are not subject to revenue shortfalls. Effective education and awareness-building activities require consistent, long term investment and are undermined by on-again-off-again funding. It is also important to note that the same challenges exist when waste reduction activities are funded through revenues from the sale of recyclables, which are directly tied to a volatile market. Boulder County's "trash tax" is an example of dedicated waste reduction revenue stream. Other counties – Hennepin, Palm, and Alameda – have a dedicated fee that provides steady revenue to the entire materials management system.

Central coordinating agency

Across our case studies, solid waste managers from centralized and decentralized systems agree about the value of a having central coordinating body to keep the various pieces of multi-jurisdictional, integrated systems working harmoniously. Creating a level of standardization across a network of actors that can encompass a variety of private contractors across multiple municipalities makes it much easier to achieve system goals. Having one agency serve as the "face" of an integrated system is also essential for making relevant information available to community residents. This is particularly important because solid waste management relies so heavily on waste generators knowing what to do with their materials.

San Francisco County, maintaining one of the most aggressive materials management programs in the nation, benefits from a highly coordinated system. The county contracts with Recology, Inc. for all elements of its ISWM system. In Boulder County, a nonprofit organization that serves as the control node in a system based on inter-organizational collaboration. Lee County owns every piece of its integrated system.

Supporting ordinances

The most effective waste reduction programs among our case studies benefit from supportive local ordinances. Legal mandates, such as an ordinance requiring haulers to charge by volume, can provide standardization in systems that encompass municipalities with otherwise disparate collection operations. As described above, standardization strengthens a county's ability to pursue waste reduction targets efficiently. When materials management efforts depend on collaboration from commercial entities, recycling ordinances can be the most effective incentive for businesses to take on community waste reduction goals. Finally, a zero waste ordinances can be a powerful tool to centralize community attention on waste reduction. A city or county's commitment to pursuing zero waste ensures that public policies and public entities' operating procedures are in line with zero waste goals. Additionally, a zero waste ordinance can provide a framework under which a county can encourage and incentivize businesses and agencies to incorporate waste reduction provisions into their operations.

Boulder County and San Francisco County provide examples of how local ordinances can strengthen waste reduction efforts. Some examples of local ordinances are provided in the appendix.

PAYT fee structure with embedded recycling and organics collection

The greatest opportunity to divert waste in any system is at the source. Strategies that can motivate residential and commercial waste generators to sort materials out of their garbage have the most significant impact on waste diversion rates. Across our case studies, the greatest successes in generator-level diversion are from PAYT collection structures where the generators pay little or no marginal cost for recycling and organics collection. Because the costs to generators are then associated with the amount of garbage they produce, the fee structure incentivizes generators to reduce their waste as much as possible by separating out their recycling and compostable streams. The relatively large impact of an embedded PAYT system was demonstrated in a 2008 study in King County. In the eight municipalities with embedded fees, the average pounds of garbage per household was 17% lower than in the rest of the County, where residents are charged a flat fee for recycling and organics pick-up[26].

Linking contractor incentives to agency missions

Across the spectrum of our national case studies, innovative financing structures have succeeded in aligning incentives for waste management entities towards waste reduction goals. Examples include Lee County's innovate volume-based profit sharing agreement between its MRF operator and subsidized tipping fees for compostables and recyclables.

[26] "Draft - 2011 Comprehensive Solid Waste Management Plan." King County, WA. Department of Natural Resources and Parks, Solid Waste Division. 2011.

Guide for Communities and Local Authorities

This section provides instructions for local level governments and authorities to carry out a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and advice about three common issues: funding, collaboration, and economic development. We aim for this section to be a reference for communities wishing to implement more progressive practices in solid waste management.

Solid Waste Management SWOT Analysis

A SWOT analysis is one of the most practical decision-making tools in the private sector and is equally useful in the public sector. While strengths and weaknesses are internal characteristics, opportunities and threats are features external to the organization. This section provides a guide for conducting a SWOT analysis to identify possible strategies for improving a solid waste management operation and moving a community towards SMM. This list is intended to provide decision-makers with a starting point for assessing their organizations but would usually need to be adapted for local conditions.

After completing the questionnaire we urge public managers to identify specific strategies to leverage the strengths, address the weaknesses, take advantage of opportunities, and mitigate the threats. An application of this analysis to OCRRA is provided in Part 2 of this report.

Strengths / Weaknesses (Yes = Strength, No = Weakness)

Question	**Answer**
Recognition	
Is your organization's name recognized in the community?	
Does your organization have a positive image in the community?	
Is your organization recognized locally, regionally, or nationally for its leadership or innovation in waste management?	
Programs	
Does your community have curbside recycling?	
Does your community have PAYT or volume based pricing for waste?	
Does your community have large scale composting or other diversion programs?	
Does your community have a WTE facility?	
Does your community have a MRF?	
Rates	
Does your community have a high rate of diversion of material from the landfill?	
Does your community have a high rate of recycling or composting?	
Does your community have a high rate of participation in curbside recycling?	
Management	
Is the operation of your organization transparent to other stakeholders of the waste management system?	
Does your organization have strong collaborative alliances with other public, private, or nonprofit organizations?	
Does your organization have high employee satisfaction and retention rates?	
Have you conducted a waste stream and recycling stream composition study?	

Financial	
Does your organization have a funding stream dedicated to waste management and waste reduction?	
Does your organization have profit sharing agreements with its private sector partners?	
Are most of your costs variable with production levels?	
Do you have flow control over materials in your area of operation?	
Strategies	
Strength 1	Strategy 1a
	Strategy 2b
Strength 2	Strategy 2a
	Strategy 2b
Weaknesses	
Weakness 1	Strategy 1a
	Strategy 2b
Weakness 2	Strategy 2a
	Strategy 2b

Opportunities (Yes = Opportunity)

Markets	
Do robust markets exist for recovered materials (plastics, compost, paper, etc.) in or near your community?	
Are prices rising for any of the materials your operation recovers or for electricity if you have a WTE facility?	
Are there materials in the waste stream the recovery of which you could increase?	
Have waste reduction practices been successfully implemented in communities near your own?	
Legislation and Legal	
Do federal regulations, state statutes, or local ordinances exist to support your efforts?	
Are carbon offsetting funds or credits available for your operations?	
Do you have long-term agreements with other stakeholders in the system?	
Demographics	
Are your programs and outreach efforts appropriate for the demographics of your community?	
Does your community have the type of workforce required to increase your operation?	
Opportunities	
Opportunity 1	Strategy 1a
	Strategy 2b
Opportunity 2	Strategy 2a
	Strategy 2b

Threats (Yes = Threat)

Financial	
Are transportation costs rising and will they impact your bottom line?	

Does your organization encounter competition from the private sector?	
Does your community have low tipping fees for landfilling?	
Are the materials you recover in danger of theft?	
Other	
Is the climate in your area an impediment to composting or other elements of your operation?	
Does your community have an aging population, or are the demographics changing in a way that will require major changes to your operations?	
Threats	
Threat 1	Strategy 1a
	Strategy 2b
Threat 2	Strategy 2a
	Strategy 2b

Funding Models and Revenue Streams

This summary section is intended to provide decision-makers with a starting point for considering what funding models and revenue sources make the most sense given a community's specific strengths, weaknesses, opportunities, and threats.

Below is a summary of the diverse funding models being implemented successfully across our national case studies. Some communities stick to a traditional funding structure that relies heavily on tipping revenue at county facilities to fund all programs and operations, while others have incorporated revenue streams from fees levied on waste generators. More detailed implementation details for each of these examples can be found within the national case study descriptions.

Jurisdictions that do not have the authority to levy taxes or assess fees should consider the tip revenue-based systems in King County and Alameda County. The solid waste management divisions of King County and Alameda County (Stopwaste.org) both finance over 90% of their work through tip fees. While their funding models are traditional, both these agencies are recognized national leaders in innovative waste reduction and diversion programs. Both these systems were hit hard by the reduction in MSW that accompanied the recession, illuminating the sensitivity of tip-based financing to factors outside of a county's control.

Jurisdictions considering a revenue stream to support all aspects of a waste management system can find successful urban and rural examples of "system fees" in Palm Beach County and Tompkins County respectively. The Palm Beach County SWA has the authority to levy taxes to finance its operations. Palm Beach County has opted to build and maintain ownership of almost 100% of its ISWM system. As a result, it has huge liabilities and large annual debt payments, so it is especially important for the SWA to have a reliable revenue stream to maintain its high bond rating. The flat curbside collection fee that the SWA levies on generators covers roughly 75% of operating expenses, with tip fees and WTE revenues supplying most of the remaining revenue.

At a totally different scale of operation, Tompkins County similarly enjoys a reliable revenue stream from its straight forward annual household solid waste removal fee, which funds the entire waste management system. The solid waste division was successful in petitioning at the state level to gain the authority to levy this fee. Generating 46% of the departments' budget,

this structure provides a steady dedicated revenue fee for the system. A PAYT collection structure brings in additional revenue.

Jurisdictions considering the creation of a dedicated revenue source for waste reduction programs might look to Hennepin County's model. A county ordinance created a solid waste management fee to cover programs such as waste reduction and reuse, recycling, tree waste management, and management of problem materials and household hazardous waste. The ad valorem fee is added to waste generators' hauler bills. This fee structure would provide incentives for waste reduction if private haulers were compelled to follow Minnesota state mandate to charge customers by volume of waste. However, the difference in hauler fees for different sized containers is so nominal that the fee does not incentivize reduction currently.

Across the spectrum of funding models are innovators that have succeeded in achieving alignment between generating revenue and supporting waste reduction goals. Local level governments and authorities can use the summaries below to direct back to specific case study examples, which include more implementation details.

San Francisco County's trash collection fee succeeds in providing incentives for generators to reduce waste. Collection fees vary according to the size of residents' and business' trash bins. These fees finance residential compost and recycling programs and support grants to county non-profits, as well as staffing, consulting costs, toxics goals, and program outreach and education. Through an innovative profit sharing structure, the county incentivizes its service provider, Recology, to meet 4 specific recycling targets each year. Each target, if met, provides Recology with an additional ½% additional profit from the profit sharing agreement.

Lee County's unique volume-based revenue sharing agreement with its MRF's operator is another example of innovative alignment of revenue generation with waste reduction. The county and private MRF operator each have a 70/30 split of recycling tip fee revenue when annual tons per year of recyclables is below a threshold value of 60,000 tons. In years where the MRF receives more than this threshold, the profit sharing arrangement shifts to a 78/22 profit split. This structure ties revenue gains to county diversion efforts.

Boulder County's "trash tax" is charged of all haulers per residence serviced and per cubic yard collected from commercial accounts. This tax is generally passed on the customer by the hauler as a line item on the waste collection bill. In 2010 this tax generated $1.8 million for a variety waste-reduction programs. Boulder's service provider, Eco-cycle, is perhaps the strongest example of aligned revenue generation and waste reduction. Eco-cycle generates 90% of its $5 million budget through recycling services they provide to businesses, municipalities, and the county.

Collaborative public management

Benefits of collaboration

This section highlights considerations when assessing collaborative arrangements. First, in the case studies there are several such collaborations to reduce the waste stream through composting. One example is the King County partnership to promote composting of food waste into yard waste carts. The bags were sold at drug stores which received advertisement sponsored by the County. Similarly, Oneida-Herkimer Solid Waste Authority, which will be discussed in the local case study section, established multiple partnerships with businesses and public entities to promote composting. San Francisco's operation processes 600 tons per day of food waste contracting with over 5,000 restaurants, an operation of this magnitude demands strong data collection systems, efficient collection, and strong media support. As the

trend to use composting to reduce waste streams and landfilling continues to expand, establishing collaborative efforts between commercial groups and government entities will need to be a priority for public managers.

Working with businesses is also very common when looking for new ways to recycle alternative waste. For example in Westchester County there are numerous partnerships for items that can be reintroduced into the materials cycle: a cell phone recycling system with Verizon Wireless, and working with the County and restaurants to reuse waste vegetable oil as fuel for "green" vehicles.

Intergovernmental collaboration
A different way of considering collaborations is by looking at cross jurisdiction collaborations such as those implemented in Lee County, and the City of Portland. Lee County has a contract with Hendry County to collect and process Hendry County's trash in exchange for housing the Waste to Energy plant's ash monofill. Hendry County receives a reduced rate for collection because they are also incurring the cost of housing a landfill and Lee County receives a guaranteed tonnage of waste. The challenge with this arrangement is the cost of transportation as well as the long-term planning question of what will happen once this monofill reaches capacity. Strategic planning coordination should be undertaken to maintain such relationships, as that between Lee and Hendry County.

The City of Portland has many different organizations with whom it works: beginning with the Metro government, the state and multiple groups within each of those jurisdictions. They also work with a citizen review group who analyses their rates for collection and disposal. Housed under the Office of Sustainable Development, their mission is dictated in part by the vision of this umbrella organization. As such it includes job development for example, a benefit that is not traditionally the focus of solid waste services. While this is not the direct mission of solid waste agencies, there are opportunities to expand the scope where an organization's managers feel most appropriate. Advertising job creation will bring positive publicity to the agency.

Impact on costs and other resources
Solid waste managers aim to achieve the missions of their organizations while maintaining a strong bottom-line. Accordingly, collaboration offers many different opportunities to reduce costs or increase revenues. One such example is partnering with the local haulers to improve outreach to educate residents on the benefits of improving the quality recyclables. This could both bring in larger revenues from the sale of higher quality materials and also lower costs by collecting less municipal solid waste. Partnerships between governing bodies and businesses can be mutually profitable. An example of this is Oneida Herkimer's landfill gas utilization project where the Authority works with a private developer who would receive the full rights for the landfill gas collected. This would reduce the Authority's revenue by 50%, a tradeoff that is being evaluated.

Recommendations for the Solid Waste Industry

Standardization of Measurements

One of the main challenges we faced in compiling this report was the general lack of standard measures between communities for solid waste management. This is not a small problem. The fact that there are not universally agreed on standards of measures for diversion rates means that a waste stream diversion rate of 60% can be very high for a county in New York,

but low for one in Florida, because Florida now counts WTE as part of their diversion rate. In most California communities, the tonnage diverted is higher than Iowa, in part because California counts scrap metal from recovered auto bodies, while Iowa does not. Discrepancies like these make it difficult to accurately determine which communities are the most effective at reducing their waste streams. While there have been attempts to create common standards, this has occurred only on the regional level and with mixed success. The reasons for the regionalized approach stem from both the EPA's regional approach to guiding communities for solid waste management, and the fact that geography and infrastructure vary greatly throughout the U.S.

The lack of standard measurements for solid waste management is coupled with a lack of standardization of recyclable materials. While the Institute of Scrap Recycling Industries (ISRI) has standard grade definitions for recyclables in the U.S., these standards are often higher than the MRF need to meet in order to sell their materials to producers. If an MRF operator meets the ISRI standard, then they can sell to any producer. However, each producer has their own standards of the materials they accept, based primarily on the type of separation/cleaning intake system they have. The difference between the standards that ISRI sets and the quality of recyclables that producers of paper, glass and metals accept is based on the fact that that different MRFs accept different materials and produce bales of varying quality. Several municipalities may share a MRF, but their collection practices may vary. Adding to this, the waste collected in one community on Monday is different from the waste collected in the same community on Tuesday. This lack of material consistency helps explain why there is a lack of a standard recyclables market in the U.S. and why attempts to form markets for these materials have failed. Instead, there is a marketplace for recyclables where relationships between MRF operators and producers are essential for quality assurance. As one former MRF operator told us, "you meet the standards your customer sets."[27]

Compounding the issues of measurement regarding diversion rates and standardization of recyclables is the fact that in areas which are considered exemplary in terms of diversion and recycling, the amount of collected materials has hit a plateau. This is due in part to the changing nature of waste in America; as fewer newspapers are printed, less paper ends up as part of the waste stream. Additionally, the use of thinner plastics in recent years has helped to decrease the weight of recovered materials. However, calls to move towards different metrics to measure collection of municipal solid waste based on volume or tons per capita population present their own issues. A municipality which relies on seasonal tourism might see its collection rates soar during some months and be meager in comparison in during the off season. Using volume as a metric is problematic because not all collection trucks carry the same volume and estimating volume collected is difficult as waste is often compacted. Therefore, it makes sense to have a measurement based on weight as a ton is uniform throughout the U.S. As one industry expert told us, "You can't cheat the scale".[28]

A national standard for diversion rates, perhaps organized by the National Recycling Coalition, would do wonders for clarifying what exactly are the best practices in reducing the solid waste within communities. We believe this could be an initiative for the National Recycling Coalition. As the NRC's mission is, "to facilitate activities between individuals, governments, businesses to maintain a prosperous and productive American recycling system that is committed to the conservation of natural resources" they are well positioned to work with a variety of stakeholders, including the EPA, to create a standard measure for comparing diversion rates.

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[27] Barry, Mick. Consultant for Greenstar Recycling. Telephone interview conducted by Patrick Gaetjens on May 24, 2011.

[28] Ibid.

Further Research

In carrying out this study, we encountered a number of areas in the field of solid waste management financing ripe for further research. The National Recycling Coalition is well-positioned to undertake or facilitate this research. One area of concern to SWM officials including Tom Rhoads of OCRRA in Onondaga County, New York is the challenge of structuring a PAYT system that could fairly but reliably levy fees on multi-unit residences for materials collection services. A potential novel financing idea for SWM organizations discussed above is the application of the deposit-refund system which could be applied to difficult to dispose of materials (or any materials for that matter), and which would incentivize proper disposal while discouraging wasteful consumption. Finally, we would suggest expanded research into the potential applications of hard to recycle materials by the building trades. Such research could be conducted in collaboration with industry and with innovator in building materials science including the Syracuse Center of Excellence.

