



Hillsborough County
Florida

Pay-As-You-Throw:

**Tossing New Light on an Underutilized Waste Reduction Tool
Innovative Grant #7-03**

Final Report

March 2010



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SECTION 1 INTRODUCTION

1.1 Background and Purpose

In a variable rate, or pay-as-you-throw (PAYT) program, customers are charged for waste collection and disposal based on how much – or how little – waste they generate. PAYT breaks with the traditional fixed or flat fee for waste collection services by treating trash services like other utilities – customers pay only for what they use. If a customer’s action directly affects the cost of their service, they are more likely to limit their usage, and take advantage of available waste reduction opportunities including source reduction, reuse, recycling, and composting. PAYT programs have helped communities decrease waste disposal by an average of 17 percent by weight,¹ and achieve recycling rates of 50 percent and higher,² yet few Florida communities have implemented PAYT programs.

Hillsborough County (County) Solid Waste Management Department (SWMD) applied for and was awarded a FY 2006-2007 Innovative Recycling Grant from the Florida Department of Environmental Protection (FDEP). The SWMD enlisted Kessler Consulting, Inc. (KCI) to assist with the planning and implementation of a PAYT Pilot plan in the County funded by the FDEP innovative grant.

1.2 Goals and Objectives

The purpose of this project was to provide the County with information on PAYT programs and to evaluate the feasibility of implementing PAYT in unincorporated Hillsborough County, the fourth largest county (by population) in Florida. The results of this project were intended to demonstrate how the costs and benefits of such a program could provide Hillsborough County with useful information on how PAYT could impact its solid waste management operations and costs in the future.

¹ Skumatz, Lisa and Kenneth Green, “Pay-as-you-throw” Waste Management, Reason Public Policy Institute, July 2002.

² Canterbury, Janice and Sue Eisenfeld, “The Rise and ...Rise of Pay-As-You-Throw,: *MSW Management*, Volume 15, No. 4: 32-45

1.3 Innovative Features

From 1916 to 2004, the number of communities utilizing PAYT programs in the U.S. has grown from just one (Richmond, CA) to more than 6,000.³ Some states, including Iowa, Minnesota, Washington, and Wisconsin require PAYT through mandates to ensure that financial incentives for waste reduction are implemented. According to a 1999 study of PAYT programs in the U.S., only six (6) such programs existed in Florida.⁴ However, research regarding these six programs revealed that only three communities in Florida currently operate a PAYT program. The largest PAYT program in Florida, the Alachua County/Gainesville program, serves a population of about 170,000 residents. In comparison, a PAYT program in unincorporated Hillsborough County would serve a population of over 700,000 residents, making it by far the largest, most extensive PAYT program in the state. A PAYT program of this size has never been implemented in Florida.

1.4 Information Dissemination

The results of this project are transferable to other local governments in Florida. While the pilot program was specific to Hillsborough County, the research conducted on PAYT may be applicable in other situations.

An article about the project is planned for publication in a statewide publication and, if possible, a national journal. A presentation on the project is planned with Recycle Florida Today and the Florida Sunshine Chapter of SWANA.

³ Canterbury and Eisenfeld.

⁴ Mirando, M.L., Unit-Based Pricing in the United States: A Tally of Communities, Duke University, 1999.

SECTION 2 IMPLEMENTATION

2.1 Initial Project Activities & Timeline

Project Schedule

The information listed below details the scope of services listed in the County’s contract with the FDEP, including the project tasks, project schedule, a task description, and the deliverables for the project.

Table 2-1: Project Schedule

Task	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8Q	9Q	10Q
Task 1: PAYT Research	X	X								
Task 2: Pilot Program Plan		X	X							
Task 3: Pilot Mobilization			X	X	X	X	X			
Task 4: Education			X	X	X	X	X			
Task 5: Develop and Conduct Focus Groups								X		
Task 6: Develop and Conduct Surveys								X	X	
Task 7: Prepare Summary Report								X	X	X
Task 8: Reporting	X	X	X	X	X	X	X	X	X	X
Task 9: Project Administration	X	X	X	X	X	X	X	X	X	X

Table 2-2: Scope of Services

Task	Activities	Deliverables
Task 1: PAYT Research	Research and prepare a summary of existing PAYT programs.	PAYT Summary report
Task 2: Pilot Program Plan	Develop a plan for implementing the pilot program.	Pilot Program Plan
Task 3: Pilot Mobilization	Enlist participants, obtain equipment, confirm routing and schedules, etc.	No deliverable
Task 4: Education	Educate participating residents prior to and during the pilot program.	Copies of all educational materials
Task 5: Develop and Conduct Focus Groups	Prepare focus group goals, coordinate and conduct focus groups and surveys.	List of focus group parameters, participant lists and results
Task 6: Develop and Conduct Surveys	Prepare survey instrument and mailing lists, conduct surveys, and compile results.	Survey instrument and results
Task 7: Prepare Summary Report	Summarize the results and findings of the focus groups and surveys.	Summary Report (with focus group and survey results)
Task 8: Reporting	Prepare and submit quarterly and final reports as specified under the terms of the FDEP contract.	Nine progress reports and one final report
Task 9: Project Administration	Manage and coordinate all project tasks and ensure adherence to FDEP agreement.	No deliverable

2.2 Equipment and Services Procured

Listed below are the technical and professional services that were procured for the overall project.

- Kessler Consulting, Inc. (KCI) provided ongoing project management and technical assistance for all project tasks for the duration of the project.

- Quest Corporation of America (QCA) conducted qualitative research and compiled results from six (6) residential Focus Groups in the targeted pilot areas.
- Genesis Direct provided data postal processing, printing, addressing, and mail processing of 25,000 surveys.

2.3 Problems Encountered

The project team encountered obstacles while planning the implementation of the pilot program and therefore requested an amendment to the project scope in order to accomplish the project's objectives by other means. The Pilot Program (Pilot) was not implemented for reasons explained below:

- One of the three targeted Home Owner Associations (HOAs) pulled out of the program at the last minute. To continue with the Pilot without their participation would have changed the dynamics of the Pilot and compromised findings and outcomes.
- The impact on home occupancy levels created by the current recessionary economy and the fact that winter residents were in the process of leaving homes in targeted neighborhoods would also have made it inadvisable to proceed with the Pilot given the already reduced participation.

As a result of the factors described above, the County was left with a low confidence level for the data that would be collected during the planned Pilot. After the termination of the Pilot, the project team met to determine viable alternatives and research necessary to assess the feasibility of implementing a PAYT program in unincorporated Hillsborough County. Although the Pilot targeted only 3,000 households, the project team determined that the use of focus groups and direct mail surveys could reach enough residents (over 25,000) to provide the County with meaningful feedback and results. The team determined that quantitative data would be obtained via a direct mail survey, and qualitative data would be provided via focus groups. The County requested and the FDEP approved a modified grant scope and budget, as well as an extension of the grant period until March 31, 2010.

SECTION 3

PROJECT RESULTS

3.1 Achievement of Goals and Objectives

The following section describes the achievement of goals and objectives of this grant project by task, and details corresponding results and deliverables.

PAYT Research

The first task in the grant project entailed researching existing PAYT programs in Florida and throughout the country, evaluating the advantages and effectiveness of implementation, while at the same time analyzing the applicability and compatibility of the various PAYT program options to unincorporated Hillsborough County. This section of the report provides a summary of the research findings; the full report has been submitted with the Final Report.

Research found that there are various options and approaches to consider when implementing a PAYT residential collection system. PAYT, also known as unit-based pricing, is described as a system that charges a household by the amount of solid waste it disposes, instead of utilizing a fixed rate per household, regardless of the quantity of waste set out at the curb. All PAYT programs introduce a level of accountability to the waste generator, by offering a financial incentive to place less waste out for disposal. Current systems in use today include either volume-based or weight-based systems.

Volume based systems include cart systems (either full or semi-automated), bag systems using jurisdiction-provided bags, or tag/sticker systems using resident-provided bags. Prices for each container and bag are based on capacity and are often combined with free recycling as an added incentive. Weight-based systems utilize onboard vehicle scale systems to determine the actual weight of waste being disposed by the customer. Weight-based systems are not in broad use in the United States. Regardless of the approach, PAYT programs encourage residents to pay close attention to the amount of waste they generate.

Advantages to PAYT systems include:

- Increased awareness of solid waste issues
- Residential financial incentives

- Jurisdictional financial incentives
- Supporting recycling and composting programs
- Greenhouse gas reduction benefits

Potential barriers to PAYT systems include:

- Litter and illegal dumping
- Transient tenancy
- Low income households
- System accounting
- Expanded education and outreach
- Language barrier issues

Pilot Program Plan

A Pilot Program Plan (Plan) was developed based on the results of the research report. The concept of a pilot program was created to demonstrate in real-world, local conditions, how automated cart systems using variable cart sizes would impact residents. The Plan was designed to test equipment and educational materials, gauge residents' reactions, and solicit feedback, while measuring the impact of PAYT on solid waste generation rates and recycling participation. A brief summary of the Plan is provided below. The full Pilot Program Plan has been submitted with the Final Report.