PART 2: APPLICATION OF RESEARCH FINDINGS TO OCRRA

OCRRA is a public benefit corporation charged with managing solid waste in Onondaga County, NY, as well as with the reduction of waste and increased diversion. OCRRA operates a WTE facility which is major the source of both expenses and revenues for the Agency. By reducing waste, OCRRA inadvertently also reduces its revenues, while the expenses are largely fixed. Our recommendations for OCRRA are based on materials provided by the NYS DEC and a survey of other communities in New York. This section will first detail OCRRA's organizational structure, then other local case studies, followed by financial and operational recommendations for OCRRA.

About OCRRA

OCRRA's Mission
"Serve our community by providing a comprehensive solid waste management system that is environmentally, socially and financially sound. Through innovative strategies such as waste reduction, recycling, composting, disposal and education, we make our community a more healthy and sustainable place to live."

Community Description

Population	454,753
Median age	38.6
Education	31.5% BA+
Median household income	$49,886
Unemployment	8%
Household size	2.40

Highlighted Features
- Waste to energy plant
- Model aerated static pile composting operation
- 60% diversion rate
- Single stream recycling

Ownership Arrangements and System Structure
As a multi-jurisdictional entity, OCRRA serves 33 of the 35 municipalities in Onondaga County. OCRRA owns a waste to energy facility, operated by Covanta. As the current agreement stands, in 2015, Covanta will purchase the plant from OCRRA. However, OCRRA is considering partial ownership and profit sharing arrangements for the plant beyond 2015.

The Agency also owns two transfer stations, two compost facilities—one for yard waste only and one with an aerated static pile composting operation for both food waste and yard waste. For recycling, OCRRA contracts with two MRFs that are run by private companies.

WTE Specifics
The Jamesville, NY facility has been operating since 1995. The plant was bonded at $178 million. At the waste to energy facility, they process around 1,000 tons of trash per day. This produces on average 32 megawatts per hour, which is sold to Niagara Mohawk, the local electric utility. OCRRA and Niagara Mohawk have a power purchase agreement, under which OCRRA had a price floor of $0.06/kwh until 2008. After 2008, OCRRA is required to repay Niagara Mohawk for the previous above market electricity pricing. Accordingly, OCRRA is subject to pay market value until 2016, at which point OCRRA can decide between two

different electricity price rates through 2025. One option is to pay $12 M to Niagara Mohawk and receive 83% of the market rate for power. The second option is for OCRRA to receive 77.5 % of market rate. If Covanta buys the facility, they are not party to the contract with Niagara Mohawk and will not be subject to its terms.

Financial Arrangements and Revenue Streams

The majority of OCRRA's revenue comes from the tip fees paid by haulers at the WTE facility and the sale of electricity to Niagara Mohawk. OCRRA does not receive financial support from the County government. The individual municipalities have contractual agreements with haulers, who then haul trash to the WTE facility and recyclables to the MRF. OCRRA and the MRFs have a revenue sharing agreement and an agreement to allow haulers to pay zero tip fees at the MRFs, in order to provide incentives for haulers to bring recyclables to these two MRFs.

Operational Best Practices

OCRRA has a 60% diversion rate and is a recognized leader in the region for recycling. Haulers are legally required to provide recycling services. Inspectors monitor the incoming waste stream at the WTE facility and the hauler must pay a penalty fee if there is an excessive quantity of recyclable materials in a hauler's load. This provides a disincentive to haulers from throwing source separated recyclables into the trash. Both MRFs are now single stream facilities. The Agency has invested considerable efforts into outreach and recycling education in the community. OCRRA provides blue bins to residents for curbside recycling free of charge.

OCRRA's compost operation is also recognized as a model by the NYS DEC. The Agency has been composting yard waste since 1992, and began a pilot project for composting commercial food waste. Initially, the food waste came from the kitchens of Syracuse University Food Service. The technology is an aerated static pile which doesn't require turning to aerate. The large pile of organics has piping running underneath with forced air to keep conditions aerobic without turning. , This technology is very innovative and compared to windrow composting technology, it requires one third of the land space, a third of the time, and processes three to four times the amount of organic material.

Contact Information

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Miller, Amy. Personal communication during tour of WTE facility. May 24, 2011.

"Overview." OCRRA. Available at: www.ocrra.org/about_overview.asp

Case Studies from New York State

The case studies presented in this section were selected from the communities in New York State. Some, but not all of these communities have WTE facilities. We found these communities to be most similar and appropriate for comparison to Onondaga County.

Tompkins County, which is located in upstate New York, is presented above in this report in the section for national case studies. We believe that Tompkins County represents many of the best practices applicable nationally in a rural setting. The table below summarizes the case studies from New York State.

Table 2. Summary of local case studies

	OCRRA	**Tompkins**	**Oneida-Herkimer**	**Broome**	**Westchester**
Population	454,753	101,799	293,280	194,630	955,962
Diversion Rate	60%	60%	50%	50%	34%
Recycle					
single stream	X	X			
profit sharing with MRF	X	X		X	X
Compost					
yard trimmings	X	X	X	X	X
food waste	X	X			
biosolids				X	
WTE					
electricity revenue sharing	X				X
county ownership	X				
Landfill					
public ownership			X	X	
methane recapture				X	

Oneida-Herkimer Solid Waste Authority

Community Description

Population	299,397
Median age	40.8
Education	19.5% BA+
Median household income	$43,093
Unemployment	8.1%
Average household size	2.38
Total diversion rate:	50%

Highlighted Features:

- PAYT in some municipalities within the jurisdiction
- Import recyclables from neighboring counties for additional revenue

Ownership Arrangements and System Structure

Oneida-Herkimer Solid Waste Authority is a New York public benefit corporation which was created by NY State Legislature at the request of Oneida and Herkimer Counties in 1988. "The Authority's mission is the management of the region's solid waste and recyclable material in an environmentally sound, cost-effective, efficient and safe manner. The Authority remains committed to maintaining and enhancing the region's self-reliant integrated solid waste management system while protecting the health, safety and welfare of the region." OHSWA owns and operates a regional landfill, a recycling center, a household hazard waste collection facility, a green waste composting facility, 3 transfer stations. The Authority has also partnered with local colleges and health care institutions to develop a regional composting operation.

WTE Specifics

OHSWA does not have a WTE facility. However, a landfill gas-to-energy project is planned to begin operating in 2011, which they project "will not only reduce greenhouse gases, but generate enough green energy to initially take care of the annual needs of 2,100 homes and ultimately over 8,500 homes."

Financial Arrangements and Revenue Streams

The largest revenue source for Oneida-Herkimer Solid Waste Authority is tipping fee revenue at the landfill, $17,212,509 in FY2010. Next, are the solid waste charge and the sale of refuse bags (PAYT/user fees) in the City of Utica—$2,040,682 and $2,016,755, respectively. The largest expenses are personal services and contractual services, $5,200,181 and $5,613,744, respectively.

OHSWA also reduced its operating budget from 2009 to 2010 by approximately $1 million by not filling vacant positions, and reducing overtime and other budgeted expenses.

Operational Best Practices

The most prominent feature of the OHSWA operation is the PAYT system. PAYT systems are only operating in 11 of the 79 municipal entities in these two counties. The PAYT programs of 6 municipalities – Utica, Dolgeville, Franckfort, Herkimer, Ilion, and Mohawk – are administered directly by OHSWA. OHSWA serves to "purchase bags, assist with procurement of contractors, provide customer service and manage accounts for those six communities." The costs per bag vary slightly between municipalities (Table 3). The City of Utica PAYT trash system users are charged $1.55 or $0.95 per large or small bag, respectively. Residents cannot receive recycling or yard waste pick-up if they do not participate in the PAYT program.

Each single family home is allowed to set out a maximum of 10 city blue bags each week. Each multiple family (two or more) home is allowed to set out 20 city blue bags each week. The Authority assisted another 5 municipalities—Clayville, New York Mills, West Winfield, Whitesboro, Yorkville – with establishing PAYT programs that the municipalities administer independently from OHSWA.

Table 3. PAYT programs administered by OHSWA

Municipality	Large Bag Price	Small Bag Price
Utica	$1.55	$0.95
Dolgeville	$3.25	$2.75
Franckfort	$2.40	$1.90
Herkimer	$2.60	$2.00
Ilion	$3.60	$2.95
Mohawk	$2.95	$2.30

Recycling is currently dual stream, with comingled paper and comingled containers. OHSWA is in the process of retrofitting the current recycling center into a single stream facility. This conversion is beginning in July 2011 and is expected to be completed by December 2011. The Authority processes recyclables from within both counties and from outside Oneida and Herkimer counties, including Montgomery and Otsego counties, and charges a tipping fee to these imported recyclables to offset the processing costs.

Collaborative Governance

OHSWA has agreements with the individual municipalities which have PAYT programs and the municipalities set the rates for refuse bag charges and have agreements with various businesses for sale of these refuse bags.

Another collaborative effort of OHSWA is in their regional composting operation. In partnership with Mohawk Valley Community College, Herkimer County Community College, and Masonic Health Care Community, OHSWA has begun this operation collecting food waste and processing these organics in windrow composting processes. OHSWA has also assisted Turning Stone Casino and Resort with a pilot composting program at the PGA tour.

Additionally, a public-private partnership has been considered for OHSWA's landfill gas utilization project with development companies who want to utilize landfill gas. The developer would lease the property at the landfill site, and invest in the construction of the infrastructure for the utilization option of their choosing. This developer would have full rights to all of the landfill gas collected, and the landfill would receive a portion of the revenue from the utilization project. However, there is a tradeoff to this partnership. Generally, "it is reasonable to expect that the annual revenues to the Authority that are shown in this report would be reduced by approximately 50 percent if the Authority were to contract with a developer for such a LFG utilization project."

Contact Information

Oneida Herkimer Solid Waste Authority
1600 Genesee Street
Utica, NY 13502
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References

Barton & Loguidice. Landfill Gas Utilization Alternatives Study. Oneida-Herkimer Solid Waste Management Authority Regional Landfill. 2009. Available at: http://www.ohswa.org/quick_links/publications_documents

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"Local Solid Waste Management Plan" Oneida-Herkimer Solid Waste Management Authority. 2010. pp. 7. Available at: http://www.ohswa.org/PDF/Final-LSWMP.pdf

"Resident." Oneida-Herkimer Solid Waste Authority. Available at: http://www.ohswa.org/cgi-bin2/ohswasearch.cgi?q=large

Broome County Solid Waste Management

Community Description
Population: 194,630
Median age: 39.9
Education: 27.7% BA+
Median household income: $42,619
Total diversion rate: 50%
Unemployment: 8.5%
Average household size: 2.37

Highlighted features:
- PAYT for some municipalities
- Biosolids composting
- Innovative Solid Waste Mater Plan

Current Material Management System
Broome County contracts with both private and municipal haulers. Each municipality in the county determines its own collection and fee strategy with the city of Binghamton using a PAYT model, while the village of Endicott uses as fixed fee as part of a resident's water bill. The county operates a landfill which they are expanding. Waste Management operates the county MRF, although some of the collected materials are sent out of county to another MRF owned by Waste Management in Liverpool, NY. Sewage sludge from the municipalities of Endicott, Vestal and Union is processed at the village of Endicott's wastewater treatment plant, dried and composted then sold to We Care Organics, a composting company.

Financial Arrangements
For the majority of its revenues, Broome County relies on tipping fees of $40/ton for landfilling and $32/ton for materials brought to the MRF. There is a revenue sharing plan in place with the MRF. The county also reclaims methane released by the landfill and produces electricity through methane gas to energy generators.

Operational Best Practices
Contracting out the operations of the MRF and most of the collection has helped insulate the County from swings in materials prices, as well as allowed it to focus on innovative sludge composting programs. Searching out grants for residential composting has also proved successful. Last year, Broome County hired a consulting firm to produce recommendations for an updated solid waste Master Plan. The plan outlines how the county will move to a 60% diversion rate by 2020 and thoroughly evaluates how legislative changes, like New York State's producer responsibility law for electronics and technological advances in composting and landfill gas to energy may impact the county's situation. Additional considerations in the plan describe the benefits and challenges of establishing a WTE plant within the county.

Collaborative Governance
Broome County has entered a partnership with Tioga County for a nationally recognized electronics recycling program. There are additional partnerships in place with SUNY Binghamton and other colleges for a variety of waste reduction programs.

Contact Information
Broome County Solid Waste Management
County Landfill Knapp Rd
Binghamton, NY 13905
(607)778-2250, http://www.gobroomecounty.com/solidwaste

Westchester County Division of Solid Waste Management

Community Description

Population:	864,867
Median age:	39.4
Education:	44.4% (B.A.+)
Median household income:	$79,585
Unemployment:	7%
Average household size:	2.72
Total diversion rate:	34%

Highlighted Practices

- Waste to Energy plant
- Customer Oriented
- Organic Yard Waste Transfer Station program
- Recycles plastics #1-7
- Innovative recycling programs

Current Material Management System

Westchester County's Department of Environmental Facilities (DEF) is responsible for 43 municipalities and manages the Refuse Disposal District (RDD) to which 36 municipalities belong. The municipalities signed a new contract in 2009 committing them to 10 more years, with the option of extension. DEF oversees the county's recycling and waste facilities and programs. The County has contracts with companies who operate the facilities serving the residents. The WTE Facility is run by Wheelabrator Westchester, L.P. The MRF is operated by City Carting of Westchester, Inc. Hauling is both a private and public venture in that the Department of Public Works hauls directly to the WTE plant but there is also private hauling to one of the four county-owned transfer stations or MRF.

Haulers are required to deliver both recyclables to the county-owned Daniel P. Thomas Material Recovery Facility. The MRF has been retrofitted to accept plastics coded 1-7 a dual stream process at the MRF which has shown lower contamination levels, reflected in the higher revenues from middle and end markets. The MRF is operated by a private contractor that also serves as the marketing agent, working to increase marketability of the products processed. In addition, the Northern Tier Recyclables Transfer Station (the "Northern Tier MRF") consolidates recyclables collected in the northern sector of the county into county-owned trailers for delivery to the central MRF. County trailers also deliver MSW from transfer stations in the southern part of the county to the northerly located WTE plant at Charles Point.

Financial Structure

A tipping fee of $71.50 per ton is charged on all waste and paid by the County. The County in turn charges the municipalities who are members of the RDD a tip-fee of $25.31 per ton. The County makes up the difference from the proceeds of an ad valorem tax levied on the aggregate property value of each municipality. It is a progressive tax system in that municipalities with larger aggregate property values subsidize those with lesser values. The tax generates enough revenue to cover approximately $63.00 per ton. Combined with the RDD tip fee, the County's budget is approximately $88.00 per ton. There is no tipping fee at the MRF so that municipalities have an incentive to increase recycling rates.

Operational Best Practices
The County has retrofitted the MRF in Yonkers to allow the District to collect more plastics (#1-#7) following the Beyond Waste plan enacted by the State. This came as the result of the amendment to the County's "Source Separation Law" which now includes all plastics.

The following programs are examples of best practices Westchester County has implemented. They are innovative programs that show how Westchester is a leader in the area. Here is a list of their successful outreach and education materials and programs.

- Treasure Hunt: a 'used-but-usable' item swap shop linking donors and recipients
- MRF: Solid Waste Technology's "Recycling Facility of North America"
- Recycling Help Line: providing 24/7 recycling/solid waste informational assistance
- Veggie Van program: subject of nation-wide media coverage

Fourteen of the county's municipalities operate compost sites. The county's Organic Yard Waste Transfer Station Program serves municipalities that do not have land area to allow for full composting activities. The county provides for transportation of municipally collected yard waste to commercial composting facilities.

Collaborative Governance
The county offers numerous programs to residents in addition to curbside recyclable pickup in order to divert recyclable and hazardous material from the waste stream. This is made possible through collaboration with a variety of organizations.

- Boat Shrink Wrap Recycling Program, in partnership with marinas in Westchester County
- Veggie Van Program, in partnership with local restaurants for waste oil "fuel"
- County-sponsored business targeted seminars at county-owned venues
- Toner Cartridge Recycling
- Cell phone recycling, in partnership with Verizon

Finally, the county uses local media sources for informational purposes as well as providing "auto call" service announcements to residents advising them of any county-sponsored recycling events and/or initiatives.

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References
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OCRRA SWOT Analysis

As noted in Part 1 of this report, SWOT analysis can be a practical decision-making tool for public entities such as OCRRA. This section of the report provides a SWOT analysis for OCRRA. The analysis contained in this SWOT table is not exhaustive, but identifies a broad range of OCRRA's organizational characteristics. This analysis offers basic strategies for leveraging OCRRA's strengths, capitalizing on its opportunities, addressing its weaknesses and mitigating its threats. The strengths, weaknesses, opportunities, and threats presented below each section of the survey encompass some elements that may not be directly in the survey questions, but resulted from the thought processes during the completion of the survey. Many of these strategies are offered as recommendations in the report or discussed indirectly in the context of the national and local case studies.

Question	**Answer**
Recognition	
Is your organization's name recognized in the community?	Yes
Does your organization have a positive image in the community?	Yes
Is your organization recognized locally, regionally, or nationally for its leadership or innovation in waste management?	Yes
Programs	
Does your community have curbside recycling?	Yes
Does your community have PAYT or volume based pricing for waste?	No
Does your community have large scale composting or other diversion programs?	Yes
Does your community have a WTE facility?	Yes
Does your community have a MRF?	Yes
Rates	
Does your community have a high rate of diversion of material from the landfill?	Yes
Does your community have a high rate of recycling or composting?	Yes?
Does your community have a high rate of participation in curbside recycling?	Yes
Management	
Is the operation of your organization transparent to other stakeholders of the waste management system?	Yes
Does your organization have strong collaborative alliances with other public, private, or nonprofit organizations?	Yes
Does your organization have high employee satisfaction and retention rates?	Yes
Have you conducted a waste stream and recycling stream composition study?	Yes
Financial	
Does your organization have a funding stream dedicated to waste management and waste reduction?	No
Does your organization have profit sharing agreements with its private sector partners?	Yes
Are most of your costs variable with production levels?	No
Do you have flow control over materials in your area of operation?	Yes

STRENGTHS	STRATEGIES
High brand and name recognition in the community	
	Leverage brand to undertake and promote new initiatives, such as expanded composting operation
	Enhance image of WTE by promoting its environmental advantages over landfilling
High Onondaga County diversion rate	
	Connect revenue with diverted materials: increase profit sharing with MRF, increase composting
	Promote success locally and nationally to attract grant funding, collaborations
	Broaden service offerings, including waste reduction consulting to businesses
Transparent availability of agency information	
	Promote transparency in advertising
	Increase citizen participation in OCRRA's decision-making
	Expand social media visibility of agency initiatives and data
Leadership in region: recognized as state-of-the-art integrated solid waste management system	
	Undertake innovative recycling/disposal initiatives
	Expand grant applications to fund pilot projects
	Collaborate with regional partners to take advantage of collective experience and to share costs
Strong relationships with the Syracuse University, Center of Excellence and other local stakeholders	
	Explore innovative partnerships (e.g. testing CoE's private sector partners' technologies)
	Pursue grant applications collaboratively
	Work with CoE to research novel approaches to transform recycling and waste operations
High safety standards in operations	
	Promote safety record in attracting talented staff
High degree of employee retention	
	Invest in training and continuing education to enhance workforce skill set
	Hold employee focus groups to identify opportunities for improvement
Onondaga County MRFs achieve low residue rate	
	Increase single-stream promotion to increase recycling participation and exploit MRF capacity for somewhat higher residue rate
Legal authority to flow control to WTE plant	
	Maintain the public ownership to the extent necessary to continue flow control
Positive relationship with haulers & municipalities	
	Maintain municipal hauler contracts directing MSW to OCRRA
	Coordinate messaging from haulers, municipalities and agency to enhance impact of public education campaigns
Leverage over Covanta in terms of required transfer of ownership for tax benefit	
	Negotiate a favorable profit-sharing or purchase arrangement prior to 2015 when ownership must be determined
	If ownership is transferred, retain % ownership necessary to maintain flow control
	Invest cost savings from divesting from WTE plant into new services and additional education and outreach
WTE produces less GHG per ton of waste processed than landfilling	

	Promote the environmental benefits of WTE over landfills
	Explore and pursue carbon-offset credits
Knowledge of waste and recycling stream components	
	Increase composting to match organic content of waste stream, offer curbside organic collection
	Seek out end markets for recycled goods prioritizing paper products

WEAKNESSES	STRATEGIES
Revenue streams are dependent on volume of trash processed, representing tension with mission to reduce trash	
	Diversify revenue streams including: composting, MRF profit sharing, dedicated funding streams, additional services
Dependence on private MRFs for processing recyclable materials	
	Renegotiate a more aggressive profit sharing model
	Profit sharing agreement based on weight or volume rather than market prices to create incentives for all parties to increase recycling rate
Market rate period of Power Purchase Agreement with Niagara Mohawk/National Grid	
	Explore the possibility for special pricing of WTE as "green" energy
	Renegotiate PPA to increase rate
	Work towards Tier 1 energy designation
WTE plant is seen by some citizens primarily as a pollution source, not as a power source	
	Improve education & outreach, focusing specifically on the advantages of WTE over land-filling
	Collaborate with Covanta marketing and outreach efforts, share in expense
	Pursue tier 1 designation of WTE power
High costs of WTE operation and tipping fees relative to competing landfills	
	Promote environmental benefits of WTE
	Decrease tipping fees by generating revenues from other sources
Not a strong market for deconstruction/ C&D recycling	
	Partner with nonprofits to buy vacant homes, deconstruct, and sell materials
Diminishing marginal returns to increasing diversion rate from 60-90% maybe more costly than beneficial	
	Engage Environmental Finance Center, National Recycling Coalition resources
	Retain Maxwell intern to calculate externalities of disposal and the optimal recycling rate where marginal benefit = marginal cost

Opportunities (Yes = Opportunity)

Markets	
Do robust markets exist for recovered materials (plastics, compost, paper, etc.) in or near your community?	Yes/No
Are prices rising for any of the materials your operation recovers or for electricity if you have a WTE facility?	No – Mat. Yes – Elec.
Are there materials in the waste stream the recovery of which you could	Yes

increase?	
Have waste reduction practices been successfully implemented in communities near your own?	Yes
Legislation and Legal	
Do federal regulations, state statutes, or local ordinances exist to support your efforts?	Yes / No
Are carbon offsetting funds or credits available for your operations?	No
Do you have long-term agreements with other stakeholders in the system?	No
Demographics	
Are your programs and outreach efforts appropriate for the demographics of your community?	Yes
Does your community have the type of workforce required to increase your operation?	Yes

OPPORTUNITIES	STRATEGY
MRFs are now able to process materials in a single stream	
	Increase promotion of single stream collection
Increase curbside recycling	
	Hold neighborhood recycling competitions
	Explore options for introducing a county fee or a tax that covers recycling
	Create online waste calculators
	Invest in bigger bins or introduce three bin system
Expand grant funding	
	Create non-profit fund-raising affinity organization to pursue foundation grants, e.g. Friends of the Rosamond Gifford Zoo
Increase composting	
	Expand composting partnerships to school districts
	Increase composting education and outreach
	Municipal pilot project for curbside food scrap pick ups
	Expand yard waste collections, including curbside
	Improve composting facilities
	Increase institutional composting partnerships (e.g. SU, SUNY ESF, Le Moyne, OCC, area hospitals, etc.)
	Expand Syracuse University food sorting efforts
	Consider county mandate for food composting
	Conduct benefit-cost analysis of curbside food waste collection programs
	Explore alternative hauling options (e.g. compost every week; other waste every two weeks, three bin system)
	Explore options for introducing a county fee or a tax that covers composting
	Provide incentives and inducements to residents and haulers that participate in composting program
	Create additional sites for organic material drop-off to enhance convenience
Presence of many farms in the region	
	Market and sell high quality compost to agricultural interests
	Accept manure into composting facilities

Pay as You Throw pricing structure has been implemented successfully in many areas	
	Establish municipal PAYT pilot projects
	Evaluate options for local level ordinances requiring PAYT
	Increase public understanding of PAYT
Rising electricity prices	
	Re-structure PPA to ensure profitability and maximize returns
	Continue a profit sharing arrangement with Covanta regardless of plant ownership
Carbon credits markets are likely to develop in coming years	
	Hire consultant to explore offset credits (e.g. Energy Recovery Council)
	Review best practices in other U.S., global jurisdictions
	Improve GHG monitoring
Variety of diversion applications for WTE ash have been developed	
	Investigate legislative requirements
	Explore "ash for trash" arrangements
	Partner with Center of Excellence, construction industry, and other stakeholders to identify optimum local uses
Prevalence of recyclable paper in the waste stream	
	Develop additional messaging targeted specifically at keeping paper out of the waste stream
	Increase commercial services and focus on paper
	Collaborate with haulers to provide clear instructions on recycling and sorting
	Identify incentive based pricing, ideally within the PAYT pricing structure
Electronic Equipment Recycling and Reuse Act changes	
	Work with manufacturers to determine potential revenue sources from e-waste recycling
	Re-examine creation of a hard to recycle materials center, including the collection of e-waste
Designation of WTE plant generated electricity as NYSERDA Tier 1 energy source	
	Pursue designation by NYSERDA
	Review strategies used in other states (e.g. Maryland)

Threats (Yes = Threat)

Financial	
Are transportation costs rising and will they impact your bottom line?	Yes
Does your organization encounter competition from the private sector?	Yes
Does your community have low tipping fees for landfilling?	Yes / No
Are the materials you recover in danger of theft?	No
Other	
Is the climate in your area an impediment to composting or other elements of your operation?	Yes
Does your community have an aging population, or are the demographics changing in a way that will require major changes to your operations?	No

THREATS	STRATEGY
Single stream recycling may reduce quality of materials processed at MRF	
	Public education about cleaning containers prior to placing in bin
	Introduce separate glass collection
	Collaboratively invest in state of the art MRF technology
Continued expansion of bottle bill would reduce recycling revenues	
	Increase recycling participation generally
	Increase types of accepted plastics
Theft of recyclable materials	
	Educate public about loss of public revenue due to theft
	Create theft notification hotline or webpage
	Prosecute theft of recyclables
Blue bins are difficult to use for the County's aging population	
	Invest in rolling bins and mechanical pick up
Rising transportation costs for taking ash to landfill	
	Identify alternative uses for ash, including revenue generating uses
	Invest in hybrid or biodiesel trucks
	Consider alternative ash transportation options including rail
	Consider mono-filling ash at Site 31
Municipal agreements are expiring in 2013-2015	
	Renegotiate agreements and maintain flow control
	Work with Covanta to incentivize extension of delivery agreements
	Promote environmental benefits of WTE for municipalities and OCRRA education and outreach efforts
	Decrease tip fees by diversifying revenue
Injury to collections employees	
	Introduce mechanical collections

OCRRA Financial Summary

A complete financial assessment of OCRRA's operations is outside the scope of this report. We did, however, gather historical data to make projections of future cash flows. Both the historical figures and several future scenarios are described below. We also describe the spreadsheet tool developed to project future cash flows. Summary tables and graphs are presented in the appendix.

Historical Information

We collected data for this section of the report from the annual reports available on OCRRA's website. We used the Annual Reports from 2001 to 2010, the Annual Reports on Recyclables Recovered from 2002 to 2010, and the Annual Reports of Facility Performance from 2005 to 2010. This information, along with financial projections and a number of charts, is presented in the appendix.

In terms of materials collected and processed by OCRRA a steady increase during most of the decade is followed by a sharp decline in 2009 and 2010 when the economic downturn led to a decrease in purchases and hence a reduction in the discard of waste materials. Recyclable materials, for all categories other than paper, which increased toward the end of the decade, showed a steady or slightly declining trend, and then a sharper decline during the recession. The steady decline may be due to practices such as "thin-walling" where plastic containers are made lighter and the general reduction in paper products.

OCRRA's annual change in net assets (the difference between expenses and revenues) shows a volatile pattern with multimillion dollar losses in 2002, 2003, 2009 and 2010 and similar size gains in the other years. High expenses explain the losses in the early part of the decade (the expenses decrease gradually over the time period) and the combination of the recession and a change in the terms of the Power Purchase Agreement with Niagara Mohawk, which halved the price at which OCRRA is able to sell electricity, explain the more recent negative change in net assets.

Almost all of the expenses are incurred in operations and financing of the WTE plant. While program expenses, which include expenditures on recycling, education, outreach, among other waste reduction initiatives, represent a small portion of total expenses for the agency, they have been steadily rising and represent approximately 10% of the total. It is also important to note that the revenue stream for the agency is almost entirely from the WTE plant. Approximately 60% of the revenues come from tip fees collected, approximately 35% come from waste electricity sales, and approximately 5% from other sources, which include recovered metal also coming from WTE operations.

Projections

We used a Microsoft Excel-based tool, which is included with this report, to help us understand future financing of OCRRA's operations. The tool is based on 32 different parameters which can be changed to create different scenarios. A comparison of the scenarios in terms of future cash flows and their net present value is possible. We created seven hypothetical scenarios representing different WTE contractual arrangements and different growth rates for waste materials, recycling, composting, etc. The model is more sensitive to the growth rate of electricity revenues than almost any other value. This is consistent with the sharp decline in revenue after the change in the PPA in 2009.

We assume a 50 year life for the WTE plant and base our cash flow analysis on this period, ending in 2045. In constructing the initial seven scenarios we changes parameters such as the expected growth rates of electricity prices, material collection, recycling, revenues and expenses. We also analyzed the effects of different ownership and profit-sharing arrangements between OCRRA and COVANTA. The optimistic business as usual model resulted in a $97 MM net present value, while the most pessimistic model resulted in a net present value loss of nearly $35 MM. It should be noted that the scenarios were constructed to explore the effects of different economic variables on OCRRA but are not forecasts of future conditions.

In 2015, the ownership of the WTE facility will be transferred to COVANTA, unless the contractual arrangements are renegotiated. The period ahead of 2015, therefore, presents an excellent opportunity for OCRRA to reassess its entire operation. OCRRA will need to identify sources of revenue to cover its program expenses other than the WTE facility. A number of financial recommendations are presented in the following section.

Recommendations

Our recommendations presented for OCRRA's consideration are divided into two groups: financial and operational.

Financial Recommendations

1) Renegotiate private sector contracts and improve profit sharing arrangements

Aligning incentives
Important to the finance of the solid waste management is to align the incentives of each operator. Underlying each of the following recommendations is the goal of finding compatible incentives for OCRRA and the organizations with which it is contracting.

MRF
We recommend OCRRA utilize the cash flow analysis tool to estimate the financial benefit of new contracts with the MRF. We recommend exploring a weight-based profit sharing agreement where OCRRA receives a set share of MRF profits up to a certain annual tonnage received at the MRF. In years when OCRRA was successful in diverting more than that baseline tonnage to the MRF, the profit sharing ratio would shift in OCRRAs favor. The Lee County case study presents a useful example of such a contract. Negotiating such an agreement could be difficult for OCRRA as it does not currently own the MRF facility, but an incentive for pushing a greater amount of recyclables to the MRF would benefit the private MRF as well.

WTE
We recommend that OCRRA focus on two components of its WTE operations – capacity and efficiency. First, OCRRA could reduce periods of below-capacity operation by importing waste, especially during the slower winter months. Secondly, OCRRA could maximize the plants efficiency by burning items with high BTU values. This could be achieved through greater diversion of compostables from the waste stream.

2) Dedicated Revenue Source

Because revenues in solid waste management are often volatile, as already described in this report, we recommend for OCRRA to consider avenues for establishing a dedicated funding source for its education, outreach, and waste reduction programs. Ideally, this revenue stream would be resistant to economic downturns and factors external to the organization, such as competition from the private sector.

Boulder's "trash tax" is one such example, where the municipality collects $3.50 per month per residential account and $0.85 per cubic yard of commercial waste collection. The tax is levied on the haulers who pass it on to their customers as a line item on their bill. The money is dedicated to a variety of waste reduction programs including, for example, the operation of the Center for Hard to Recycle Materials, which otherwise would not be financially feasible.

In Onondaga County the complexity of the solid waste management system makes it difficult to levy such a tax as ordinances would have to be passed in many different municipalities and

at the county level. Nevertheless, the long-term payoff from such a system justifies persistent effort on the part of the Agency to make clear the benefits of its programs to the member municipalities and to explain the advantages of shifting its funding base to a more predictable source.

Other options include a small increase in the sales tax in Onondaga County. To raise $5 million or so needed for OCRRA's programs, the county-wide sales tax of 8%, which raises more than $1 billion, would have to be increased to 8.04%. (Administratively, it may be simpler to increase the tax rate by half a percent on a small subset of goods rather than raising the rate on all goods by a very small amount.) As discussed previously, this tax could be an innovative deposit/refund system where residents would be able to receive a portion of the money back when recycling or properly discarding certain items.

The passage of any tax is a political challenge. As such OCRRA would have to be transparent about how much different elements of the system cost and their environmental, health, and social benefits. By engaging the community in its operations OCRRA would be able to build the constituency needed for dedicated, tax-based, funding stream.

1) Fee-based services

We recommend for OCRRA to consider diversifying its revenue streams through services for which it would charge fees. Boulder's Eco-Cycle is again a good example of this operating model, as this non-profit generates 90% of its $5 million annual budget through fees. Eco-Cycle charges 10% above cost for its services, dedicating this amount to its education and outreach programs.

OCRRA's expertise in waste reduction and composting can be leveraged into a consulting package for businesses that want to reduce their waste. OCRRA personnel would assess the businesses needs and create customized solutions for "zero waste" operation, including on-site composting, paperless operation, effective waste stream sorting, and waste conscious purchasing policies. Many businesses around the country and in Onondaga County are seeking ways to promote their operations. Businesses participating in OCRRA's workshops could receive special recognition from OCRRA and conduct joint advertising campaigns with the Agency. In addition, many businesses around the country have found their employees to be more productive and happier when participating in environmentally friendly programs, resulting in lower turnover and higher profit margins for the companies.

Contracting with event organizers to provide "zero waste" events can be another source of revenue for OCRRA. Almost every weekend during the summer in Syracuse and other municipalities in Onondaga County has events that generate high quantities of waste. By partnering with the private sector haulers, the MRF, and event organizers, OCRRA could increase the amount of materials recovered and recycled from these events, help promote the participating organizations, and generate revenue for its coordination of the waste management during the event.

Other ideas include operating locations for hard-to-recycle materials. These centers should become more profitable under the new extended producer responsibility requirements in New York. While it is doubtful that OCRRA will be able to support its entire operation with fees from service, these fees can be a significant portion of a diversified funding stream, when combined with other recommendations in this report.

Operational Recommendations

1) Enhancing outreach and education

Social networking
Social media is a low cost way for the OCRRA to manage its image, share its successes, and advocate for its mission at a local and national level. If OCRRA can commit to putting in a small, but regular, allocation of effort to its Facebook presence, social media can become a very powerful tool for the agency. The simple steps outlined below are the foundation of a continuing iterative process of social media engagement that truly maximizes the utility of the tool.

Creating content is often one of the biggest roadblocks to starting a successful social media program. Many organizations' Facebook pages remain social media "ghost towns" after a couple of enthusiastic initial posts. Regular contribution of content is hugely important. Don't wait for something extraordinary to post about. Simply recalling an experience at a regular collection event or providing an update on the progress of a program or project are great ways to develop a body of content.

However, the most important tip for maximizing the utility of social media tools like Facebook is to remember that they are instruments for *engagement*. The real power of a Facebook presence is in building relationships, locally and nationally, with potential collaborators and supporters. Relationship-building involves making Facebook conversations bi-directional. For example, OCRRA can cultivate relationships by offering supportive comments on the Facebook pages of current or prospective partners, local agencies with similar missions, or groups that simply do good work in the area. Even the quick action of "liking" a post on the wall of one of OCRRA's agency "friends" can strengthen a relationship. On OCRRA's own wall, it can prompt discussions and engage with respondents. Having a network of engaged regional partners would be especially useful should OCRRA have a need to gather constituencies to support a local ordinance in the future.