The project team developed a Plan that outlined the program logistics, implementation steps, and tracking methodology to conduct the PAYT pilot program. The Plan was to include the participation of the County's three franchised solid waste service providers: Republic Services of Florida, Waste Management of Tampa, and Waste Services, Inc.; for curbside solid waste collection (garbage, recyclables, and yard waste) for single-family homes located in the unincorporated areas of the County. The Plan was to include approximately 3,000 households distributed evenly among the residential collection franchisees to allow the haulers to each develop one collection route.

The three pilot routes were designed to meet the objectives of the FDEP Innovative Grant, which specified piloting a reduction in collection frequency, automated collection for garbage and recyclables, and the utilization of variable cart sizes. Factors used to select pilot neighborhoods included:

- Median household income

- Household density
- HOA involvement
- Current franchise collection routes

The table below lists the franchised haulers, the existing level of weekly solid waste services, the proposed level of weekly solid waste services for each of the pilot routes, and how the variables among the pilot routes would meet the different grant objectives.

Table 3-1: Pilot Service Levels

Pilot Route Designation	Hauler	Current Service	Pilot Service	Grant Objectives
1	Waste Management	2x Garbage bags or cans 1x Recycle - 2 bins 1x Yard Waste	1x Garbage - 95 Gallon Cart 1x Recycle - 65 Gallon Cart 1x Yard Waste	Frequency Automated Cart Recycling
2	Republic Services	2x Garbage bags or cans 1x Recycle - 2 bins 1x Yard Waste	1x Garbage - 95 Gallon Cart 1x Recycle - 2 bins 1x Yard Waste	Frequency Automated Garbage Collection
3	Waste Services, Inc.	2x Garbage bags or cans 1x Recycle - 2 bins 1x Yard Waste	1x Garbage - 95 or 65 Gallon Cart 1x Recycle - 2 bins 1x Yard Waste	Frequency Variable Container Sizes

Wheeled poly carts with rigid plastic sides and hinged lids in two different capacities were to be used in the pilot because the mechanical lifting devices of semi-automated and automated collection vehicles require standard sized and shaped collection containers. In addition to other criteria, the pilot was to provide an opportunity to evaluate the carts available from a variety of manufacturers. A number of cart manufacturers expressed interest in supplying the necessary amount of wheeled carts for the pilot.

Although the pilot was discontinued, a number of observations were made and lessons learned from the process:

- Although full automation may be preferable, it is not a necessity for implementation of variable container size programs. Cart programs can be serviced by a variety of equipment. It is vital to work with haulers to determine what is available in an effort to control costs and test equipment and programs.
- Many cart manufacturers have recently developed assembly and distribution business units that guarantee that carts and program education materials are delivered correctly, thus allowing haulers to focus on their core responsibility – solid waste collection.

- Automated and semi-automated collection technology provides for high productivity and reduced manpower requirements, which significantly reduces operating costs. However, the fixed costs associated with these vehicles may be between 30-40 percent higher than those of conventional rear load vehicles.

Pilot Mobilization

Pilot mobilization was discontinued due to reasons outlined in Section 2.3 Problems Encountered.

Education

Education and outreach is crucial to the success of a pilot program and were tailored to each of the pilot route types. Education and outreach materials developed included:

- Direct mailings
- Brochures
- County website content
- Press releases
- SWMD staff outreach to participating HOAs

The table below provides a summary of the education and outreach effort developed and planned. Educational materials have been submitted with the Final Report.

Table 3-2: Education and Outreach

Component	Distribution Method	Timeframe	Literature Design	Distribution
Pilot Introduction Post Card	Mailing	3 Mos. Prior to Pilot	KCI	SWMD
Pilot Introduction Presentation	HOA Presentation	1 - 3 Mos. Prior to Pilot	SWMD	SWMD
Pilot Details Brochure	Mailing	4 - 6 weeks prior to Pilot	KCI	SWMD
Cart Instruction Brochure	Cart Delivery	7 - 10 days prior to Pilot	KCI	Hauler / Cart Co.
Follow-up Survey Brochure	Mailing (data to be collected by both mail and via internet)	7 - 10 days post Pilot	KCI	KCI / SWMD

Focus Groups

The SWMD held six focus group discussions in December 2009 to obtain community input on specific solid waste collection systems. A total of 56 residents of unincorporated Hillsborough County participated in the six focus groups sessions. The participants represented a diverse cross section of the County, as recruitment efforts targeted:

- A variety of socio-economic groups, including low, medium, and high income levels;
- A mix of high-density (urban) and low-density (rural) population areas; and
- A mixture of various geographic areas in the unincorporated County.

Quest Corporation of America (QCA) facilitated all six focus groups under the supervision of KCI and County staff who addressed solid waste management questions. The facilitator used pre-approved discussion guides for each session and a participant agenda was displayed at each session.

While participants in each focus group had unique perspectives, there were a number of consistent themes heard in each session.

- Need for additional and better education
- Strong support for PAYT
- Strong support for single-stream recycling
- Moderate support for automated collection
- Barriers to recycling include:
 - Inadequately sized bins, lack of bins, and not knowing how to obtain a bin
 - Confusion concerning what is, versus what is not, recyclable

A complete report of the development, implementation, and results of the Focus Groups has been submitted with the Final Report.

Surveys

A postage-paid self mailer style survey was developed to be mailed to 25,000 randomly selected unincorporated Hillsborough County residents. The survey consisted of one pre-folded page with 20 questions designed to gather demographic data, recycling activity, and opinions regarding garbage and recycling services.

The survey was mailed during the week of November 23, 2009. The returned surveys were received by KCI for compilation and analysis. Surveys received through January 31, 2010 were included in the analysis. This timeframe allowed approximately 65 days for residents to complete and return the survey.

In total, the County received 2,826 completed surveys. This represents a return rate of over 11 percent, which, in KCI's experience, is well above average for unsolicited mass mailings. This significant number of responses allowed KCI to have a high level of confidence that the results of the survey represent an accurate depiction of the recycling habits and opinions of the County's residential population as a whole.

The majority of respondents can be described as white, older, empty nesters with moderate to higher incomes. Over half had at least a college degree. The vast majority of respondents were active recyclers who participate on a weekly basis. More than half recycle at least 25 percent to half of the waste they generate. Materials recycled include:

- Mixed paper
- Cardboard and paperboard
- Newspaper
- Plastic containers
- Aluminum/steel cans
- Glass containers

Lack of a recycling bin was most often cited as a reason for not recycling. Increased convenience (larger, wheeled containers, no sorting necessary) was most often cited as an incentive to encourage more recycling. The ability to reduce solid waste costs by increased recycling was also noted to be an incentive. There was very little support for reducing garbage collection to once per week.

Mailings and newsletters were most often cited as the way respondents obtain information about recycling, followed by the internet. Most respondents reported satisfaction with the County's garbage and recycling collection programs. A Summary report of the findings from the focus groups and surveys has been submitted with the Final Report.

3.2 Advanced Technology or Process Demonstration

According to the Environmental Protection Agency (EPA) there are over 7,095 communities utilizing PAYT programs nationwide. However, only three communities in Florida currently operate a PAYT program. Research found, as a result of this project, that PAYT is not common in Florida because of the following reasons:

- Relatively low disposal costs
- No mandates for PAYT
- Abundance of disposal capacity
- Many jurisdictions count on landfill tip fees as source of system revenue

If the County were to implement a PAYT program, it would be by far the largest and most extensive PAYT program in the state. A PAYT program of this size has never been implemented in Florida.

This project also provided a unique opportunity to evaluate PAYT in combination with other collection program changes to determine which combination would be effective in maximizing waste reduction and increase recycling in Hillsborough County. The project considered various program combinations such as automated collection, frequency of collection, and single stream recycling.

In an effort to project potential costs and benefits of implementing a PAYT program within unincorporated Hillsborough County, the EPA SMART BET calculator was used. The calculator asks for specific information such as tons of residential waste landfilled and recycled annually, local population, landfill tip fees, and disposal breakdown (landfill vs. waste-to-energy). The tool then combines this information with nationwide average waste disposal data, typical PAYT results, and greenhouse gas emission factors to provide the greenhouse gas and cost savings that the County is likely to see after the implementation of a PAYT program.⁵ Results of this tool are included in the following sections of this report.

⁵ Environmental Protection Agency PAYT – SMART BET Calculator

3.3 Material Recovery

Since the original PAYT pilot was discontinued for reasons previously discussed, actual material recovery was not performed during this project. In lieu of calculating actual recovery rates, the EPA SMART BET tool was used to project estimated recovery rates if a PAYT program was implemented.

The SMART BET Calculator estimates that implementing a PAYT program in unincorporated Hillsborough County could potentially increase residential recycling rates by 29.8 percent, for a total recyclable material recovery of 120,309 tons annually.

Detailed assumptions and calculations generated by the SMART BET calculator are attached.