Increased awareness of the transition to single stream
A common success among our case studies was the impact of single stream recycling on curbside recycling rates. Now that the integrated system is able to process comingled recyclables, we recommend a full outreach campaign to reinvigorate Onondaga recyclers. To spread the message of OCRRA's simplified single stream recycling collection, we strongly recommend seeking out Jim Boeheim for a televised public service announcement. This could be initiated through contacting the Jim & Julie Boeheim Foundation here in Syracuse.

Promote WTE awareness
Outreach efforts around waste-to-energy present particular challenges because of the difficulty of addressing both waste reduction and the benefits of WTE over landfilling in a concise, sound bite-ready message. We recommend the use of thought provoking, interactive tools for WTE education that aim to raise awareness of how Onondaga residents' behaviors are connected to WTE, and how the WTE facility fits into OCRRA's integrated system.

One especially creative example of provocative WTE outreach comes from Hennepin County, which saw its HERC facility in a new light this summer when the facility supported a giant outdoor video projection on its downtown-facing wall as part of Minneapolis' summer arts

festival[29]. The video installation explores the scale of waste production in Minneapolis and allows viewers to conceptualize the communities collective waste visualize how it gets transformed into energy and steam within the facility. The Onondaga County Resource Recovery Facility's external wall facing I-81 could support a visual installation. OCRRA could recruit a video artist from Syracuse University's College of Visual and Performing Arts to undertake a similar project.

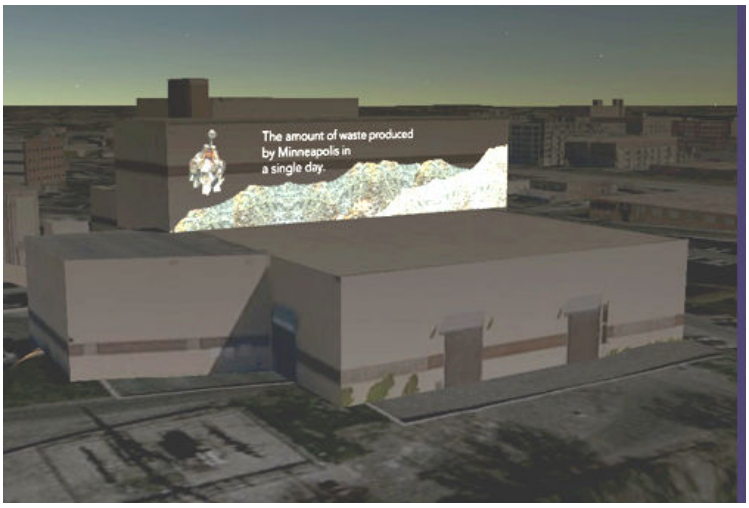

Figure 4: The Hennepin Energy Recovery Center (HERC) supporting an artistic and educational video installation on its downtown-facing exterior wall. This scene depicts the grapple managing a trash pile that represents "the amount of waste produced by Minneapolis in a single day." A preview of the video installation can be viewed at: http://vimeo.com/24643136 .

This style of thoughtful, awareness-raising outreach could be replicated on a smaller scale, but for a wider audience, on OCRRA's website. For example, an interactive tool could provide a visual representation of the county's current waste generation and electricity production that was linked to real-time changes in the amount of MSW being processed.

2) Expand compost programs

OCRRA's ongoing efforts to expand its compost operation are impressive: its goal is to expand from its current level of 1,000 tons of food waste per year to 9,600 tons by 2013. OCRRA plans to achieve these goals by utilizing aerated static pile composting, rather than the traditional wind row composting in which long lines of compost are slowly turned. Aerated static pile composting, in which air is forced into one pile, reduces composting time to 90 days rather than 9 months with wind row composting. Additionally, with aerated static piles volume can increase to 3-4 times the traditional capacity, while using only 1/3 of the geographic footprint. OCRRA's pilot program has attracted the attention of municipal composters from across the U.S. and as far away as Russia, Kenya and Indonesia.

While OCRRA currently partners with universities, supermarkets and hospitals to get the pre-consumer food waste, we recommend that OCRRA investigate expanding its program to include municipal school systems. Schools present the same opportunities of volume of quality collectable materials that universities and other institutions already provide, and if kitchen

[29] Northern Spark. "Christopher Baker, Waste Not." Accessed 01 June 2011: http://northernspark.org/projects/waste-not.html?org=p

level collection proves successful, then in-cafeteria education programs can be rolled out. In Minnesota, Hennepin County has successfully integrated school collection and education programs into its compost operations. School children now separate out compostable food waste in the cafeteria and each year they visit the compost facility to 'take back' the compost to use in a school community garden. The program serves goals of reducing the amount of material sent to landfills, educates children on the waste stream and composting, and helps to form habits on how the next generation will handle its waste. Hennepin County funds its program through grants from its Waste Abatement Incentive Fund (total budget of $300,000 year). The grants allow schools to keep new collection programs cost-neutral while they renegotiate haulers contracts that incorporate the reduced cost of organics disposal. In recent years, the fund has supported the start-up of organics recycling programs in over one hundred schools and a handful of municipalities. The program has been the subject of a great deal of media coverage and attention from public officials.

While we see school composting as shorter term opportunity, in the longer term we recommend that OCRRA investigate the feasibility of curbside municipal pickup. Curbside pickup presents obvious challenges of a reduction in compost quality and increased costs of running different collection routes. For this reason, we believe that OCRRA should run pilot program for residential compost pickup within a neighborhood in Syracuse or a surrounding municipality to determine the viability of curbside pickup in Onondaga County.

3) Pursue NYS Renewable Energy Portfolio Main Tier Eligibility

Another potential opportunity for waste to energy facility operators is state renewable energy credits. In May 2011 Maryland enacted S.B. 690 reclassifying waste-to-energy facilities connected to the Maryland distribution grid as Tier 1 resources.[30] Similarly, Covanta has filed a petition for waste to energy technology to be included in the main tier of New York's Renewable Energy Portfolio Standard Program. In their petition, Covanta contends that the ten waste to energy facilities in New York State—seven of which are operated by Covanta—should be eligible for renewable energy credits as these facilities use municipal solid waste as fuel and thus reducing the need to burn fossil fuels "avoid 3.2 million tons of GHG emissions as carbon dioxide equivalent (CO2E) each year."[31] Covanta also cites §1-103(12) of the N.Y. Energy Law which defines WTE as a renewable energy source. If this eligibility is granted, renewable energy credits will be an additional source of revenue for the waste to energy facility.

4) Explore creation of Friends of OCRRA

We recommend that OCRRA explore the creation of a Friends of OCRRA (FOCRRA) nonprofit partner to assist waste reduction education and programming. FOCRRA's main strength would be its ability to raise outside funds specifically available to 501(c)(3) organizations. FOCRRA could also help to rally constituencies when needed. An early step in the exploratory processes should be gauging interest in voluntary membership in F OCRRA among current

[30] Database of State Incentives for Renewables & Efficiency (DSIRE).(2011). Renewable Energy Portfolio Standard. http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MD05R&re=1&ee=1

[31] Attorneys for Covanta Energy Corporation. (2011). "Verified Petition of Covanta Energy Corporation Requesting Inclusion of Energy from Waste (EfW) as an Eligible Technology in the Main Tier of New York's Renewable Energy Portfolio Standard Program."

and past board members and existing regional stakeholders. Once a group of interested people have been identified, more in depth research should be done to gauge if the grants potentially available to FOCRRA align with OCRRA's programmatic plans. This alignment should be the first criteria for determining whether a grant should be pursued. A list of state and national grants available to 501(c)(3) organizations is in included in the grant appendix chart.

Additional Ideas

Regional collaboration could potentially lower redundancy of spending on outreach and education efforts for OCRRA and other solid waste management entities in Central New York. For example, if OCRRA and the surrounding counties could agree upon recycling messaging and form a common outreach campaign, they could advertise together in both television and print news outlets that serve Central New York more broadly.

Richard Gertman, a principal of Cascadia Consulting, also suggested several innovative ideas for incentivizing municipal waste reduction through alternative financial arrangements. First, charging by weight instead of a PAYT volume-based system. Trucks could be retrofitted with scales to measure weight at each pick-up. To account for error between calibrations, the measurements could be rounded down, so as to avoid overcharging customers. This creates more easily achievable increments of reduction. Households would likely find it easier to reduce by a few pounds over time than by an entire trash bag or trash can.[32]

Second, charging proportionally more for larger quantities of trash than for smaller quantities, known as conservation pricing, incentivizes lower waste output. The first smaller increments would be a lower rate per quantity of trash while larger quantities would be increasingly more per quantity.[33]

Third, charging by type of service rather than charging for trash pick-up and embedding recycling and/or composting collection and disposal costs in this price of trash removal. This would result in greater visibility of the costs of waste collection and disposal. Consumers would be made aware of the costs of their own waste stream and could still be incentivized to recycle by charging a greater price for trash, and less for recycling and compost. This would change the fee structure of solid waste management to be a charge for collection and processing, rather than charge for trash removal with "free" recycling. [34]

The greater visibility of a more transparent billing system would educate the public and foster a culture of the community "owning" the costs of their waste stream. This would be an integral step toward building constituencies for waste reduction ordinances within the local government and the general public.

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[32] Gertman, Richard. Principle, Environmental Planning Consultants. Telephone interview conducted by Madison M. Quinn on May 29, 2011.

[33] Ibid.

[34] Ibid.

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Appendices

Appendix 1: Acronyms

ADC – Alternative Daily Cover
BTU – British Thermal Unit
C&D – Construction & Demolition
CHaRM - Center for Hard to Recycle Materials
CO2E – Carbon Dioxide Equivalent
CRC - Center for Resource Conservation
D&A – Depreciation and Amortization
DEC – Department of Environmental Conservation
DEF - Department of Environmental Facilities
DPW – Department of Public Works
EBC – Environmental Benefits Calculator
EFC - Environmental Finance Center (SU EFC)
EoW – Every other Week
EPF – Environmental Protection Fund
EPA – United States Environmental Protection Agency
ESDC – Empire State Development Corporation
E-WASTE – Electronic Waste
FPL – Florida Power and Light
GHG – Greenhouse Gases
HERC – Hennepin Energy Recovery Center
HHW – Household Hazardous Waste
ISRI - Institute of Scrap Recycling Industries
ISWM – Integrated Solid Waste Management
KCSWD - King County Solid Waste Division
LSWMP – Local Solid Waste Management Plan
MRF – Materials Recovery Facility
MSW – Municipal Solid Waste
MWC – Municipal Waste Combustor
NRC – National Recycling Coalition
NYS – New York State
NYSDEC – New York State Department of Environmental Conservation
NYSERDA - New York State Energy Research and Development Authority
OCRRA – Onondaga County Resource Recovery Agency
PAYT – Pay As You Throw
PBA - Public Benefit Authority
PPA – Power Purchase Agreement
PURB - Portland Utility Review Board
RCRA - Resource Conservation and Recovery Act
RDD - Refuse Disposal District
RDF - Refuse Derived Fuel
RHRF – Recyclables Handling and Recovery Facility
SERDC – Southeast Recycling Development Council
SSO – Source-Separated Organics
SSR – Source-Separated Recyclables
SMART – Save Money and Reduce Trash
SMM - Sustainable Materials Management
SSR – Source-Separated Recyclables

SUNY – State University of New York
SWA – Solid Waste Authority
SWM – Sustainable Waste Managment
SWOT – Strengths, Weaknesses, Opportunities, and Threats (analysis)
VDF – Vehicle Dismantling Facility
VOCs – Volatile Organic Compounds
WARM – Waste Reduction Model
WTE - Waste to Energy

Appendix 2: Glossary

Curbside Recycling - residents separate predetermined recyclable materials from their trash and place them near the curb. There, the recyclable materials are picked up by a recycling vehicle.
Ferrous Metal - iron-based metal.
Hazardous Waste - (toxic waste) harmful materials that are disposed of which are toxic, flammable, explosive and/or caustic.
Incineration - process of burning waste.
Integrated Waste Management - an approach to waste management that incorporates reducing, reusing, recycling, composting, transforming and disposing of waste in and environmentally safe manner that protects public health and safety.
Landfill - a place where garbage, rubbish, etc., is disposed of by burying it under a shallow layer of soil.
Leachate - liquid that has percolated through solid waste and/or been generated by solid waste decomposition and has extracted, dissolved or suspended materials in it. This liquid may contaminate ground or surface water.
Methane - gas formed from decomposing waste.
Material Recovery Facility - (MRF) commonly used to describe facilities that receive, sort and process for market only *source-separated recyclables*, both commingled and segregated. However, it is also commonly applied to facilities that receive *source-separated recyclables*, both commingled and segregated. However, it is also commonly applied to facilities that receive *mixed wastes and which separate out materials for recycling prior to transferring the residue to a landfill or transformation facility.* and which separate out materials for recycling prior to transferring the residue to a landfill or transformation facility.
Municipal Solid Waste - nonhazardous, nonagricultural solid waste generated by residences, businesses, and institutions.
Nonferrous Metals- metals that contain no iron, such as aluminum, copper and brass.
Recycling Center - a site where used manufactures materials are collected and resold for reprocessing. Types of centers include drop-off and donation or buyback; community service; and processing.
Recycling Coordinator - the city or county official responsible for coordinating waste reduction and recycling programs in the city or county.
Recycling Operator - person responsible for operating a recycling program/center.
Reduce - to lessen the amount of waste generated.
Refuse - anything thrown away or rejected as worthless or useless; waste; garbage; trash; rubbish.
Resource Recovery - a process that extracts value from the waste stream in the form of materials, energy or fuel.
Reuse - using products over again, either for the same purpose or for another use.
Waste - refuse; no longer of use.
Waste Disposal - controlled assimilation of waste materials into the environment without causing unacceptable damage.
Waste-to Energy - the process of burning waste to produce energy /electricity.
Waste Hauler - specially equipped company which picks up solid waste for disposal.

Appendix 3: Client Missions

Onondaga County Resource Recovery Agency
Mission
Serve our community by providing a comprehensive solid waste management system that is environmentally, socially and financially sound. Through innovative strategies such as waste reduction, recycling, composting, disposal and education, we make our community a more healthy and sustainable place to live. http://www.ocrra.org/

Environmental Finance Center of Syracuse University
Mission
We enhance the administrative and financial capacities of state and local government officials, nonprofit organizations, and private sectors to make change toward improved environmental infrastructure and quality of life. http://efc.syracusecoe.org/efc/

The National Recycling Coalition, Inc.
Mission
The Mission of the National Recycling Coalition is to partner with and facilitate activities between and among non-profit organizations (NGO's), businesses, trade associations, individuals and government to maintain a prosperous and productive American recycling system that is committed to the conservation of natural resources. http://www.nrcrecycles.org/

Maxwell School Department of Public Administration
Mission
To prepare students for leadership and management in public service in a multi-sector, global political economy, the MPA program seeks to endow students with knowledge, cultivate talents and perfect skills in three pillars of the field –policy, management and analysis— for careers in government, non-profit and for-profit agencies with links to the public sector in the U.S. and abroad. http://cepa.maxwell.syr.edu/

Appendix 4: OCRRA Financial Charts

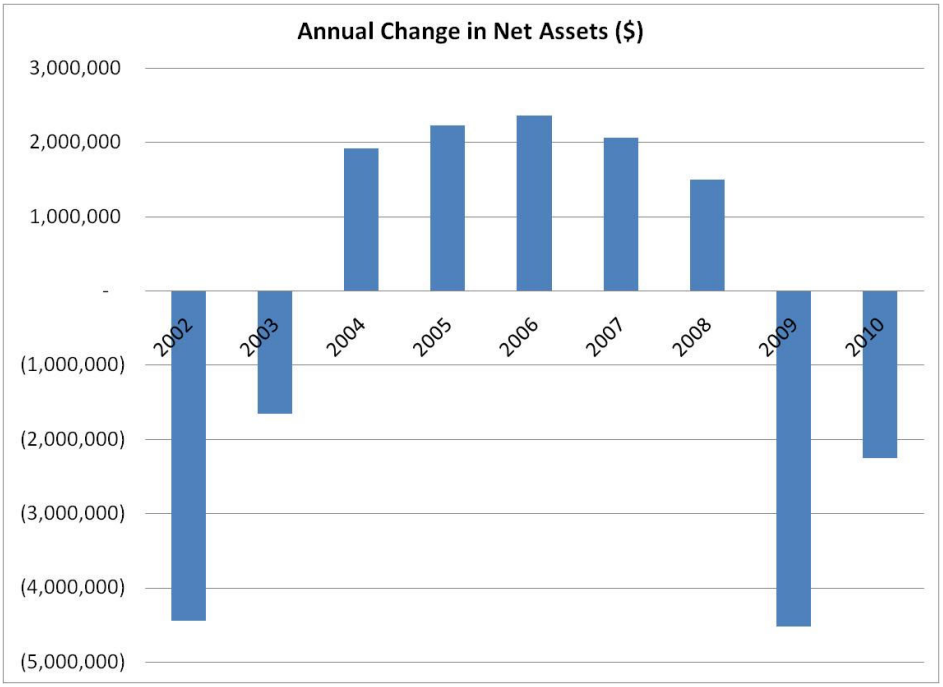


Figure A1. OCRRA's historical changes in net assets. High expenses explain losses in 2002 and 2003 while the more recent losses are due primary to the reduction in the price for electricity that OCRRA receives. (Source: OCRRA's Annual Reports.)