3.4 Transferability

The results, lessons learned, and all materials developed from this project are transferable through the FDEP website to many Florida jurisdictions. The following materials have been developed:

- PAYT research report
- PAYT pilot program plan
- Pilot education and outreach materials
- Focus group results report
- Direct mail survey instrument
- Survey results
- Survey response comparison

In addition, the project team plans on presenting the results of this project at a future Recycle Florida Today (RFT) Conference. Project results were not available until 2010 for a formal presentation. Articles will also be developed and submitted for future issues of RFT's newsletter and the Florida Sunshine Chapter of the Solid Waste Association of North America (SWANA) newsletter.

3.5 Cost Effectiveness and Efficiency

The following sections describe the total project expenditures, as well as potential avoided disposal fees and cost/benefit rationale for implementing a PAYT program in unincorporated Hillsborough County.

3.5.1 Project Expenditures

The following table provides a breakdown of the total expenditures of this innovative grant project by category/expenditure type and vendor payments. The total grant funds expended equaled \$199,251.58.

Table 3-3: Innovative Grant Expenditures

Category/Expenditure Type	Vendor	Total Expenditures
<i>Professional/Technical Services</i>		
Consulting Services	Kessler Consulting, Inc.	\$168,540.41
Focus Group Services	Quest Corporation of America	\$19,800.00
Survey Printing and Mailing Services	Genesis Direct	\$8,918.01
Business Reply Mail Account	United States Postal Service	\$1,993.16
Total		\$199,251.58

The table below provides a breakdown of the total in-kind contributions provided by County staff and project partners not directly paid for their services or time on the project. The total in-kind contributions equaled \$63,354.52 for the grant duration.

Table 3-4: In-Kind Contributions

Quarter/Work Period	Contribution
Project Budget	\$65,000.00
First Quarter - Period end 12/31/07	\$1,422.56
Second Quarter - Period end 3/31/08	\$993.36
Third Quarter - Period end 6/30/08	\$2,169.36
Fourth Quarter - Period end 9/30/08	\$522.80
Fifth Quarter - Period end 12/31/08	\$4,847.36
Sixth Quarter - Period end 3/31/09	\$9,634.16
Seventh Quarter - Period end 6/30/09	\$25,602.72
Eighth Quarter - Period end 9/30/09	\$2,965.44
Ninth Quarter- Period end 12/31/09	\$10,676.96
Tenth Quarter – Period end 3/31/10	\$4519.80
Total	\$63,354.52
Ending Balance	\$1,645.48

3.5.2 Avoided Disposal Fees

The SMART BET Calculator estimates that implementing a PAYT program in unincorporated Hillsborough County could potentially reduce solid waste generation by 42,659 tons per year or 500 pounds per capita, which is a direct cost savings of \$1.7 million in landfill disposal fees (currently \$41.00 per ton fee).

The following graphics were provided by the SMART BET Calculator to depict residential disposal per capita before and after implementation of PAYT, as well as total costs. Recycling assumptions were not available because recycling collection and processing costs are included in the total solid waste franchise collection contracts and not available separately.

Figure 3-1: Per Capita PAYT Benchmarks for Hillsborough County, FL in FY 09-10 (projected)

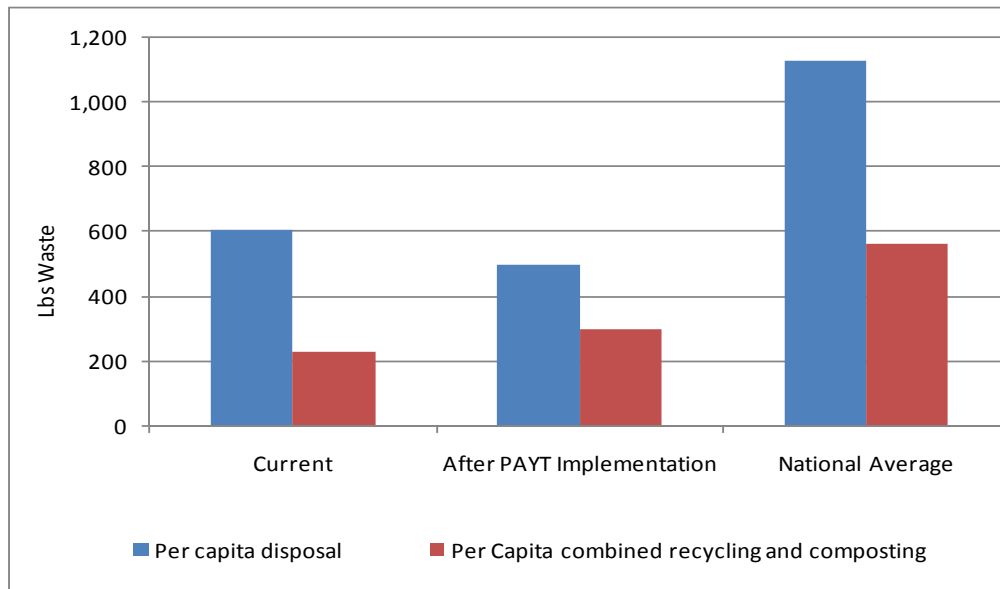
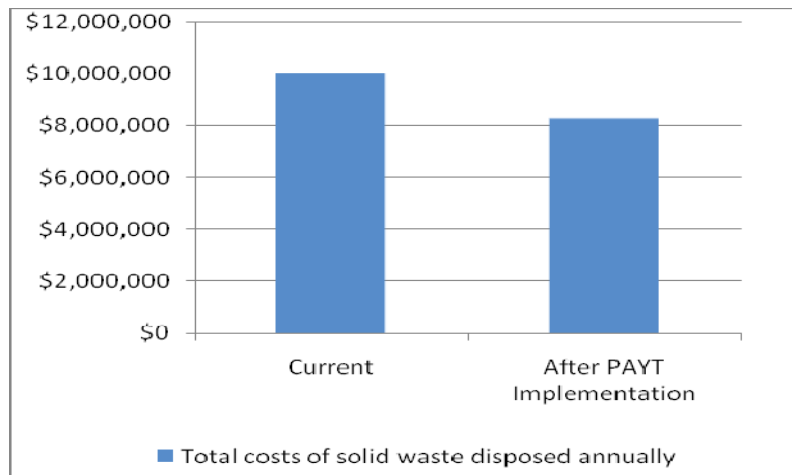


Figure 3-2: Costs for Hillsborough County, FL in FY 09-10 (projected)

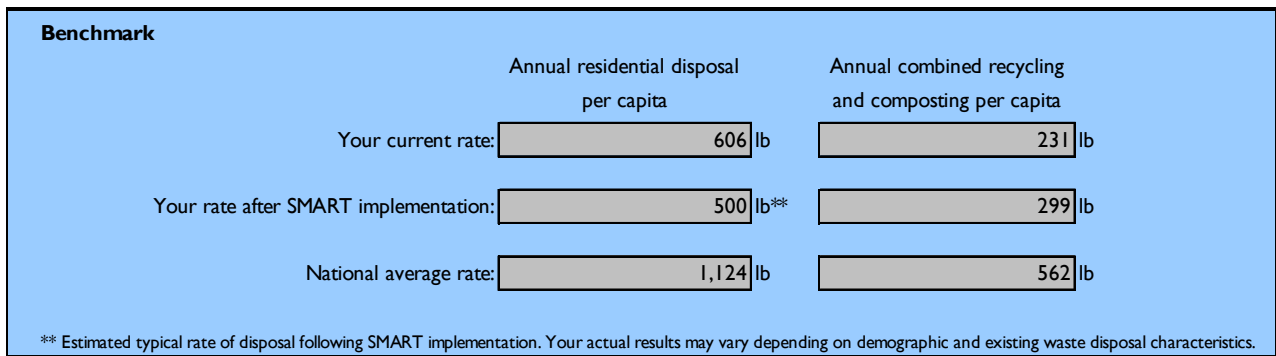
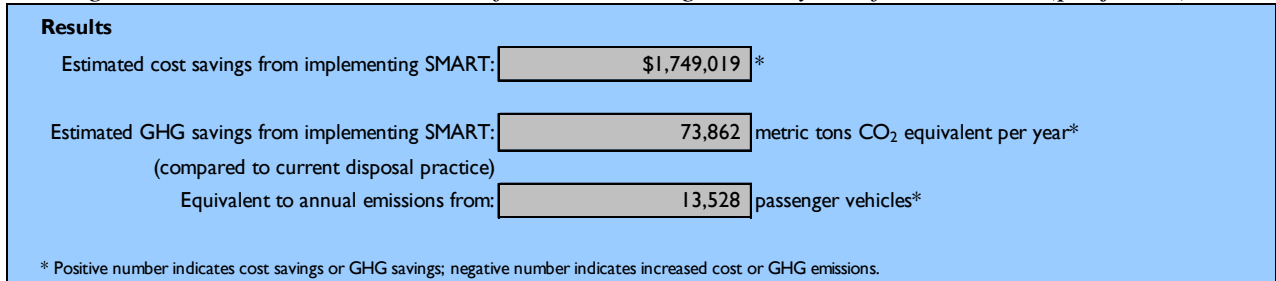


3.5.3 Cost/Benefit

The SMART BET Calculator estimates that implementing a PAYT program in unincorporated Hillsborough County could potentially avoid \$1.7 million in disposal fees annually. Additionally, the implementation of PAYT could result in a reduction of 73,862 metric tons of greenhouse gases, which is equal to taking 13,528 passenger cars

off the road. The detailed results of the SMART BET for the County utilizing projected fiscal year 2009-2010 data are detailed below.