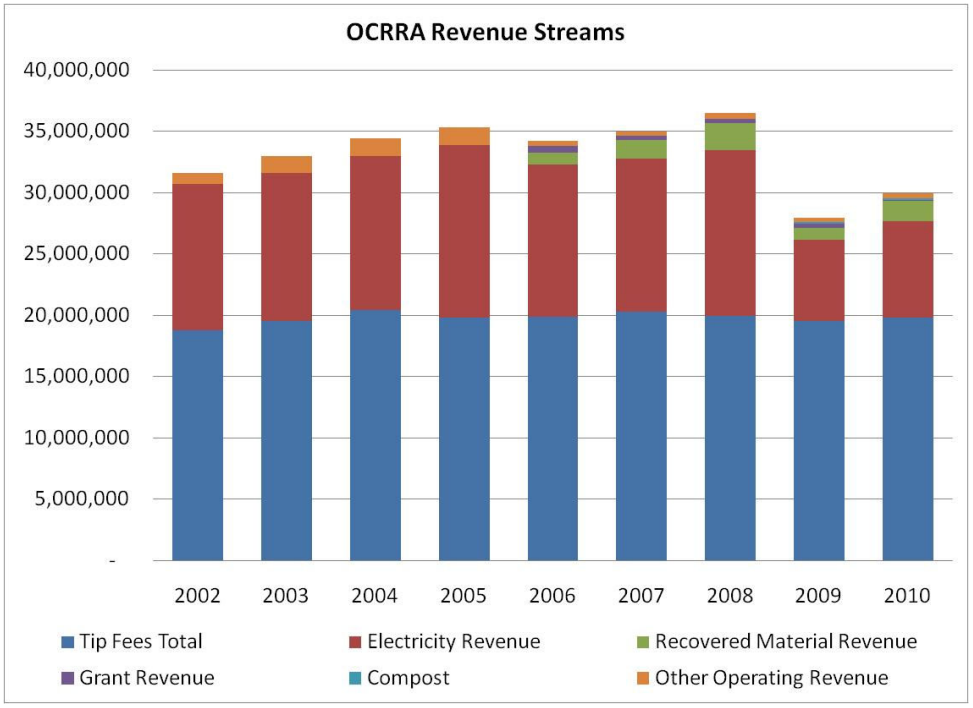


Figure A2. OCRRA's revenue stream shows steady revenues from tip fees and lower revenues from electricity since 2009 due to the price for electricity that OCRRA receives. (Source: OCRRA's Annual Reports.)

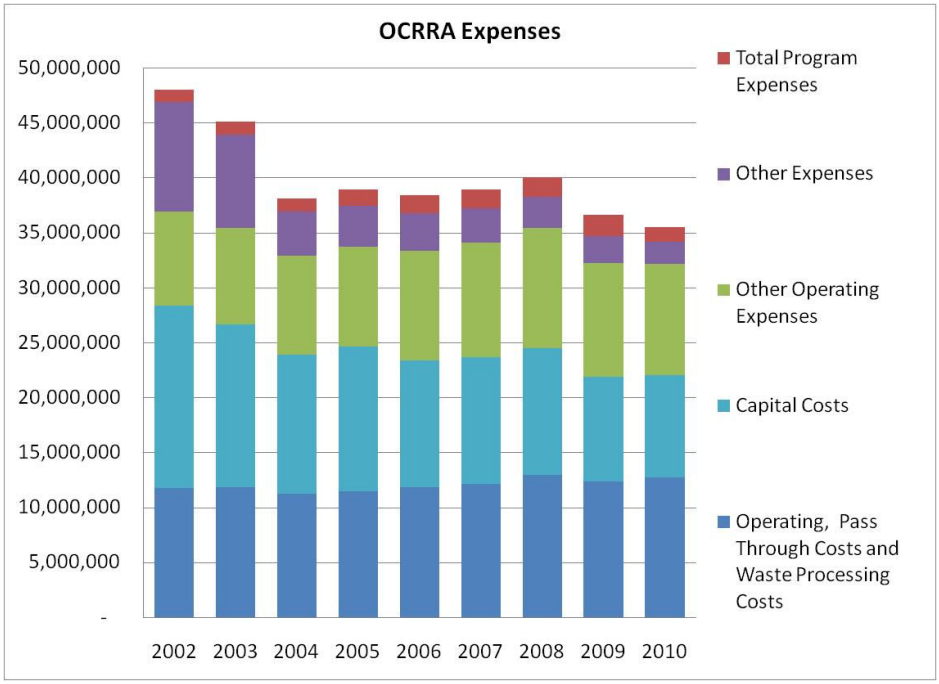


Figure A3. OCRRA's expenses have decreased gradually over the period shown. While the expenses directly associated with operating the WTE facility have remained relatively steady, the capital costs have decreased. Other operating expenses are largely personal services, landfill contracts, and depreciation, among a number of other categories, many of which are also associated with the WTE plant. Other expenses are non-operating in nature. (Source: OCRRA's Annual Reports.)

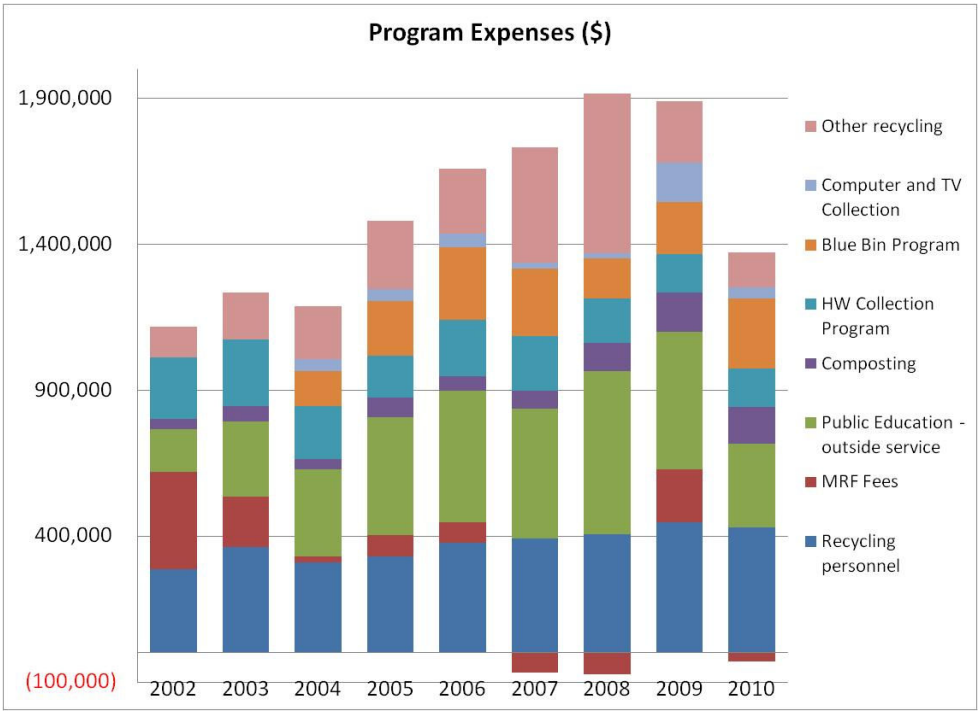


Figure A4. Program expenses are the top category in the bar chart above. Here they are broken out into different programs. The MRF fees are negative in 2007 and 2008 when the facility shared its profits with OCRRA. (Source: OCRRA's Annual Reports.)

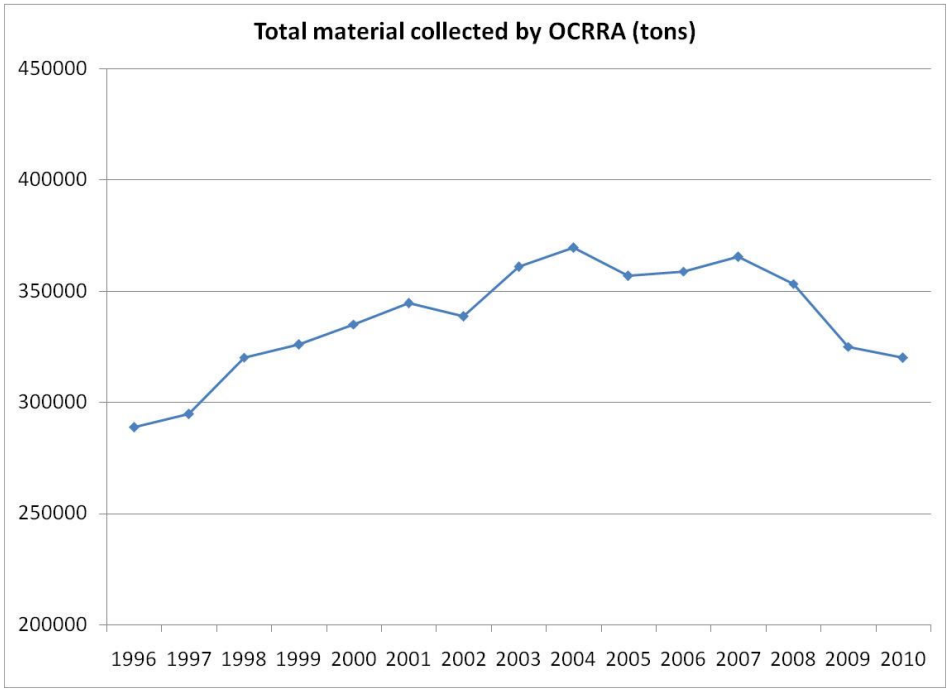


Figure A5. The materials collected by OCRRA, including C&D, show a gradually increasing trend until the end of the decade when the recession led to a decrease in consumption and therefore in discards. (Source: OCRRA's Annual Reports on Recyclables Recovered.)

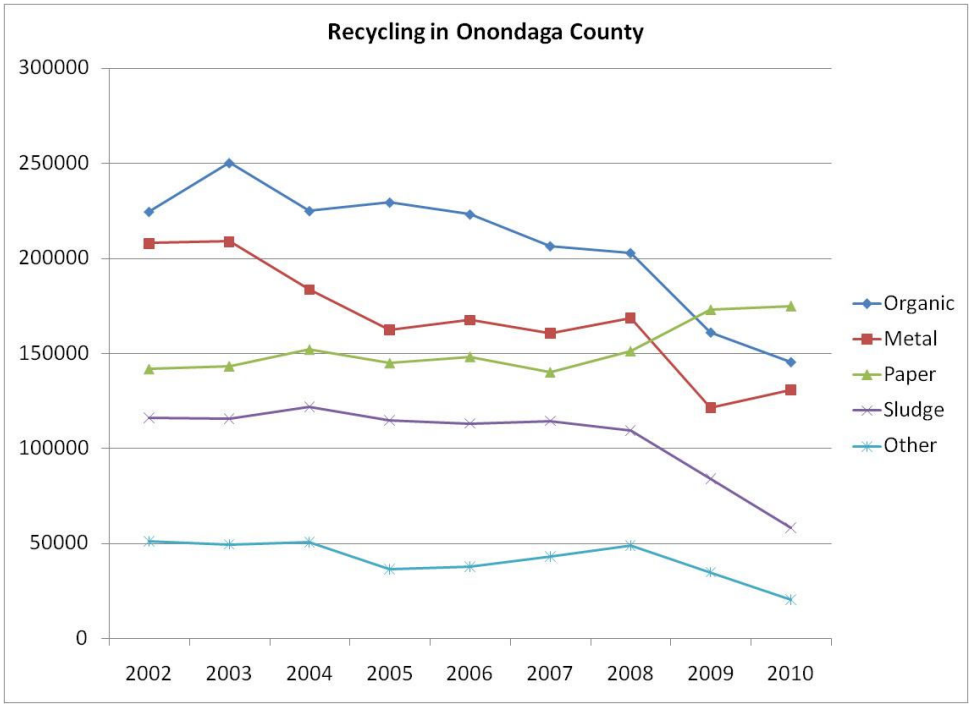
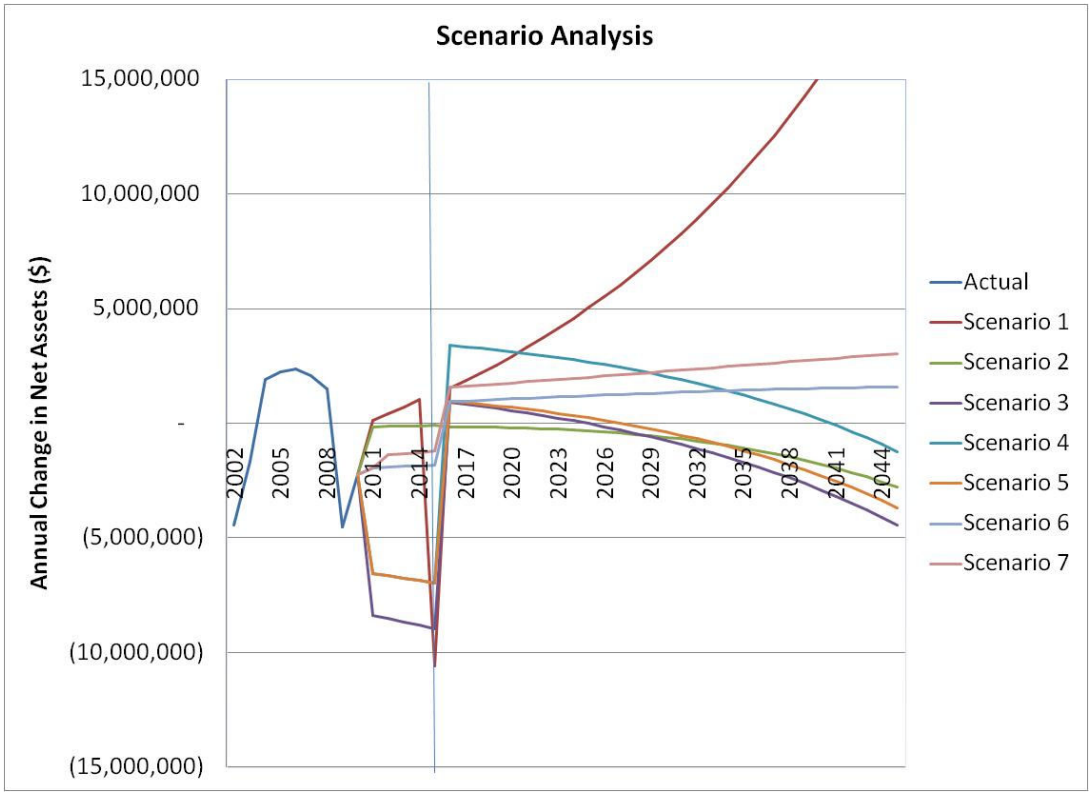


Figure A6. The recycling tonnage for most materials in Onondaga County, according to OCRRA's annual survey, has decreased. Some of the contributing factors include "thin-walling" of plastics, reduced paper use, and a change in the way sludge from the waste water treatment plant is handles. The notable exception is paper, on which OCRRA has focused many of its efforts recently. (Source: OCRRA's Annual Reports on Recyclables Recovered.)



Scenario Analysis	**S 1**	**S 2**	**S 3**	**S 4**	**S 5**	**S 6**	**S 7**
NPV (Millions $)	**$97**	**-$11**	**-$48**	**-0.4**	**-$35**	**$9**	**$24**
Parameters							
Capacity utilization after 2015	83%	83%	99%	99%	99%	83%	83%
Composting revenue growth	10%	3%	3%	3%	3%	3%	3%
Curbside recycling growth	-1%	-1%	-1%	-1%	-1%	0%	3%
Electricity price growth	3.60 %	1.00 %	1.00 %	1.00 %	1.00 %	1.00 %	1.00 %
Electricity price as % of market price after 2015	83%	77%	77%	77%	77%	77%	77%
Electricity share	90%	90%	0%	20%	20%	70%	70%
Grant revenue growth	3%	0%	0%	0%	0%	3%	3%
Material processing growth through 2015	1%	0%	1%	1%	1%	1%	1%
OCRRA's WTE ownership after 2015	100%	100%	0%	0%	20%	70%	70%
Plastic recyclables share	0%-	0%	0%	0%	0%	0%	20%
Paper recyclables share	0%	0%	0%	0%	0%	0%	20%
Program Expenses growth rate	3%	5%	5%	5%	5%	3%	3%
Recovered material share after 2015	100%	100%	0%	20%	20%	70%	70%
Recycling Growth Rate	-1%	-1%	-1%	-1%	-1%	0%	0%

Figure A7. Seven initial scenarios of future cash flows are presented. The scenarios vary in growth rates associated with material collection, recycling, and WTE ownership and profit sharing.

Appendix 5: Federal Grants for Solid Waste Management Programs

Solid waste management organizations are well placed to seek grant funding from a broad range of grant programs and categories offered by the EPA and other federal and state agencies, and may additionally be eligible for certain foundation grants.[35] These funds may be used to promote a variety of programs and projects such as waste reduction, development of SWM plans and recycling product and market development. The grant funds typically may be used for hiring personnel, for minor capital purchases or travel. Federal funds are often limited to government or non-profit entities, but SWM for-profit businesses may find financing resources from the EPA's Recycling Market Development program[36], or its Small Business Innovation Research program.[37] Additional grant information and strategies may be found through the EPA Center for Environmental Finance[38] and from the regional EPA office websites listed later in this section.

The following list of grants and accompanying descriptions are excerpted from the *Federal Grants Guide for Community Environmental and Public Health Activities*, a guide published by the Environmental Protection Agency, the Center for Disease Control and the Agency for Toxic Substances & Disease Register.[39] The guide offers tips for identifying and applying for federal grants. Not listed amongst the grant programs below is the EPA Construction and Demolition Related Grant program, which funds pilot projects in the management of construction and demolition materials.[40]

US EPA Grant Programs

- **Pollution Prevention (P2) Grant Program**

This program supports state and Tribal technical assistance programs that help businesses and industries identify better environmental strategies and solutions for reducing or eliminating waste at the source. It also aims to improve business competitiveness without increasing environmental impacts.

Eligible Activities:
- Technical assistance
- Training
- Outreach and education
- Identifying and addressing regulatory and non-regulatory barriers and incentives to pollution prevention

Funding Amount: $20,000 to $180,000

Eligible Entities:
- State colleges
- Federally-recognized tribes and intertribal consortia
- States

Limitations:

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[35] See foundation grant section of the report.
[36] EPA Recycling Market Development program: http://www.epa.gov/epawaste/conserve/rrr/rmd/index.htm.
[37] EPA Small Business Innovation Research program: http://www.epa.gov/ncer/sbir/.
[38] EPA Center for Environmental Finance: http://www.epa.gov/efinpage/
[39] EPA. (2008). EPA/CDC/ATSDR Federal Grants Guide for Community Environmental and Public Health Activities. United States Environmental Protection Agency. Accessed 6-1-2011: http://www.epa.gov/care/documents/EPA_CDC_ATSDR_Grants_Guide_web_061708.pdf.
[40] EPA Construction and Demolition Grants: http://www.epa.gov/wastes/conserve/rrr/imr/cdm/grants.htm.

- 50 percent cost share required.
Availability:
- Total program funding for FY07 was approximately
$4.5 million (up to $163,000 per EPA region)
- EPA receives approximately 200 grant proposals and awards approximately 60 grants annually.

Contact Information:
http://www.epa.gov/opptintr/p2home/pubs/grants/ppis/ppis.htm

Source Reduction Assistance Grants
Program: This program provides funding to reduce hazardous substances, pollutants or contaminants entering waste streams or otherwise released into the environment prior to recycling, treatment, disposal and/or energy recovery activities.
Eligible Activities:
- Pollution prevention, source reduction and/or resource conservation projects that reduce or eliminate pollution at the source
Funding Amount: $5,000 to $90,000
Eligible Entities:
- Non-profit organizations
- Independent school districts
- Local governments
- Federally-recognized tribes and intertribal consortia
- States
Limitations:
- Five percent cost share required.
- Two-year project period.
- This grant program does not support projects that rely on reducing pollution by using recycling, treatment or disposal and/or energy recovery activities.
Availability:
- Total program funding for FY07 was approximately $1.3 million.
- $163,000 available per EPA region in 2007.
- Approximately 40 awards will be made nationally.
- Funded activities are EPA region-specific. During some years, regions will conduct their own solicitations independently. In those years, the national solicitation will specify which regions are doing so.
Contact Information:
http://www.epa.gov/p2/pubs/grants/index.htm

Solid Waste Management Assistance Grants
This program provides funding to promote the use of integrated solid waste management systems to manage solid waste issues.
Eligible Activities:
- Provide training
- Conduct surveys, studies and demonstrations
- Develop educational materials and programs
Funding Amount: $100,000 on average
Eligible Entities:
- Non-profit organizations
- Local governments
- Tribes
Limitations:
- Three-year project period.

Availability:
- $4 million available annually.

Contact Information:
http://www.epa.gov/epaoswer/osw/

Environmental Justice Collaborative Problem-Solving Cooperative Agreements Program

This program enables recipients to use the Environmental Justice Collaborative Problem-Solving Model to address environmental and/or public health concerns in their communities.

Eligible Activities:
- Issue identification, community vision and strategic goal-setting
- Community capacity-building
- Consensus-building and dispute resolution
- Multi-stakeholder partnerships and resource mobilization
- Management and implementation
- Evaluation, lessons learned and replication of best practices

Funding Amount: $100,000

Eligible Entities:
- Non-profit organizations

Limitations:
- Grantee must work with or provide services to an affected community, which is disproportionately impacted by environmental harms and risks, and has a local environmental and/or public health issue that is identified in the proposal.
- Three-year project period.

Availability:
- Ten to thirty grants awarded.

Contact Information:
http://www.epa.gov/compliance/environmentaljustice/grants/ej-cps-grants.html
(800) 962-6215

Environmental Education Grant Program

The purpose of this program is to support environmental education projects that enhance the public's awareness, knowledge and skills to help people make informed decisions that affect environmental quality.

Eligible Activities:
- Capacity building
- Education reform
- Environmental community stewardship
- Health education
- Teacher training
- Student career development

Funding Amount: $15,000 to $125,000

Eligible Entities:
- Non-profit 501(c)(3) organizations
- School districts
- Other educational institutions

Limitations:
- 25 percent non-federal cost share required
- Individual teachers are not eligible
- The primary applicant must be based in the U.S. Partner organizations and project activities may be located in Canada or Mexico

Availability:
- 70 grants estimated annually

- EPA regions will each fund eight to twelve grants of approximately $15,000 to $25,000
- EPA Headquarters will fund three to eight grants of approximately $50,000 to $125,000

Contact Information:
www.epa.gov/enviroed

Community Action for a Renewed Environment (CARE) Program

The purpose of this program is to help communities reduce toxics and solve environmental problems that affect the health and environment of the people who live and work in the community. Level I cooperative agreements focus on activities related to developing programs and identifying challenges and Level II cooperative agreements focus on implementing solutions and becoming sustainable.

Eligible Activities:
- Build sustainable community-based collaborative partnerships
- Conduct education, training and outreach
- Identify sources of toxics and environmental pollutants in the community
- Determine community priorities for risk reduction
- Conduct activities to reduce risks
- Monitor and evaluate risks

Funding Amount: $75,000 to $100,000 (Level I); $150,000 to $300,000 (Level II)

Eligible Entities:
- Non-profit organizations
- Colleges and universities
- Local governments
- Tribes

Limitations:
- Two-year project period.

Availability:
- Awarded annually.
- Total estimated funding in FY08 is approximately $3 million. This includes five to ten Level I and six to eight Level II cooperative agreements.
- This is a cooperative agreement grant, which allows for more direct involvement by EPA

Contact Information:
http://www.epa.gov/care

Technical Assistance and Training Grants

This program provides funding to identify and evaluate solutions to water and waste disposal challenges.

Eligible Activities:
- Identify and evaluate solutions to water and waste disposal problems in rural areas
- Assist applicants in preparing applications for water and waste grants awarded by state level offices
- Improve operations and maintenance of existing water and waste disposal facilities in rural areas

Funding Amount: Unknown

Eligible Entities:
- Non-profit organizations

Limitations:
- Available only in rural areas (population of 10,000 or less)

Availability:
- Unknown

Contact Information:
http://www.usda.gov/rus/water/tatg.htm
(202) 720-9637

water@wdc.usda.gov

Solid Waste Management Grant Program
The purposes of this program are to reduce or eliminate pollution of water resources in rural areas and to improve planning and management of solid waste sites in rural areas.
Eligible Activities:
- Evaluate landfill conditions to determine water resource threats
- Provide technical assistance and/or training to help communities reduce their solid waste stream and work on landfill operation and maintenance and closure issues
Funding Amount: $18,000 to $200,000
Eligible Entities:
- Non-profit organizations
- Academic institutions
- Public bodies
- Tribes
Limitations:
- Available only in rural areas (population of 10,000 or less).
Availability:
- Applications are accepted annually from October 1 through December 31 of each calendar year
- 40 grants were awarded in FY07.
Contact Information:
http://www.usda.gov/rus/water/SWMG.htm

Other Federal Grants

Solid waste managers may seek grant funding from a variety of federal agencies, including the Department of Agriculture, the Department of Energy, and the Department of Health and Human Services. The following grant program of the USDA, for example, offers funding to improve planning and management of solid waste sites in rural areas.

USDA Solid Waste Management Grant Program
The purposes of this program are to reduce or eliminate pollution of water resources in rural areas and to improve planning and management of solid waste sites in rural areas.

Eligible Activities:
- Evaluate landfill conditions to determine water resource threats
- Provide technical assistance and/or training to help communities reduce their solid waste stream and work on landfill operation and maintenance and closure issues
Funding Amount: $18,000 to $200,000
Eligible Entities:
- Non-profit organizations
- Academic institutions
- Public bodies
- Tribes
Limitations:
- Available only in rural areas (population of 10,000 or less).
Availability:
- Applications are accepted annually from October 1 through December 31 of each calendar year.
- 40 grants were awarded in FY07.
Contact Information:
http://www.usda.gov/rus/water/SWMG.htm

Regional EPA Grant Websites:

Region 1 (CT, MA, ME, NH, RI, VT)
EPA Region 1 Grants & Funding: http://www.epa.gov/region01/grants/index.html

Region 2 (NJ, NY, Puerto Rico, U.S. Virgin Islands)
EPA Region 2 Grants: http://www.epa.gov/region02/grants/
Pollution Prevention Grants and Source Reduction Grants:
http://www.epa.gov/region02/p2/grants.htm

Region 3 (DE, DC, MD, VA, PA, WV)
EPA Region 3 Grants & Funding: http://www.epa.gov/region03/grants/index.htm
Mid-Atlantic Municipal Solid Waste Grants:
http://epa.gov/reg3wcmd/solidwastegrants.htm

Region 4 (AL, FL, GA, KY, MS, NC, SC, TN)
EPA Region 4 Grants and Financial Assistance:
http://www.epa.gov/region4/financial/index.html

Region 5 (IL, IN, MI, MN, OH, WI)
EPA Region 5 Contracts& Grants:
http://www.epa.gov/region5/business/index.htm#financial

Region 6 (AR, LA, OK, NM, TX)
EPA Grants and Procurement: http://www.epa.gov/region6/gandf/index.htm

Region 7 (IA, KS, MO, NE)
EPA Region 7 Grants and Funding:
http://www.epa.gov/region7/grants_funding/index.htm

Region 8 (CO, MT, ND, SD, UT, WY)
EPA Region 8 Grants: http://www.epa.gov/region8/grants/
Recycling grants page: http://www.epa.gov/region8/recycling/grants.html

Region 9 (AZ, CA, HI, NV, American Samoa, Guam)
EPA Region 9 Grants and Funding: http://www.epa.gov/region09/funding/index.html

Region 10 (AK, ID, OR, WA)
EPA Region 10 Grants and Funding:
http://yosemite.epa.gov/R10/HOMEPAGE.NSF/webpage/Grants

Appendix 6: Foundation grants available to 501(c)(3) organizations – resources for Friends of OCRRA

The table below provides a list of foundation grants available to 501(c)(3) organizations who specialize in activities that could be germane to OCRRA's potential nonprofit-partner, Friends of OCRRA (FOCRRA). These grants were compiled using the National Foundation Center's database, available for public use at the Onondaga County Public Library's central branch in downtown Syracuse.

Table A1: Foundation grants for OCRRA's nonprofit partners

Foundation	Purpose and Activities Funded
New York State Grants	
The Wal-Mart Foundation, Inc. Telephone: (800) 530-9925 Contact: Julie Gehrki, Sr. Mgr., Wal-Mart URL: walmartfoundation.org National Grant Program: ntlgive@wal-mart.com	**State Giving Program** The foundation awards grants starting at $25,000 to nonprofit organizations that serve a particular state or region. The foundation encourages requests that support education, job skills training, environmental sustainability, health and wellness, and hunger relief. Programs that do not align with these subjects will still be given full consideration. Giving is targeted in areas of company operations, with emphasis on AR, Washington, DC, IL, NY, TN, UT, and VA.
Surdna Foundation, Inc. 330 Madison Ave., 30th Fl. New York, NY 10017 (212) 557-0010 Contact: Phillip Henderson, Pres. URL: www.surdna.org	The mission of the foundation is to foster just and sustainable communities in the United States with a core focus on "sustainable environments." **Organizational Capacity Building** Organizational capacity building grants are aimed at strengthening the organizational capacity of nonprofit organizations. Only current and past Surdna grantees are eligible to apply for grants of up to $15,000 to address important management and governance issues that can be handled with a small amount of money in a short period of time. Projects may address issues including (but not limited to): board/staff development, marketing, strategic planning, strategic restructuring and communication.
Alcoa Foundation Alcoa Corporate Ctr. 201 Isabella St. Pittsburgh, PA 15212 (412) 553-2348 E-mail: alcoafoundation@alcoa.com URL: www.alcoa.com/global/en/community/foundation.asp	**Sustainable Environment** The foundation supports programs designed to address present and future environmental challenges. Special emphasis is directed toward programs designed to inform policy development; enable community response; and mobilize individual action.
The EGBAR Foundation 15922 Pacific Coast Hwy. Huntington Beach, CA 92649 (562) 592-1126 Contact: Chelsea Bryan, Exec. URL: www.egbar.org	The foundation supports programs designed to promote clean environments. Special emphasis is directed toward programs designed to educate children about the importance of recycling and protecting the environment; promote greater awareness of community environmental clean-up needs and what can be done to meet them; challenge all segments of communities, both young and old, to be responsive to those needs; provide and raise funds to effect action on projects that address environmental clean-up needs.
The Link Foundation c/o Binghamton University Fdn. P.O. Box 6005 Binghamton, NY 13902-6005 Contact: Martha J. Gahring, Off. Admin. URL: www.linkfoundation.org	**Energy Fellowship Program** In an effort to foster education and innovation in the area of societal production and utilization of energy, The Link Foundation invites applications for 2-year fellowships of $25,000/year for students

	working toward a Ph.D. degree.
National Grants	
Environmental Research and Education Foundation Contact: Michael J. Cagney, Pres. Fax: (919) 861-6878 URL: www.erefdn.org	The organization works to fund and direct scientific research and educational initiative for waste management practices to benefit industry participants and the communities they serve. **Grant Awards** Grants ranging from $10,000 to $500,000 are available for research or education in topics pertaining to aspects of solid waste management, including: waste generation rates and composition; waste minimization; collection and transport; sorting, recycling, and remanufacture; disposal options (e.g. landfilling or incineration); waste or energy recovery (e.g. composting, landfill gas to energy); innovations in collection and transportation equipment development; employee health and safety; sustainability of resources; life-cycle assessment of waste management; education of corporate customers in purchasing environmentally-preferable waste services; and development of high school and college educational programs.
Georgia-Pacific Foundation, Inc. http://www.gp.com/gpfoundation/index.html	The foundation supports programs designed to promote education; environment; community enrichment; and entrepreneurship. **Environment** The foundation supports programs designed to promote clean air, clean water, and recycling; environmental education; land conservation; and resource conservation.

Appendix 7: List of contacts - SWM program officers and other experts

Alameda County, CA
• Tom Padia, Source Reduction and Recycling Director, Stopwaste.org, Alameda County, California http://www.stopwaste.org

Boulder County, CO
• Eric Lombardi, Executive Director, Eco-Cycle, Boulder, Colorado
http://www.ecocycle.org

Broome County, NY
• Daniel A. Schofield, Deputy Director, Department of Solid Waste Management, Broome County, NY http://www.gobroomecounty.com/solidwaste

Hennepin County, MN
• Randy Kiser, Supervising Environmentalist, Department of Environmental Services, Hennepin County, NY http://www.co.hennepin.mn.us/

• Paul Kroening, Supervisor, Waste Reduction & Recycling Unit, Hennepin County
http://www.co.hennepin.mn.us/

King County, WA
• Gerty Coville, Program Manager, Recycling and Environmental Services, King County, WA http://your.kingcounty.gov/solidwaste/index.asp

• Linda Knight, Solid Waste Coordinator, City of Renton, Washington
http://rentonwa.gov/living/default.aspx?id=304

Lancaster County, PA
• Barbara Baker, Assistant Recycling Program Manager, Lancaster County Solid Waste Management Authority, Lancaster County, Pennsylvania http://www.lcswma.org

• Gary Forster, Senior Manager, Energy Administration, Lancaster County Solid Waste Management Authority, Lancaster County, PA http://www.lcswma.org

Lee County, FL
• Tracy Cerchie, Fiscal Manager,
Solid Waste Division, Lee County, Florida
http://www3.leegov.com/solidwaste/

• Emory Smith, Director of Recycling,
Solid Waste Division, Lee County, Florida
http://www3.leegov.com/solidwaste/

Onondaga County, NY
• Bill Bulsiewicz, Legal Counsel, Onondaga County Resource Recovery Agency, Onondaga County, NY http://www.ocrra.org

• Greg Gelewski, Recycling Operations Manager, Onondaga County Resource Recovery Agency, Onondaga County, NY http://www.ocrra.org

• Amy Miller, Agency Engineer, Onondaga County Resource Recovery Agency, Onondaga County, NY http://www.ocrra.org

• Andrew Radin, Director of Recycling and Waste Reduction, Onondaga County Resource Recovery Agency, Onondaga County, NY http://www.ocrra.org

• Tom Rhoads, Executive Director, Onondaga County Resource Recovery Agency, Onondaga County, NY http://www.ocrra.org

• Warren Simpson, Business Officer, Onondaga County Resource Recovery Agency, Onondaga County, NY
http://www.ocrra.org

Palm Beach County, FL
• Mark Eyeington, Chief Operating Officer, Solid Waste Authority, Palm Beach County, Florida http://www.swa.org

Pasco County, FL
• Jennifer Seney, Recycling Coordinator, Solid Waste and Recovery Department, Pasco County, Florida
http://portal.pascocountyfl.net/portal/server.pt/community/solid_waste_and_resource_recovery

Portland, OR
• Bruce Walker, Recycling Manager City of Portland Office of Sustainable Development, Solid Waste and Recycling Division. http://www.portlandonline.com/bps

San Francisco City and County, CA
• Jack Macy, Commercial Zero Waste Coordinator, San Francisco Department of the Environment, City and County of San Francisco, California
http://www.sfenvironment.org

Tompkins County, NY
• Barbara Eckstrom, Solid Waste Manager, Solid Waste Management Division, Tompkins County, NY http://www.recycletompkins.org/

Westchester County, NY
• Jim Arnett, Division of Solid Waste Management, Second Deputy Commissioner of Environmental Facilities, Westchester County, New York
http://environment.westchestergov.com/

• Sean Peter O'Rourke, Environmental Project Coordinator, Division of Solid Waste Management, Westchester County, New York
http://environment.westchestergov.com/

<u>Other Experts Consulted</u>
• Mick Barry, Greenstar North America http://greenstarrecycling.com/