Figure 3-3: SMART BET Results for Hillsborough County, FL for FY 09-10 (projected)



3.5.4 Nontraditional Materials

The project targeted nontraditional materials by gauging public support for the implementation of a single stream recycling program. Although single stream recycling is gaining recognition nationwide, it is still relatively new in Florida, and in unincorporated Hillsborough County, which utilizes a traditional dual stream bin system. The focus groups (89 percent) revealed significant support for single stream recycling. The direct mail survey (64 percent) supported the key elements of single stream recycling, which include larger wheeled containers and the ability to commingle recyclables in a single container. The ease of placing all recyclables in a single, larger container (no sorting necessary) was identified as being a significant motivator for residents to either begin recycling or to recycle more.

Single stream recycling often makes the addition of new recyclable materials much easier. Many focus group participants expressed a strong desire for the expansion of plastics recycling to include #s 3-7, which are acceptable in most single stream recycling systems. Adding plastics #s 3-7 (currently nontraditional materials in Hillsborough

County) improves convenience for the customer, which typically results in increased volumes of recovered materials. Should single stream processing become available countywide and the County were to replace the two 14-gallon bins currently being used with one 64-gallon single stream recycling cart, there would be the potential for up to a 129 percent increase in weekly volume to be realized. The 64-gallon recycling cart would allow for the diversion of more materials with greater convenience. It would also provide greater storage capacity, potentially reduced garbage volumes, and would provide an opportunity for smaller, variable size carts to be used for garbage collection which would be compatible with the adoption of a PAYT program.

CONCLUSION

The results of this project effectively demonstrate that PAYT and the supporting elements of single stream recycling and automated collection can be both extremely beneficial and cost effective. PAYT creates a direct economic incentive for residents of unincorporated Hillsborough County to recycle more, and generate less waste.

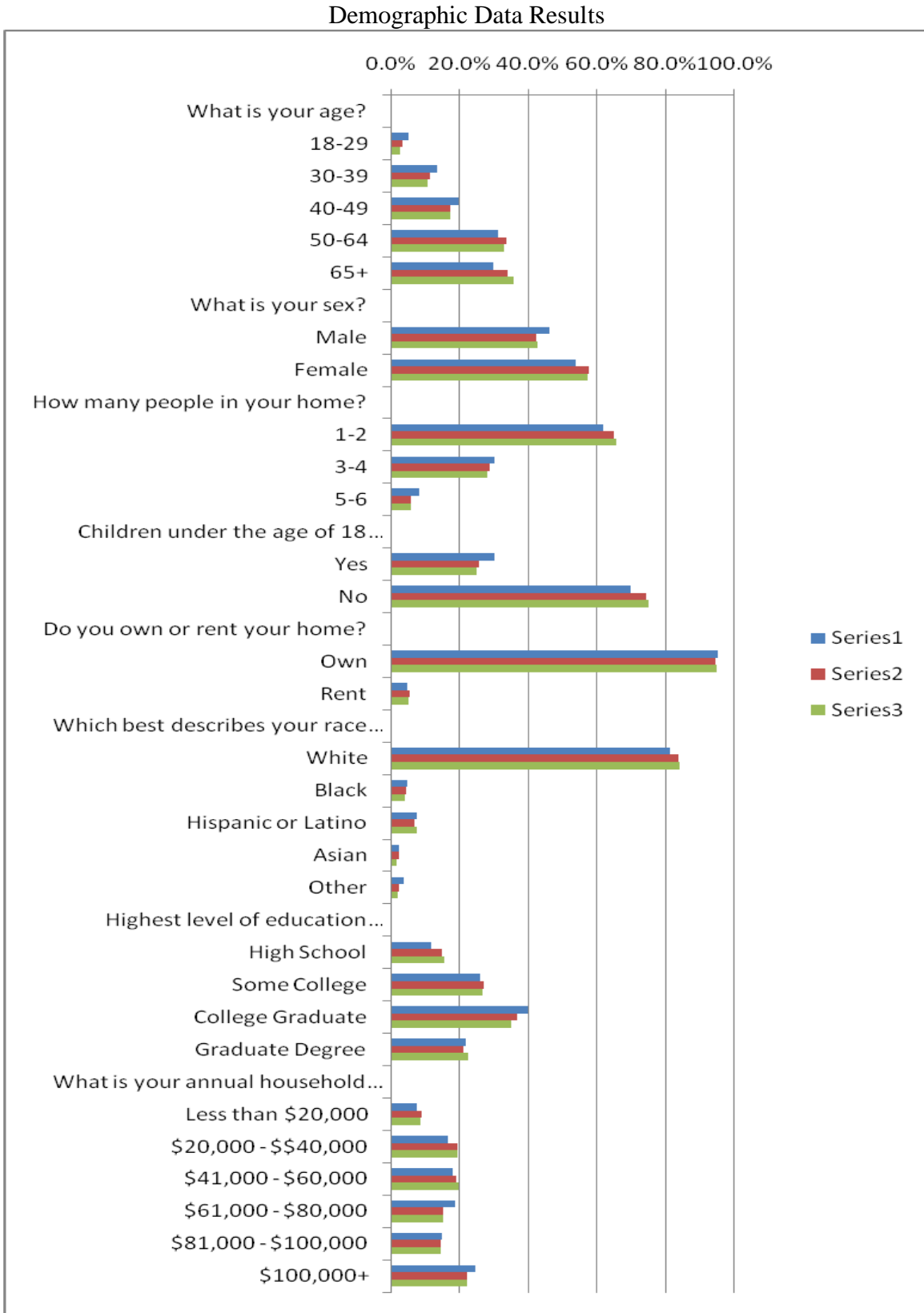
Population growth in Hillsborough County is projected to increase by 21.5 percent (172,933 persons) by 2020. As the population increases, so will the volume of waste generated. Based on SMART BET estimates of an annual solid waste generation rate of 606 pounds per capita, the County can expect to receive an additional 52,399 tons per year in residential solid waste by 2020.

The County has a Waste-to-Energy Facility which was recently expanded to incinerate 1800 tons of processable solid waste daily. Providing a sufficient volume of solid waste to this facility is important for contractual and financial reasons. However, when this facility is nearing full capacity, possibly several years in the future, attention may be turned to the feasibility of implementing a PAYT program.

Based on 2010 population and residential tonnage figures, a countywide PAYT program is estimated to reduce solid waste generation by 42,659 tons per year and reduce collection costs as a result of source reduction. A PAYT program could essentially reduce the overflow of solid waste from the WTE plant to the landfill. Ultimately, PAYT and the resulting increase in residential recycling will assist with the conservation of County landfill airspace, considered a valuable financial asset, and thus extend the operating life of existing disposal facilities.

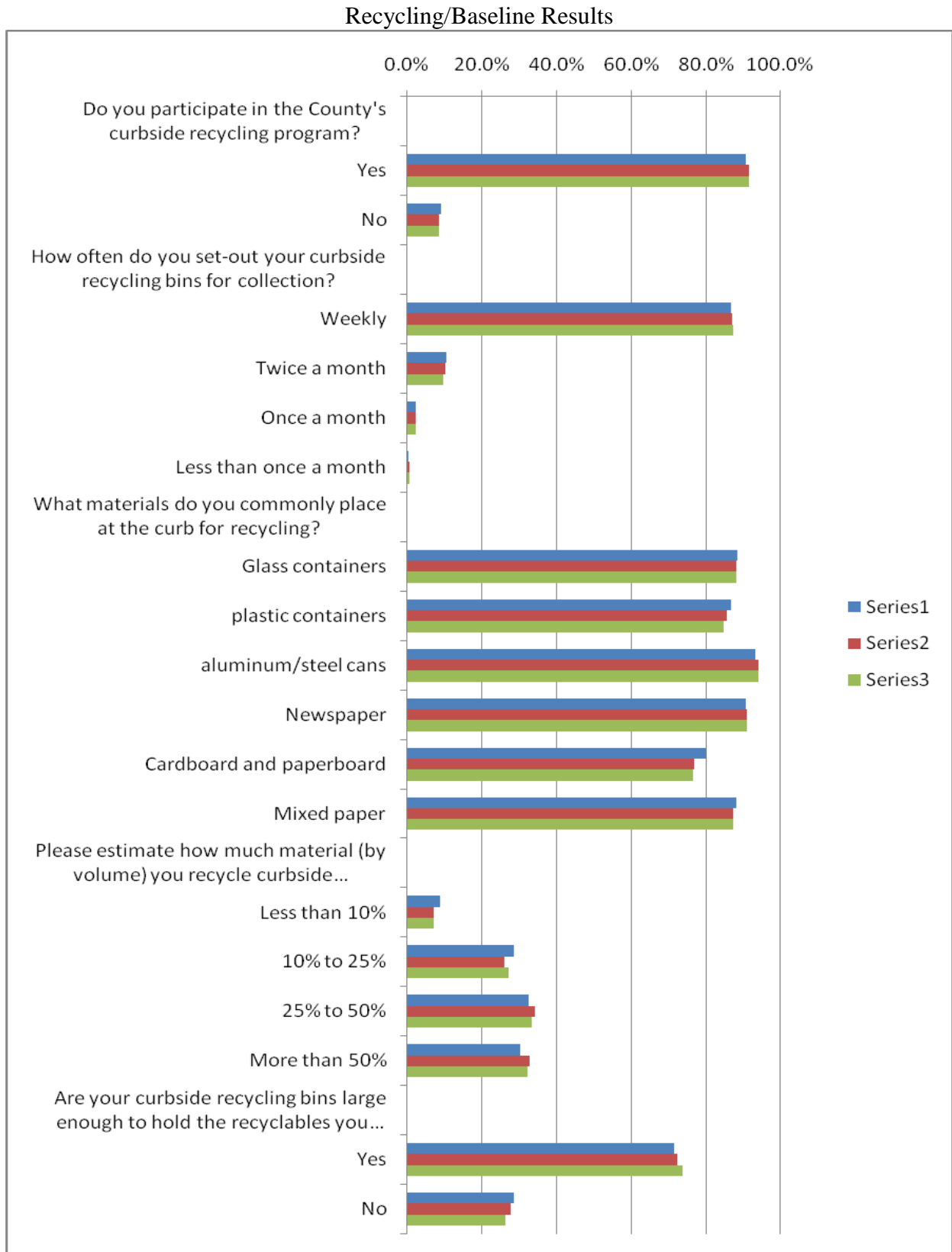
This type of program could assist the County with meeting the State of Florida's 75 percent recycling goal (The Energy, Climate Change, and Economic Security Act of 2008 - House Bill 7135). As so few communities are currently operating PAYT programs in the State of Florida, Hillsborough County has the potential to become a model of waste reduction and recycling practices in the State.

Side-by-Side Comparison of Survey Results in Intervals of 500 Respondents



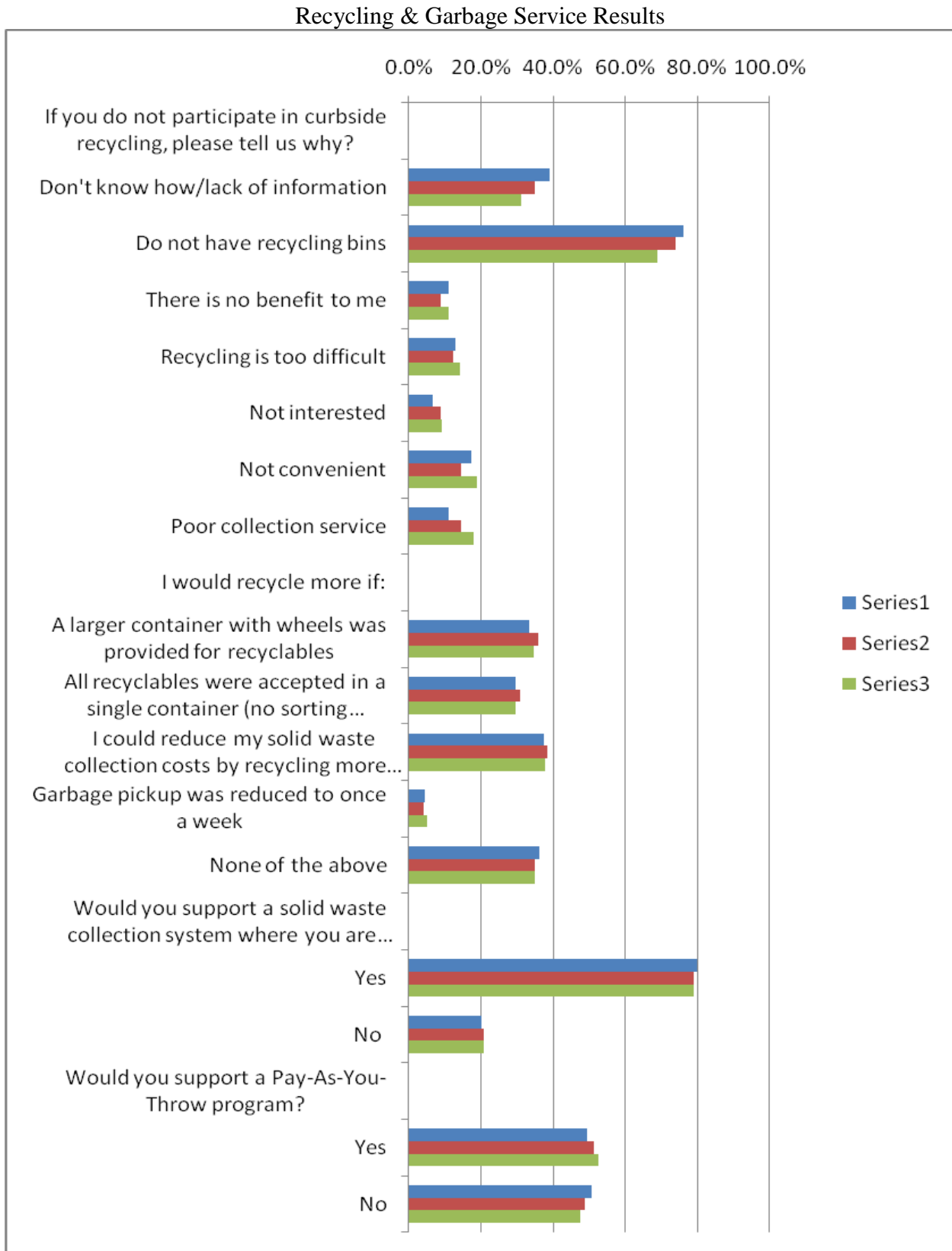
Series1 = 500 respondents, Series2 = 1,500 respondents, Series3 = 2,828 respondents

Side-by-Side Comparison of Survey Results in Intervals of 500 Respondents



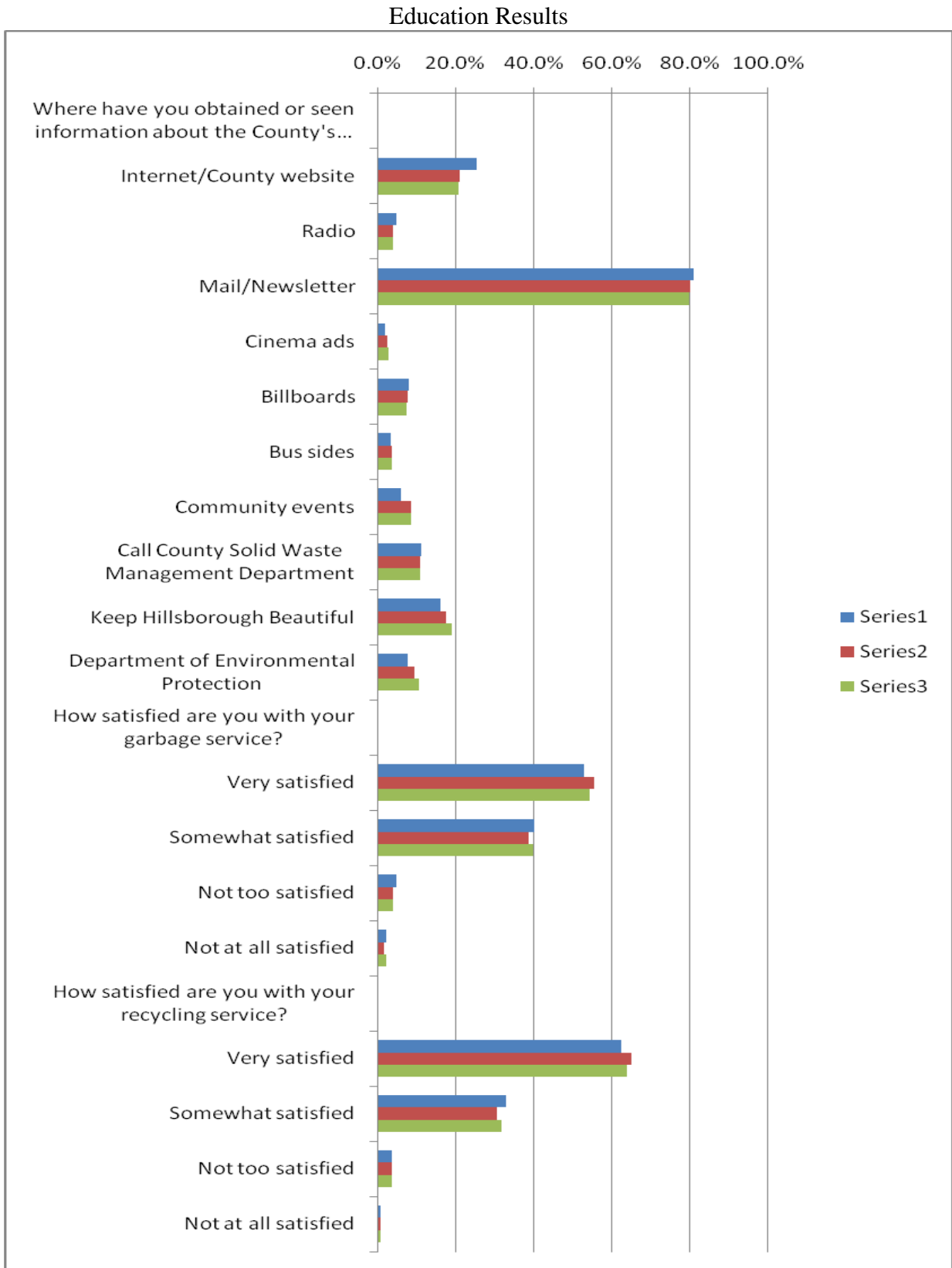
Series1 = 500 respondents, Series2 = 1,500 respondents, Series3 = 2,828 respondents