• Kathleen Carroll, Business Manager, Covanta Onondaga, LP
http://www.covantaenergy.com/en/list-of-facilities/covanta-onondaga/covanta-onodaga-

detailed.aspx

- Linda Christopher, Executive Director, GrassRoots Recycling Network http://www.grrn.org

- Jim Duke, Caca Loco Composting, El Jebel, Colorado cacalococompost@gmail.com

- Khristopher Dodson, Communications and Program Manager, Environmental Finance Center of Syracuse University http://efc.syracusecoe.org/efc

- Richard Gertman, Principal, Cascadia Consulting Group http://www.cascadiaconsulting.com

- Susie Gordon, Solid Waste Program Manager, Ft. Collins, Colorado http://www.fcgov.com/recycling

- Nicholas LaPlant, Engineer II, Solid Waste Department, Barton & Loguidice, PC http://www.bartonandloguidice.com

- Angie Leith, Senior Policy Analyst, Office of Resource Conservation and Recovery, United States Environmental Protection Agency http://www.epa.gov/osw/conserve/index.htm

- Mark Lichtenstein, Executive Director, Syracuse University Environmental Finance Center of Syracuse University & President, National Recycling Coalition http://www.nrcrecycles.org

- Gary Liss, President, Gary Liss & Associates; Zero Waste Advisor, GrassRoots Recycling Network http://www.garyliss.com/

- Chas Miller, Director of State Programs, National Solid Wastes Management Association http://www.environmentalistseveryday.org/about-nswma-solid-waste-management/index.php

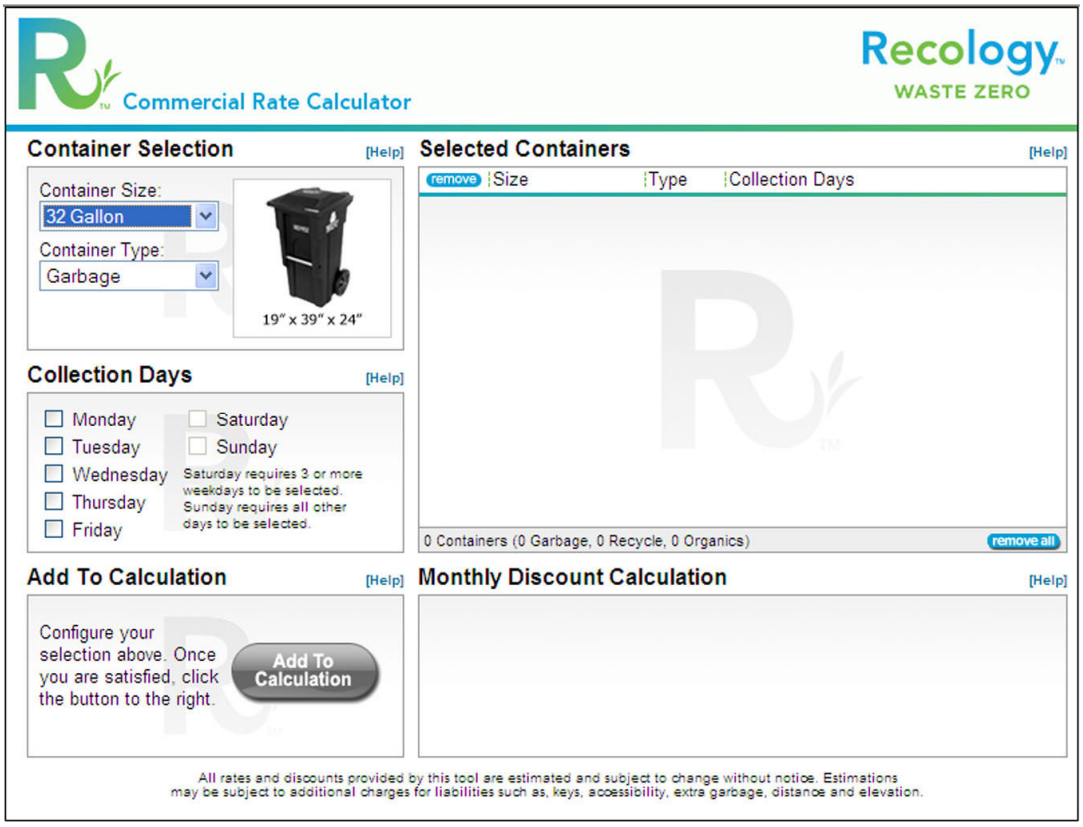
- Jerry Powell, Executive Editor, Resource Recycling http://www.resource-recycling.com

- Lisa Ruggero, Program Assistant, National Recycling Coalition http://www.nrcrecycles.org

- Will Sagar, Policy Director, Southeast Recycling Development Council http://www.serdc.org

- Peter Wilcoxen, Associate Professor of Economics and Public Administration & Director, Center for Environmental Policy and Administration, Maxwell School, Syracuse University & Co-director, Brookings Institution Climate and Energy Economics Project http://cepa.maxwell.syr.edu/people/15.htm

Appendix 8: Online Rate Calculator for Commercial Customers in San Francisco, CA



Appendix 9: Sample Ordinances Attached

COPY

ORDINANCE NO. 2007 - 01

AN ORDINANCE FOR THE LICENSING OF THOSE IN THE BUSINESS OF COLLECTING AND TRANSPORTING DISCARDED MATERIALS WITHIN THE UNINCORPORATED AREA OF BOULDER COUNTY

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(II) to inspect vehicles proposed to be operated in the conduct of the business of transporting ashes, trash, waste, rubbish, garbage, or industrial waste products or any other discarded materials; and

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(IV) to regulate the activities of persons in the business of collecting and transporting such materials within the unincorporated area by requiring each such person to secure a license from the County and charging a fee therefore; and to require adherence to such reasonable standards of health and safety as the board may prescribe and to prohibit any such person from commercially collecting or disposing of such materials without a license and when not in compliance with such standards of health and safety as may be prescribed by the board; and

WHEREAS, the Colorado legislature has expressly endorsed "local efforts ...focused toward the reduction of the volume ...of the waste stream ...through source reduction, recycling, composting, and similar waste management strategies." and also recognizes that "improper disposal of solid wastes poses significant public health risks and environmental hazards." Section 30-20-101, C.R.S.

WHEREAS, boards of county commissioners are empowered by C.R.S. section 30-15-401(1)(a)(VI) to require every person in the business of transporting discarded materials to and from disposal sites to have, before commencing such operations, in such motor vehicle a motor vehicle liability insurance policy or evidence of such policy issued by an insurance carrier or insurer authorized to do business in the state of Colorado in the amounts required by 30-15-401(1)(a)(VI); and

WHEREAS, persons or companies in the business of hauling waste, recyclables and compostables within Boulder County, through their collection and transportation activities are able to supply the County with information necessary for long-term solid waste management planning and therefore should be required to submit annual information about their hauling activities to the County; and

WHEREAS, the County desires to encourage waste reduction, in order to further the waste diversion goals supported by the County; and

WHEREAS, it is the intent of this Ordinance to: (1) reduce the volume of waste, recyclables and compostables entering the waste stream and landfills; (2) encourage the recycling of certain discarded materials; (3) obtain information for long-term solid waste planning; and (4) to protect the health, safety and welfare of the public; and

WHEREAS, the County desires to encourage cities and towns within the County to enact ordinances to accomplish the same goals in incorporated areas of the County, and utilize this document as a model.

NOW, THEREFORE BE IT ORDAINED BY THE COUNTY COMMISSIONERS OF THE COUNTY OF BOULDER AS FOLLOWS:

SECTION 1: DEFINITIONS

A. For the purpose of this Ordinance, the following words, terms, and phrases will have the following meanings:

1. The term "Hauler" shall mean person or company in the business of collecting, transporting or disposing of Discarded Materials for another, for a fee, or for no fee, except as described in Section 2B below.

2. The term "Discarded Materials" shall mean all putrescible and non-putrescible solid wastes discarded from any residential or commercial sources including Recyclable Materials and Compostable Materials. The term "Discarded Materials" shall exclude liquid wastes, sewage, sewage sludge, septic tank or cesspool pumpings; discarded or abandoned vehicles or parts thereof; residential appliances containing chlorofluorocarbon refrigerants; materials used as fertilizers or for other productive purposes, household hazardous wastes, and hazardous materials as defined in the rules and regulations adopted by the Hazardous Materials Transportation Act of 1987.

3. The term "Garbage" shall mean Discarded Materials from Residential and Multi-Family customers, excluding Recyclable Materials and/or Compostable Materials that have been source-separated for collection.

4. The term "Periodic Garbage Collection" shall mean the regular collection of Garbage from single-family or multi-family residential properties, on a schedule of not less often than once every five weeks.

5. The term "Residential Customer" shall mean all residential structures with not more than two residential units that receive Periodic Garbage Collection service.

6. The term "Multi-family Customer" shall mean a residential structure with three or more residential units that employs a communal system for Periodic Garbage Collection.

7. The term "Commercial Customer" shall mean any premises where a commercial, industrial, or institutional business or enterprise is undertaken, including, without limitation, retail establishments, restaurants, hospitals, manufacturing factories, schools, day care centers, office buildings, nursing homes, clubs, churches, and public facilities.

8. The term "Recyclable Materials" shall mean Discarded Materials from any residential or commercial source that are collected separately for the purpose of such materials being re-processed into new or different products or packaging materials, provided that such materials have been designated in subsection 6B of this Ordinance as recyclable.

9. The term "Compostable Materials" shall mean Discarded Materials from any residential or commercial source that are collected separately for the purpose of such materials being

composted, or otherwise processed through natural degradation into soil amendment, fertilizer or mulch.

10. The Boulder County Recycling Center shall mean the recyclables processing facility owned by Boulder County located at 1901 63rd St., Boulder, CO.

SECTION 2: LICENSE REQUIRED

A. No person or entity shall operate as a Hauler within the unincorporated area of Boulder County, Colorado without a current Annual Hauler License for such activity.

B. Exemptions. The following persons or entities shall not be subject to this ordinance.

1. A civic, community, benevolent or charitable nonprofit organization collecting, transporting and marketing recyclables solely for the purpose of raising funds for a civic, community, benevolent or charitable activity.

2. A property owner or agent thereof who transports Discarded Materials left by a tenant upon such owner's property, so long as such property owner is not compensated for such collection service on a regular or continuing basis;

3. Demolition or construction contractors or landscaping companies that produce and transport Discarded Materials produced incidentally to the demolition, construction, or landscaping work ;

4. Haulers who provide regular Periodic Garbage Collection service will be exempt from the recycling requirement of this Ordinance where such services are being provided in neighborhoods or communities where all Residential Customers receive recycling services through a separately funded recycling collection program.

SECTION 3: LICENSING PROCESS

A. The application for a Hauler License shall be submitted to the Boulder County Resource Conservation Division on a completed Boulder County Hauler Licensing Program Application and Self-Certification Form.

SECTION 4. IMPLEMENTATION STANDARDS

A. The Boulder County Land Use Department, Resource Conservation Division, shall set standards for the implementation of the Hauler licensing program including the amount of license fees, the area of Boulder County subject to unlimited recycling requirements, schedule for requiring collection of compostable materials and area of the county to be covered by this requirement, and the designation of Recyclable Materials.

SECTION 5: LICENSE FEES

A. The Boulder County Land Use Department, Resource Conservation Division shall issue a Hauler License upon the applicant satisfying the requirements herein, and upon full payment of an annual license fee, as specified in the Hauler Licensing Implementation Standards issued by the Land Use Department, Resource Conservation Division. All license fees shall be paid in full and shall accompany the application for such license. The amount of the license fee shall be based on the actual cost of administering the Hauler Licensing Program.

SECTION 6: LICENSEE REQUIREMENTS

A. Annual Reporting

All haulers will submit annual reports on the weight (in tons) of Discarded Materials, including Garbage, Recyclable Materials (by commodity, or aggregated into commingled containers; mixed paper; single stream (commingled containers combined with mixed paper) and Compostable Materials collected and transported from within the unincorporated areas of Boulder County. Reports will be submitted to the County Land Use Department, Resource Conservation Division, 1901 63rd St, Boulder, Colorado 80301 by January 31, each year, using a Boulder County Hauler Report Form provided by the County.

B. Designation of Recyclable Materials

Changes to the list of designated Recyclable Materials shall be proposed by the Resource Conservation Division to the Board of County Commissioners, after notice to and consultation with the Resource Conservation Advisory Board (RCAB) and representatives of the licensed Haulers operating within the unincorporated county.

C. Service for Multi-family Customers and Commercial Customers

Haulers who collect Discarded Materials including Recyclable Materials and Compostable Materials from Multi-family Customers and/or Commercial Customers shall offer such services with a frequency as is necessary to prevent overflow from the collection containers utilized for the collection and preparation of such materials by such Multi-family Customers and Commercial Customers.

The following sections D-H shall be implemented 90 days following satisfactory conclusion of acceptance tests of the Boulder County Recycling Center single stream technology:

D. Requirement to provide unlimited recycling services without an additional fee

Haulers that provide Periodic Garbage Collection services to Residential Customers shall also provide to these customers weekly or bi-weekly collection of recyclables and shall charge a single rate for Garbage Collection and collection of unlimited amounts of recyclable material.

Each Hauler may provide household recycling containers for the collection and preparation of recyclables to all residential customers. Such Haulers may also establish such reasonable and industry-accepted

requirements, rules, or regulations for the separation and preparation of Recyclable Materials as are necessary to provide for the orderly collection of Recyclables Materials. Except for materials not properly prepared for recycling, Haulers may not dispose of Recyclable Materials set out for collection by their customers by any means other than delivery to a lawfully operating recyclables processing facility.

In the event the Hauler elects to perform collection of waste, including Recyclable Materials, through subcontractors or agents, such agency relationship shall not relieve the Hauler of responsibility for compliance with the provisions of this subsection or any rule promulgated hereunder.

All Recyclable Materials placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the Hauler. No person other than the person placing the Recyclable Materials for collection or that person's hauler shall take physical possession of any Recyclable Materials separated from garbage, set out in the vicinity of the curb, and plainly marked for Recyclable Material collection.

E. Volume-based rates

Haulers that provide Periodic Garbage Collection services to their Residential Customers shall charge these customers for this service on the basis of the volume of the Garbage containers subscribed by the customer for periodic garbage collection by the Hauler.

Each Hauler shall determine a single standardized Garbage container volume of approximately thirty-three (33) gallons which is the typical volume of a Garbage bag or Garbage can used by a Residential Customer. The Hauler shall establish a single standardized price to be charged for the collection of this base volume. The Hauler shall charge the same standardized price for each base volume unit of Garbage subscribed regardless of the number of Garbage containers, or standardized volume, placed for collection by the customer.

The provisions of this subsection shall not be construed to prohibit any Hauler from establishing rules and regulations regarding the safe maximum weight of containers of Garbage and/or Recyclable Materials or Compostable Materials. A Hauler may refuse to collect any Garbage container which is overloaded or which contains a volume of Garbage greater than the rated or specified volume of such container, or shall account for and bill the customer for the collection of such excess Garbage.

Special pickups for bulky items for additional fees are permitted.

F. Flat monthly fee

In addition to the volume-based rates, Haulers may establish a flat monthly fee that may be charged to Residential Customers regardless of whether Garbage, Recyclable or Compostable Materials are placed by the customer for collection during the month. The flat monthly fee may be charged for the purpose of covering the combined fixed operational costs for collecting Garbage and Recyclable Materials and Compostable Materials.

If a Hauler elects to charge a flat monthly fee, the fee shall not exceed the monthly volume-based rate charged, assuming the collection of only one standard Garbage container per week. In the event that a Hauler elects to establish a flat monthly fee, all bills for services provided by such contractor to

Residential Customers shall clearly identify both the flat monthly fee and the volume-based fees charged to the customer for the collection of Garbage.

Nothing herein shall prevent or prohibit such Hauler from charging additional fees for providing services in addition to collection of Garbage, Recyclable Materials or Compostable Materials.

G. Notification of new customers

Haulers shall notify New Residential Customers in writing that the service includes the collection of Recyclable Materials, which materials are designated for recycling collection in subsection 6B, and of such rules and regulations as have been established by the Hauler for the orderly collection of Recyclable Materials as authorized by subsection 6 E regarding the acceptable weight and volume for the collection of Recyclable Materials.

Haulers shall also notify new Residential Customers that the service includes the collection of Compostable Materials pursuant to Section 6J.

H. County to Supply Information

The County will furnish to each Hauler information that explains the changes to the County's ordinance. Haulers must distribute this information to all their Residential customers no later than 90 days after the effective date of this ordinance. In addition, the County may, no more frequently than twice per calendar year, produce an educational flyer about recycling and waste reduction opportunities in Boulder County. Haulers shall copy and distribute this flyer, not to exceed one sheet of paper in length, to all their residential customers and multi-family customers, at no charge to the County.

I. Haulers that provide Periodic Garbage Collection from Commercial Customers shall offer recycling services for the same range of materials as required for Residential Customers.

The following section shall become effective once the schedule for requiring collection of compostable materials and the area of the county covered by this requirement are implemented:

J. Requirement to provide compost collection services without an additional fee.

Haulers that provide Periodic Garbage Collection services to Residential Customers in the urbanized areas, such as but not limited to Niwot, Heatherwood and Gunbarrel, shall also provide to these customers weekly or bi-weekly collection of 96 gallons of Compostable Material and shall charge a single rate for Garbage Collection and collection of Recyclable and Compostable Material.

Each Hauler may provide household compost collection containers for the collection of Compostable Material to all Residential Customers. Such Haulers may also establish such reasonable and industry-accepted requirements, rules, or regulations for the separation and preparation of Compostable Material as are necessary to provide for its orderly collection. Except for materials not properly prepared for recycling, Haulers may not dispose of Compostable Material set out for collection by their customers by any means other than delivery to a lawfully operating compostables processing facility.

In the event the Hauler elects to perform collection of waste, including Compostable Material, through subcontractors or agents, such agency relationship shall not relieve the Hauler of responsibility for compliance with the provisions of this subsection or any rule promulgated hereunder.

All Compostable Material placed for collection shall be owned by and be the responsibility of the customer until the materials are collected by the Hauler. No person other than the person placing the compostable materials for collection or that person's hauler shall take physical possession of any compostable materials separated from garbage, set out in the vicinity of the curb, and plainly marked for compostable material collection.

SECTION 7: PENALTIES FOR NON-COMPLIANCE

A. It shall be a violation of this Hauler Licensing Ordinance 2007-01 for any person, firm or entity to engage in any commercial waste hauling within the unincorporated area of Boulder County without first having obtained a license for said operation. Each separate Periodic Garbage Collection service or each separate collection from a Residential, Multi-Family or Commercial Customer of Discarded Materials at any site, or deposit of Discarded Materials conducted without a license shall constitute a separate violation. Any such violation shall be punishable by a fine of not more than five hundred dollars ($500.00) for each separate violation.

B. Any other violation of this Waste Hauler Licensing Ordinance 2007-01 shall be punishable by a fine of not more than five hundred dollars ($500) for each separate violation and/or may result in the suspension or revocation of the license.

C. Law enforcement personnel may use the Penalty Assessment Procedure described in C.R.S. section 16-2-201 for violations of this Hauler Licensing Ordinance 2007-01. This statute permits an arresting officer to issue a penalty assessment notice and release an alleged violator upon the terms of the notice or take the alleged violator before a county court judge. The penalty assessment notice shall be a summons and complaint, and shall contain the identification of the person, firm or entity that has violated this Ordinance. The penalty assessment notice shall also specify the offense, the applicable fine and require that the alleged violator pay the fine or appear to answer the charge at a specified time and place.

D. No enforcement action for a violation of this Hauler Licensing Ordinance 2007-01 shall be taken more than one calendar year after the date on which said violation occurred.

SECTION 8: SAVINGS CLAUSE

A. If any section, clause, sentence or part of this ordinance is adjudged by any court of competent jurisdiction to be invalid, such invalidity shall not affect, impair or invalidate the other provisions of this ordinance which can be given effect without such invalid provision.

SECTION 9: REPEAL OF ORDINANCE 95-2

This ordinance shall be known as and be referred to as the "**Commercial Waste Hauler Licensing Ordinance 2007 - 01**." Commercial Waste Hauler Licensing Ordinance #95-2 is hereby repealed and re-enacted as Commercial Waste Hauler Licensing Ordinance 2007 - 01 herein.

SECTION 10: EFFECTIVE DATE

This ordinance shall be effective thirty days after publication and adoption on second reading. INTRODUCED, READ AND ADOPTED ON FIRST READING NOVEMBER 29, 2007, and ordered published in the LongmontTimes-Call.

THE BOARD OF COMMISSIONERS
OF THE COUNTY OF BOULDER, COLORADO

Ben Pearlman, Chair

ATTEST:

Clerk to the Board

ADOPTED ON SECOND AND FINAL READING on DECEMBER 20, 2007.

THE BOARD OF COMMISSIONERS
OF THE COUNTY OF BOULDER, COLORADO

Ben Pearlman, Chair

ATTEST:

Clerk to the Board

RESOLUTION NO. _____

A RESOLUTION DECLARING BOULDER A ZERO WASTE COMMUNITY.

WHEREAS, an estimated 156,773 tons of waste is generated in the city of Boulder each year by residents, businesses and institutions and approximately 70% of this amount is sent for landfill disposal;

WHEREAS, though the city of Boulder has reached an overall recycling rate of more than 30% percent, more can be done, especially in "closing the loop" by purchasing products made with recycled content;

WHEREAS, the placement of materials in waste disposal facilities, such as landfills and incinerators wastes natural resources, transfers liabilities to future generations and has the potential to cause damage to human health;

WHEREAS, avoiding the creation of waste or discards in the first place is the most economically efficient and environmentally sustainable resource management strategy;

WHEREAS, a resource recovery-based economy will create and sustain more productive and meaningful jobs than a disposal-based economy;

WHEREAS, with the appropriate economic incentives, manufacturers can and will produce and businesses will sell products that are durable and repairable and that can be safely recycled back into the marketplace or nature;

WHEREAS, government can be ultimately responsible for establishing criteria needed to eliminate waste, for creating the economic and regulatory environment in which to achieve it, and for leading by example, and

WHEREAS, the city of Boulder has positioned itself as an environmental leader among local governments by adopting environmental initiatives, programs and policies including the broad community vision contained in the Boulder Valley Comprehensive Plan, City Council's Environmental Sustainability Goal, city recycling and environmental purchasing policies, and the city Master Plan for Waste Reduction,

WHEREAS, the guiding principles of zero waste are: managing resources instead of waste, conserving natural resources through waste prevention and recycling, turning discarded resources into jobs and new products instead of trash, promoting products and materials that are durable and recyclable, and discouraging products and materials that can only become trash after their use.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BOULDER, COLORADO

The city of Boulder hereby encourages the pursuit of Zero Waste as a long-term goal in order to eliminate waste and pollution in the manufacture, use, storage, and recycling of materials. This goal must be addressed through the choices Council will make in the

context of the city's Business Plan and annual budget processes, by initiating action plans and measures that significantly reduce waste and pollution. These measures will include encouraging residents, businesses and agencies through incentives and legislation to judiciously use, reuse, and recycle materials, as well as to motivate businesses to manufacture and market less toxic and more durable, repairable, reusable, recycled, and recyclable products. In all cases, the guiding principles of the city's Master Plan for Waste Reduction will be followed. Mandatory programs will be employed only if the infrastructure exists and if convenient, voluntary programs prove not to be successful.

The city of Boulder will also review its own policies, contracts, and standard operating procedures to incorporate zero waste provisions and actions into all aspects of its organizational culture to encourage the use of materials and products that are durable, repairable, and reusable, have a minimum of packaging, toxic content or chemical hazard potential, are resource and energy efficient in their manufacture, use and disposal, and in their use or disposal minimize or eliminate the city's potential environmental liability.

ADOPTED this 2nd day of May, 2006

_____
Mark Ruzzin, Mayor

ATTEST:

_____
City Clerk on behalf of the
Director of Finance and Record

FILE NO. 070085 ORDINANCE NO. 81-07

[Plastic Bag Reduction Ordinance.]

Ordinance amending the San Francisco Environment Code by adding Chapter 17, sections 1701 through 1709, to: (1) require the use of compostable plastic, recyclable paper and/or reusable checkout bags by ~~grocery~~ stores located in the City and County of San Francisco, and (2) provide penalties for violations.

Note: Additions are *single-underline italics Times New Roman*; deletions are ~~*strikethrough italics Times New Roman*~~. Board amendment additions are double underlined. Board amendment deletions are ~~strikethrough normal~~.

Be it ordained by the People of the City and County of San Francisco:

Section 1. Findings.

(a) The City and County of San Francisco has a duty to protect the natural environment, the economy, and the health of its citizens.

(b) The City and County of San Francisco has adopted citywide goals of 75% landfill diversion by 2010 and zero waste by 2020.

(c) The expansive usage of plastic shopping bags and their typical disposal creates an impediment to San Francisco's landfill diversion goals.

(d) Plastic shopping bags are difficult to recycle and currently contaminate material that is processed through San Francisco's recycling and composting programs.

(e) Plastic shopping bags create significant litter problems in San Francisco's neighborhoods, highlighted by local residents in a series of public meetings held by the Department of the Environment, and also litter community beaches, sewer systems and the San Francisco Bay.

(f) Plastic ~~grocery~~ shopping bags have significant environmental impacts each year, including the felling of over 14 million trees, and use of over 12 million barrels of oil for

bags in the U.S., as well as the death of over 100,000 marine animals from plastic entanglement.

(g) Governments in several countries have banned or taken action to discourage the use of plastic bags, including the Republic of Ireland, which has achieved a 90% decrease in shopping bag usage.

Section 2. The San Francisco Environmental Code is hereby amended by adding Chapter 17, Section 1701 through 1709, to read as follows:

SEC. 1701. SHORT TITLE.

This Ordinance shall be entitled the "Plastic Bag Reduction Ordinance."

SEC. 1702. DEFINITIONS.

For the purposes of this Ordinance, the following words shall have the following meanings:

(a) "ASTM Standard" means the American Society for Testing and Materials (ASTM)'s International standard D6400 for compostable plastic, as that standard may be amended from time to time.

(b) "Compostable Plastic Bag" means a plastic bag that (1) ~~meets the~~ conforms to California labeling law (Public Resources Code Section 42355 et seq.), which requires meeting the current *ASTM*-Standard Specifications ~~Standards~~ *for compostability; (2)* ~~contains less than 75% petroleum derived content – the percentage to be reviewed annually with the target of achieving no products derived from petroleum by 2010~~ is certified and labeled as meeting the ASTM-Standard by a recognized verification entity such as the Biodegradable Product Institute*; (3)* ~~contains no products derived from genetically modified organisms, and~~ *)* conforms to requirements to ensure that the renewable based product content is maximized over time as set forth in Department of the Environment regulations; *(4)* conforms to requirements to ensure that products derived from genetically modified feedstocks are phased

out over time as set forth in Department of the Environment regulations; and (5) *displays the* ~~word~~ phrase "Green Cart *Compostable"* and the word "Reusable" *in a highly visible manner on the outside of the bag.*

(c) "Checkout bag" means a carryout bag that is provided by a ~~grocery~~ *store to a customer at the point of sale.*

(d) "Department" means the Department of the Environment.

(e) "Director" means the Director of the Department of the Environment.

(f) ~~"Grocery Store" means a retail establishment located within the geographical limits of the City and County of San Francisco that meets either of the following requirements:~~

~~(1) is a full-line, self-service retail store supermarket with gross annual sales of two million dollars ($2,000,000), or more, and which sells a line of dry grocery, canned goods, or nonfood items and some perishable items. For purposes of determining which retail establishments are grocery stores supermarkets, the City shall use the annual updates of the Progressive Grocer Marketing Guidebook and any computer printouts developed in conjunction with the guidebook;, or~~

~~(2) has over 5,000 square feet of retail space that generates sales or use tax pursuant to the Bradley-Burns Uniform Local Sales and Use Tax Law (Part 1.5 (commencing with Section 7200) of Division 2 of the Revenue and Taxation Code) is a retail pharmacy with at least five locations under the same ownership within the geographical limits of San Francisco that has a pharmacy licensed pursuant to Chapter 9 (commencing with Section 4000) of Division 2 of the Business and Professions Code~~

(f) *"Highly visible manner" means (1) for compostable plastic bags, displaying* ~~the word~~ both of the following in green lettering contrasting with the bag's background color that is at least two inches high: (i) the phrase "Green Cart *Compostable"* " either on the front and back

of the bag together with a solid green band at least one-half inch thick circling the circumference of the bag, or repeatedly, as a band of text or text alternating with solid stripe, circling the circumference of the bag, *and* (ii) the word *"Reusable"* displayed *on the front* ~~and~~ and/or ~~either~~ *back of the bag* ~~or repeatedly in a band circling the circumference of the bag in green lettering contrasting with the bag's background color that is at least two inches high ;~~ *;* and *(2) for recyclable paper bags, displaying the* ~~word~~ words *"Reusable" and "Recyclable" on the front* ~~or~~ and/or *back of the bag in blue lettering contrasting with the bag's background color that is at least two inches high, and (3)* for both compostable plastic bags and recyclable paper bags, *as otherwise required by Department of the Environment* ~~regulation~~ regulations.

(g) *"Person" means an individual, trust, firm, joint stock company, corporation, cooperative, partnership, or association.*

(h) "Pharmacy" means a retail use where the profession of pharmacy by a pharmacist licensed by the State of California in accordance with the Business and Professions Code is practiced and where prescriptions (and possibly other merchandise) are offered for sale, excluding such retail uses located inside a hospital. .

(i) *"Recyclable" means material that can be sorted, cleansed, and reconstituted using San Francisco's available recycling collection programs for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating, converting, or otherwise thermally destroying solid waste.*

(j) *"Recyclable Paper Bag" means a paper bag that meets all of the following requirements: (1) contains no old growth fiber, (2) is 100% recyclable overall and contains a minimum of 40% post-consumer recycled content, and (3) displays the words "Reusable" and "Recyclable" in a highly visible manner on the outside of the bag.*

(k) *"Reusable Bag" means a bag with handles that is specifically designed and manufactured for multiple reuse and is either (1) made of cloth or other machine washable fabric, and/or (2) made of durable plastic that is at least 2.25 mils thick.*

(l)" ~~Grocery~~ *Store" means a retail establishment located within the geographical limits of the City and County of San Francisco that* meets either of the following requirements:

(1) *is a full-line, self-service* ~~retail store~~ supermarket *with gross annual sales of two million dollars ($2,000,000), or more, and which sells a line of dry grocery, canned goods, or nonfood items and some perishable items. For purposes of determining which retail establishments are* ~~grocery stores~~ supermarkets, *the City shall use the annual updates of the Progressive Grocer Marketing Guidebook and any computer printouts developed in conjunction with the guidebook*;, or

(2) ~~has over 5,000 square feet of retail space that generates sales or use tax pursuant to the Bradley-Burns Uniform Local Sales and Use Tax Law (Part 1.5 (commencing with Section 7200) of Division 2 of the Revenue and Taxation Code)~~ is a retail pharmacy with at least five locations under the same ownership within the geographical limits of San Francisco ~~that has a pharmacy licensed pursuant to Chapter 9 (commencing with Section 4000) of Division 2 of the Business and Professions Code~~

SEC. 1703. MANDATORY USE OF RECYCLABLE AND COMPOSTABLE CHECKOUT BAGS.

(a) All ~~Grocery~~ *Stores shall provide only the following as checkout bags to customers: recyclable paper bags, and/or compostable plastic bags, and/or reusable bags.*

(b) Violation of the requirements set forth in subsection (a) shall subject a ~~Grocery~~ *Store to penalties set forth in Section 1705.*

(c) Nothing in this section shall be read to preclude ~~Grocery~~ *Stores from making reusable bags available for sale to customers.*

SEC. 1704. IMPLEMENTATION.

The Director, after a public hearing, may adopt and may amend guidelines, rules, regulations and forms to implement ~~and enforce~~ *this Ordinance.*

SEC. 1705. ENFORCEMENT AND PENALTIES.

(a) Any person who violates this Ordinance shall be guilty of an infraction. If charged as an infraction, upon conviction thereof, said person shall be punished by (1) a fine not exceeding $100.00 for a first violation, (2) a fine not exceeding $200.00 for a second violation within the same year, and (3) a fine not exceeding $500.00 for each additional violation within the same year.

(b) In the event that the City adopts an ordinance creating a procedure for the City Administrator to impose and review ~~imposing and reviewing~~ *Administrative Penalties pursuant to California Government Code Section 53069.4, the City may impose Administrative Penalties for violation of this Ordinance as follows: (1) in an amount not exceeding $100.00 for the first violation, (2) in an amount not exceeding $200.00 for the second violation in the same year, and (3) in an amount not exceeding $500.00 for each subsequent violation in the same year.*

(c) The City Attorney may seek legal, injunctive, or other equitable relief to enforce this Ordinance, including without limitation, civil penalties in an amount not exceeding $200.00 for the first violation, $400.00 for the second violation, and $600.00 for each subsequent violation in any given year.

(d) The City may not recover both administrative and civil penalties for the same violation.

SEC. 1706. OPERATIVE DATE.

~~This~~ All of the requirements set forth in this *Ordinance shall become operative* as to Stores that are supermarkets *six (6) months after its effective date.* All of the requirements set forth in this Ordinance shall become operative as to Stores that are pharmacies one (1) year after its effective date.

SEC. 1707. SEVERABILITY.

If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of the Ordinance. The Board of Supervisors hereby declares that it would have passed this Ordinance and each and every section, subsection, sentence, clause, or phrase not declared invalid or unconstitutional without regard to whether any portion of this Ordinance would be subsequently declared invalid or unconstitutional.

SEC. 1708. NO CONFLICT WITH FEDERAL OR STATE LAW.

Nothing in this Ordinance shall be interpreted or applied so as to create any requirement, power or duty in conflict with any federal or state law.

SEC. 1709. UNDERTAKING FOR THE GENERAL WELFARE.

In undertaking the implementation of this Ordinance, the City is assuming an undertaking only to promote the general welfare. It is not assuming, nor is it imposing on its officer and employees, an obligation for breach of which it is liable in money damages to any person who claims that such breach proximately caused injury.

APPROVED AS TO FORM:
DENNIS J. HERRERA, City Attorney

By: Catharine Barnes
Catharine Barnes
Deputy City Attorney

City and County of San Francisco

Tails

Ordinance

City Hall
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102-4689

File Number: 070085 **Date Passed:**

Ordinance amending the San Francisco Environment Code by adding Chapter 17, sections 1701 through 1709, to: (1) require the use of compostable plastic, recyclable paper and/or reusable checkout bags by stores located in the City and County of San Francisco, and (2) provide penalties for violations.

February 13, 2007 Board of Supervisors — SUBSTITUTED

March 27, 2007 Board of Supervisors — PASSED ON FIRST READING
Ayes: 10 - Alioto-Pier, Ammiano, Daly, Dufty, Elsbernd, Maxwell, McGoldrick, Mirkarimi, Peskin, Sandoval
Noes: 1 - Jew

April 10, 2007 Board of Supervisors — FINALLY PASSED
Ayes: 10 - Alioto-Pier, Ammiano, Daly, Dufty, Elsbernd, Maxwell, McGoldrick, Mirkarimi, Peskin, Sandoval
Noes: 1 - Jew

File No. 070085

I hereby certify that the foregoing Ordinance was FINALLY PASSED on April 10, 2007 by the Board of Supervisors of the City and County of San Francisco.

FOR

Kay Gulbengay
Interim Clerk of the Board

4/20/07

Date Approved

Mayor Gavin Newsom