Side-by-Side Comparison of Survey Results in Intervals of 500 Respondents



Series1 = 500 respondents, Series2 = 1,500 respondents, Series3 = 2,828 respondents

Side-by-Side Comparison of Survey Results in Intervals of 500 Respondents



Series1 = 500 respondents, Series2 = 1,500 respondents, Series3 = 2,828 respondents

SMART BET (Saving Money and Reducing Trash Benefit Evaluation Tool) is designed to help community waste managers decide whether unit-based pricing for solid waste management (also known as Saving Money and Reducing Trash—SMART or Pay as You Throw—PAYT) is the right model for their town or city. To use this tool, you must have Excel security set to allow macros. For more information on how to change security settings, see the Instructions page.

In communities with SMART programs, residents are charged for the collection of municipal solid waste—ordinary household trash—based on the amount they throw away. This creates a direct economic incentive to recycle more and to generate less waste. Traditionally, residents pay for waste collection through property taxes or a fixed fee, regardless of how much or how little trash they generate. SMART breaks with tradition by treating trash services just like electricity, gas, and other utilities. Households pay a variable amount depending on the amount of service they use.

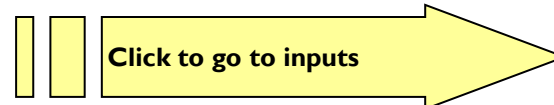
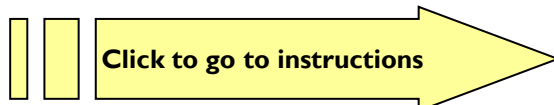
Most communities with SMART charge residents a fee for each bag or can of waste they generate. In a small number of communities, residents are billed based on the weight of their trash. Either way, these programs are simple and fair. The less individuals throw away, the less they pay, which is inherently more equitable than a one-size-fits-all model.

The U.S. Environmental Protection Agency (EPA) endorses this approach to solid waste management, as it has proven to be the one of the most effective ways to reduce residential solid waste, increase recycling, and decrease waste-related greenhouse gas emissions.

Communities that implement SMART typically see a decrease in overall solid waste production, with a final disposal (i.e., landfilling/combustion) rate of 400 to 600 pounds per person per year,* with associated increases in recycling and source reduction of waste (compared to the national average rate of disposal of 1,124 lbs per person). Well-designed programs generate the revenues communities need to cover their solid waste costs, including the costs of such complementary programs as recycling and composting. Residents benefit economically too, because they have the opportunity to take control of their trash bills.

SMART BET allows users, i.e., community waste managers, to input readily available information, such as tons of waste landfilled and recycled annually, local population, and landfill tip fees. The user may also provide a more detailed breakdown of the disposal and recycling streams, if this information is available. The tool then combines this information with nationwide average waste disposal data, typical SMART results, and greenhouse gas emission factors originally created for EPA's Waste Reduction Model (WARM) to provide the greenhouse gas and cost savings that your community is likely to see after implementation of SMART.

*Brown, Kristen. "The Tide Is Turning", 2008. *Resource Recycling*, p. 23. This tool assumes a final disposal rate of 500 lbs. per capita annually.



Instructions for SMART BET
Saving Money and Reducing Trash Benefit Evaluation Tool

This tool is designed to estimate the impact of implementing a Saving Money and Reducing Trash (SMART) (also known as Pay as You Throw or PAYT) program. The population entered on the Input Sheet should correspond to the residential population to be affected by the implementation of SMART, and the tons of residential waste currently recycled and disposed should correspond to the same population.

To use this tool you will need the following **minimum information**:

- The residential population to be affected by SMART
- Tons of residential waste disposed (i.e., landfilled or combusted) for the SMART population
- Tons of residential waste recycled and composted for the SMART population
- Disposal cost per ton (landfill tipping fee or combustion facility fee; use a positive number)
- Cost of recycling per ton (if your recycling program is a net source of revenue, use a positive number; if it is a net cost, use a negative number)

Additional information that can be used to further tailor your results:

- Whether waste is sent to a landfill, a combustor, or some combination of the two (percent by weight)
- The distance in miles to the landfill or combustion facility
- The composition of the disposal stream in percent by weight of various material types
- The composition of the recycling/composting stream in percent by weight of various material types

All user information is entered on the Input Sheet.

Microsoft Excel Security

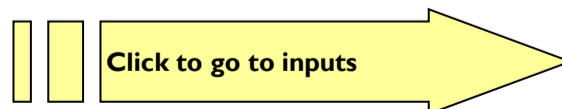
Since the SMART BET employs macros, you must have Excel security set to allow the use of macros. The following are directions for applying the correct security settings for Excel 2003 and Excel 2007.

Excel 2003

To operate SMART BET, you must have Excel security set to medium (recommended) or low (not recommended). To change this setting, launch Microsoft Excel before opening the SMART BET tool. Once in Excel, go to the Tools menu, click on the Macro sub-menu, and then select "Security". The Security box will appear. Click on the "Security Level" tab and select medium. When set to high, macros are automatically disabled; when set to medium, Excel will give you the choice to enable macros; when set to low, macros are always enabled. When Excel security is set to medium, users are asked upon opening the tool whether to enable macros. Macros must be enabled in order for the SMART BET tool to work. Once they are enabled, the tool will open to the introduction page.

Excel 2007

To allow macros in Excel 2007, launch Microsoft Excel 2007 before opening the SMART BET tool. Once in Excel, select the "Office" icon in the top left-hand corner and click on "Excel Options" in the bottom right-hand corner of the dropdown list. In the Excel Options window, select the "Trust Center" section and click on the "Trust Center Settings..." box. Within the Trust Center Settings window, select the Macro Settings section and select the button for "Disable all macros with notification". Within the Trust Center settings window, select the Message Bar and select the "Show the Message Bar in all applications when content has been blocked" if not previously selected. Next, open the SMART BET tool. You will notice a security warning bar above the tool indicating that macros have been disabled. Select the "Options..." button next to the warning. In the "Microsoft Office Security Options" window that pops up, select "Enable this content" and click OK.



SMART BET

Saving Money and Reducing Trash Benefit Evaluation Tool

Reset Inputs

1. General Information

City: State:

Year of data: City population affected by SMART:

2. Disposal Data

Current residential disposal: tons per year Landfill/combustor tip fee: \$ per ton

Waste Disposal Breakdown (tons)

Use national average

	Landfill <input type="text" value="42,659"/>	Disposal Practice (%): <input type="text" value="100%"/>	Distance to landfill <input type="text" value="20"/> miles <input checked="" type="checkbox"/> Use national average
	Waste-to-energy (WTE) <input type="text" value="201,085"/>	<input type="text" value="0%"/>	Distance to WTE facility <input type="text" value="20"/> miles <input checked="" type="checkbox"/> Use national average

Current residential combined recycling and composting: tons per year Recycling cost: per ton

3. Waste Stream Composition

Current disposal stream composition by weight (%):

Use national average

Metal	<input type="text" value="9%"/>	9%
Glass	<input type="text" value="7%"/>	7%
Plastic	<input type="text" value="20%"/>	20%
Paper	<input type="text" value="26%"/>	26%
Wood	<input type="text" value="9%"/>	9%
Food Scraps	<input type="text" value="21%"/>	21%
Yard Trimmings	<input type="text" value="8%"/>	8%
Total	100%	100%

Note:
Mac users may encounter an error when selecting the "Use national average" boxes. If this should occur, enter the percentages listed to the right of the white entry boxes to use national average values.

Current combined recycling and compost stream composition by weight (%):

Use national average

Metal	<input type="text" value="9%"/>	9%
Glass	<input type="text" value="4%"/>	4%
Plastic	<input type="text" value="3%"/>	3%
Paper	<input type="text" value="56%"/>	56%
Wood	<input type="text" value="2%"/>	2%
Food Scraps	<input type="text" value="1%"/>	1%
Yard Trimmings	<input type="text" value="26%"/>	26%
Total	100%	100%

Click to see the results

SMART BET

Saving Money and Reducing Trash Benefit Evaluation Tool

Results for Hillsborough County, Florida for 2010

Results

Estimated cost savings from implementing SMART: *

Estimated GHG savings from implementing SMART: metric tons CO₂ equivalent per year*
(compared to current disposal practice)

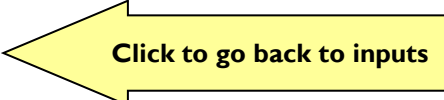
Equivalent to annual emissions from: passenger vehicles*

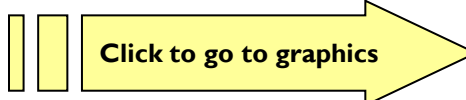
* Positive number indicates cost savings or GHG savings; negative number indicates increased cost or GHG emissions.

Benchmark

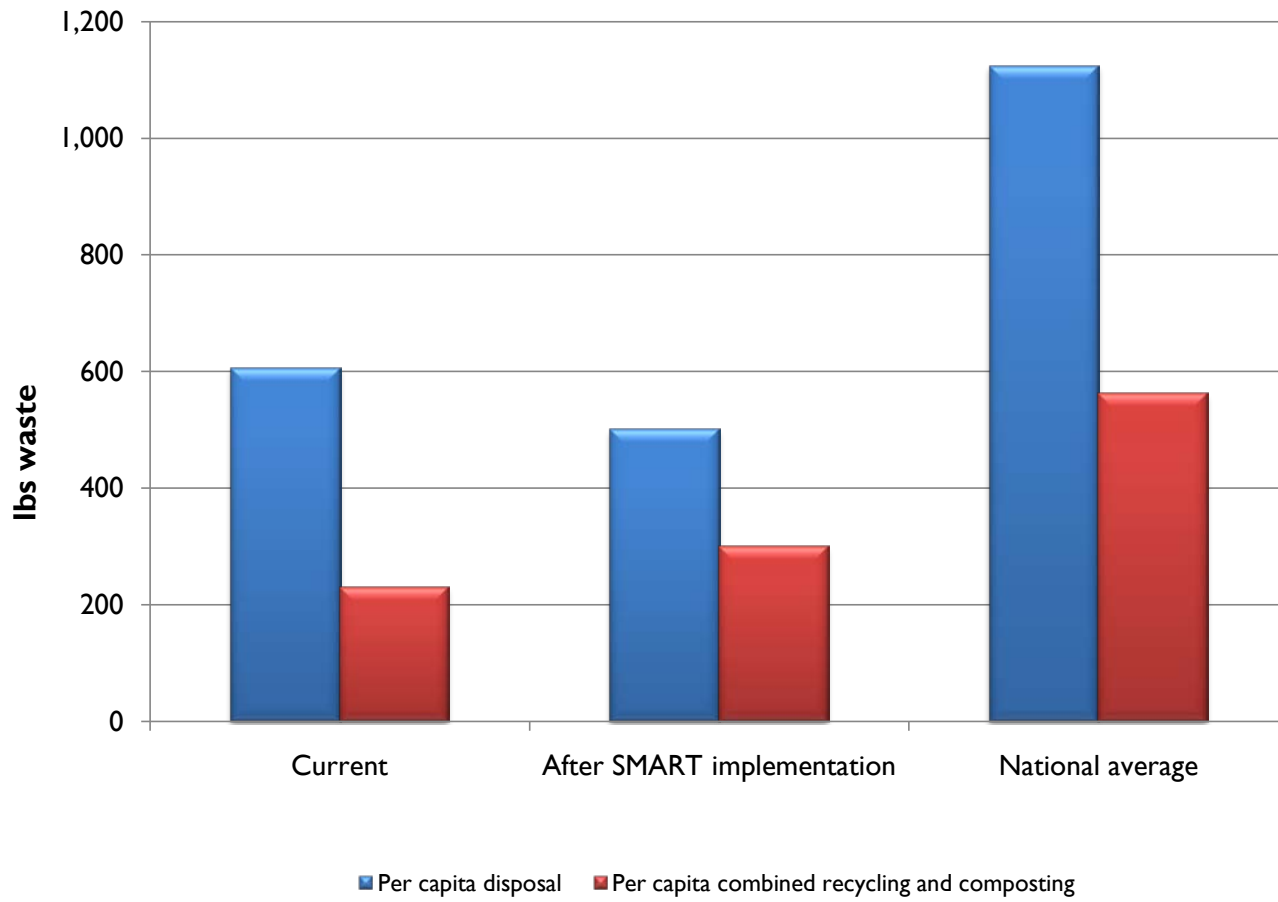
	Annual residential disposal per capita	Annual combined recycling and composting per capita
Your current rate:	<input type="text" value="606"/> lb	<input type="text" value="231"/> lb
Your rate after SMART implementation:	<input type="text" value="500"/> lb**	<input type="text" value="299"/> lb
National average rate:	<input type="text" value="1,124"/> lb	<input type="text" value="562"/> lb

** Estimated typical rate of disposal following SMART implementation. Your actual results may vary depending on demographic and existing waste disposal characteristics.

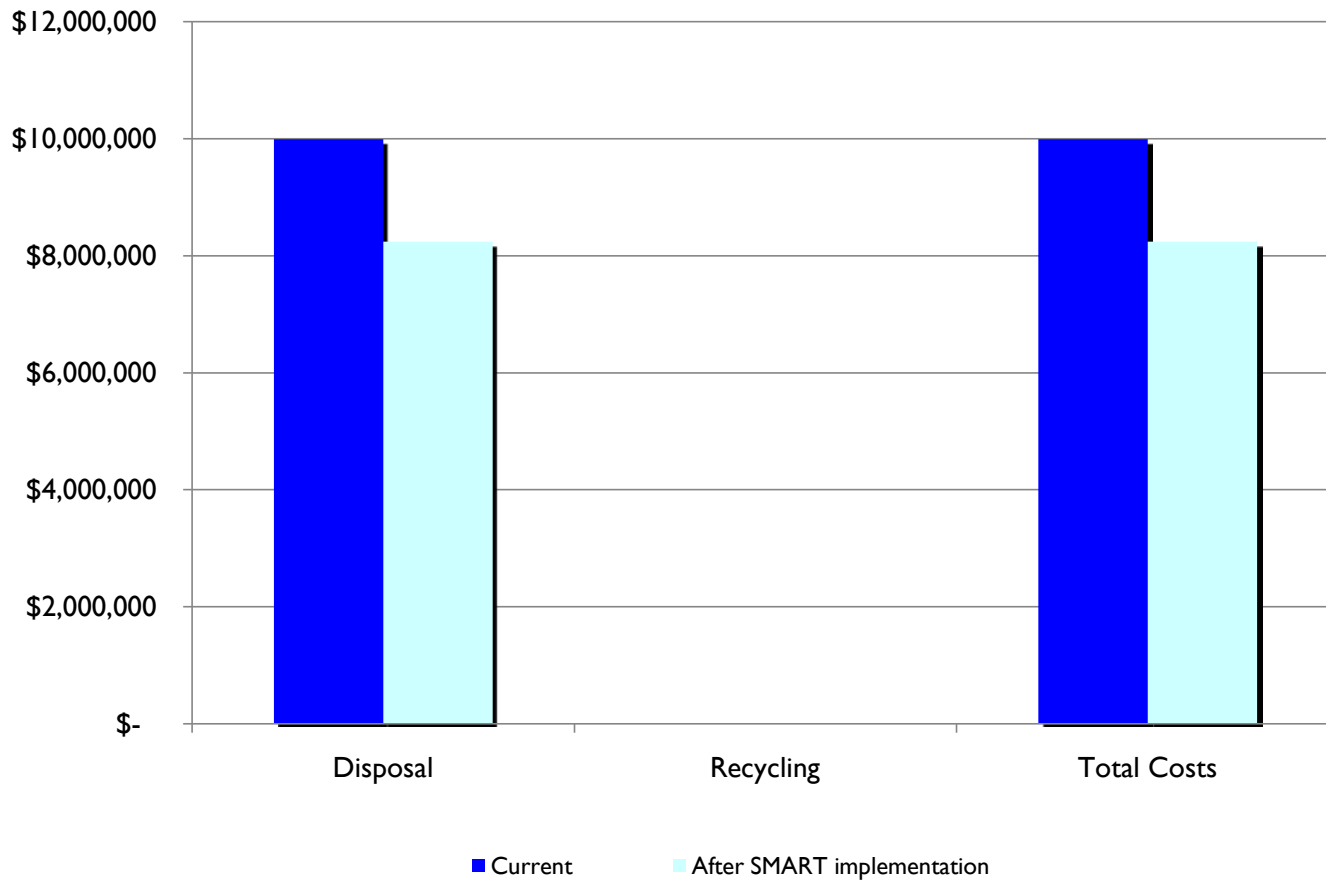
 Click to go back to inputs

 Click to go to graphics

Per Capita PAYT Benchmarks for Hillsborough County, Florida in 2010



Costs for Hillsborough County, Florida in 2010



Assumptions and Data Sources

SMART BET works by taking data entered by the user and estimating the greenhouse gas and cost savings from implementing SMART. The per capita disposal rate post-implementation is estimated at 500 lbs. per capita annually, so total post-implementation total disposal is dependent on population size only. Increases in recovery (recycling and composting) and source reduction are estimated by assuming that 65% of disposal decreases are due to recovery, and 35% are due to source reduction (based on a 2006 report by Skumatz Economic Research Associates, *Pay as You Throw (PAYT) in the US: 2006 Update and Analyses*). Cities that have current disposal rates at or below 500 lbs. per capita annually should be aware that this tool will provide results that show a net increase in disposal following SMART implementation, which is unlikely to be the case; therefore this tool is not recommended for such cities, as the results will be inaccurate.

Cost savings are estimated by multiplying the decrease in disposal by the landfill or combustor tip fee. Changes in recycling revenue are calculated by multiplying the increase in recovery by the recycling cost or revenue. The disposal and recycling cost changes are then summed.

Recycling cost should include only the direct cost of, or revenue from, recycling materials collected by the recycling program. For example, include what you pay the hauler, but don't include other recycling program costs such as advertising/marketing.

Disposal and recycling tonnages should include only municipal solid waste and not construction and demolition (C&D) debris (except to the extent that some residents may dispose of C&D-like materials in the municipal waste stream).

Greenhouse gas emissions are estimated by estimating the change in disposal, recovery, and source reduction for a particular material and multiplying that amount by a greenhouse gas emission factor for disposal, recovery, or source reduction, respectively.

Greenhouse gas emission factors in SMART BET are taken from the current version of EPA's Waste Reduction Model (WARM). The emissions estimates provided by SMART BET are intended to support voluntary GHG measurement and reporting initiatives and are not meant to be used for inventory purposes. The categories of waste used in SMART BET are more general than those used in WARM, and composition assumptions were used to assign WARM emission factors to SMART BET categories. The latest version of WARM is available at: http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html.

Specific **material assumptions** include:

- Metal is assumed to consist of aluminum and steel cans, according to their relative prevalence in the recovered materials stream according to the latest version of EPA's report, *Municipal Solid Waste in the U.S.: 2007 Facts and Figures*.
- Glass corresponds to the WARM category "Glass Bottles."
- Plastic is assumed to consist of HDPE, LDPE, and PET, according to their relative prevalence in the recovered materials stream according to the latest version of the *Facts and Figures* report.
- Paper is assumed to consist of 48% corrugated cardboard, 8% magazines, 24% newspaper, and 20% office paper.
- Wood corresponds to the WARM category "Dimensional Lumber."
- Food scraps and yard trimmings correspond to the identical categories in WARM.

All averages used are national averages. The extent that your community's waste-related demographics differ from the national average could alter the results.

The national average rate of recovery for **landfill gas** is assumed. Recovery comprises use for energy or flaring. The assumption is based on the U.S. landfill gas collection characteristics that reflect the latest values from the U.S. Greenhouse Gas Inventory.

A rate of 0.00014 metric tons CO₂ equivalent per ton-mile is assumed for **transportation of waste** to a landfill or waste-to-energy facility, based on EPA's 1998 report *Greenhouse Gas Emissions From the Management of Selected Materials*. The default distance assumed is 20 miles.

The default **percentages of materials in the disposal and recycling streams** and the **per capita disposal and recycling rates** are based on data from the latest version of EPA's report, *Municipal Solid Waste in the U.S.: 2007 Facts and Figures* available here: <http://www.epa.gov/osw/nonhaz/municipal/msw99.htm>

The annual greenhouse gas emissions per **average passenger vehicle** are taken from the EPA's Online Equivalencies Calculator available here: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.

The estimate of **500 pounds** of waste disposed per capita per year following SMART implementation is an estimate based on findings from Kristen Brown of Waste Solutions in February 2009. Communities that implement SMART generally see an annual per capita disposal rate of 400-600 pounds. For estimation purposes, we use 500 pounds in this tool, but lower rates can and are achieved, often by increasing focus on organics collection, composting, and enhanced educational efforts. (Brown, Kristen. "The Tide Is Turning", 2008. *Resource Recycling*, p. 23.)

	Pre-PAYT			Post-PAYT			Effect of PAYT on Recovery (Recycling and Composting)			Effect of PAYT on Source Reduction			Recovery and SR		% GHG per type
	Generation tons/yr	Recycling tons/yr	Discards tons/yr	Generation tons/yr	Recycling tons/yr	Discards tons/yr	Incremental Recovery tons/yr	MTCO2E/yr, Compared to Disposal - AVERAGE Landfill Practices	MTCO2E/yr, Compared to Disposal - NO LFG RECOVERY Landfill Practices	Incremental SR tons/yr	MTCO2E/yr, Compared to Disposal - AVERAGE Landfill Practices	MTCO2E/yr, Compared to Disposal - NO LFG RECOVERY Landfill Practices	TOTAL Emission Reductions	TOTAL Emission Reductions	
													MTCO2E/yr - AVERAGE Landfill Practices	MTCO2E/yr - NO LFG RECOVERY Landfill Practices	
Metal	30,904	8,294	22,610	29,436	10,764	18,653	2,470	(13,086)	(13,086)	1,469	(6,928)	(6,928)	(20,014)	(20,014)	0.270964604
Glass	21,019	3,694	17,325	19,264	4,794	14,293	1,100	(352)	(352)	1,755	(1,084)	(1,084)	(1,436)	(1,436)	0.019436303
Plastic	50,294	2,398	47,896	43,593	3,112	39,513	714	(1,117)	(1,117)	6,701	(13,829)	(13,829)	(14,946)	(14,946)	0.20234547
Paper	115,064	51,900	63,164	117,757	67,353	52,110	15,453	(50,310)	(66,985)	(2,692)	17,307	20,212	(33,003)	(46,773)	0.446814287
Wood	23,071	1,514	21,557	20,158	1,965	17,784	451	(873)	(1,141)	2,913	(4,373)	(6,110)	(5,246)	(7,251)	0.071022073
Food Scraps	52,504	929	51,575	44,898	1,206	42,549	277	(244)	(450)	7,606	N/A	N/A	(244)	(450)	0.003299833
Yard Trimmings	43,593	23,977	19,617	46,288	31,116	16,183	7,139	1,025	(1,843)	(2,695)	N/A	N/A	1,025	(1,843)	-0.013882571
Total	336,450	92,706	243,744	321,394	120,309	201,085	27,603	(64,955)	(84,974)	15,056	(8,907)	(7,738)	(73,862)	(92,712)	

42,659 Difference between pre- and post-PAYT discards

35% increase in source reduction due to PAYT, Skumatz	17 decrease in disposal, by weight, due to PAYT, Skumatz p. 5	
35% increase in recycling due to PAYT, Skumatz	6 increase in recycling, by weight, due to PAYT, Skumatz p. 5	65%
30% increase in composting due to PAYT, Skumatz	5 increase in composting, by weight, due to PAYT, Skumatz p. 5	35%
	6 increase in SR by weight, due to PAYT, Skumatz p. 5	

Generation percentage

Metal	9%
Glass	6%
Plastic	14%
Paper	37%
Wood	6%
Food Scraps	14%
Yard Trimmings	14%

Material	SR vs. landfilling	Recycling vs. landfilling	Composting vs. landfilling	SR vs. LFGTE	Recycling vs. LFGTE	Composting vs. LFGTE	SR vs. LFG Flaring	Recycling vs. LFG Flaring	Composting vs. LFG Flaring	SR vs. LFG No Recovery	Recycling vs. LFG No Recovery	Composting vs. LFG No Recovery	SR vs. WTE	Recycling vs. WTE	Composting vs. WTE
	AVG (MTCE/ton)	AVG (MTCE/ton)	AVG (MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)	(MTCE/ton)
Aluminum Cans	(2.27)	(3.74)	N/A	(2.27)	(3.74)	N/A	(2.27)	(3.74)	N/A	(2.27)	(3.74)	N/A	(2.28)	(3.75)	N/A
Steel Cans	(0.88)	(0.50)	N/A	(0.88)	(0.50)	N/A	(0.88)	(0.50)	N/A	(0.88)	(0.50)	N/A	(0.45)	(0.07)	N/A
Glass	(0.17)	(0.09)	N/A	(0.17)	(0.09)	N/A	(0.17)	(0.09)	N/A	(0.17)	(0.09)	N/A	(0.17)	(0.09)	N/A
HDPE	(0.50)	(0.39)	N/A	(0.50)	(0.39)	N/A	(0.50)	(0.39)	N/A	(0.50)	(0.39)	N/A	(0.74)	(0.63)	N/A
LDPE	(0.63)	(0.48)	N/A	(0.63)	(0.48)	N/A	(0.63)	(0.48)	N/A	(0.63)	(0.48)	N/A	(0.87)	(0.71)	N/A
PET	(0.59)	(0.43)	N/A	(0.59)	(0.43)	N/A	(0.59)	(0.43)	N/A	(0.59)	(0.43)	N/A	(0.87)	(0.72)	N/A
Corrugated Cardboard	(1.62)	(0.94)	N/A	(1.40)	(0.72)	N/A	(1.47)	(0.79)	N/A	(1.93)	(1.25)	N/A	(1.35)	(0.67)	N/A
Magazines/Third-Class Mail	(2.27)	(0.75)	N/A	(2.19)	(0.66)	N/A	(2.21)	(0.69)	N/A	(2.40)	(0.88)	N/A	(2.23)	(0.71)	N/A
Newspaper	(1.09)	(0.52)	N/A	(1.01)	(0.44)	N/A	(1.04)	(0.47)	N/A	(1.20)	(0.63)	N/A	(1.13)	(0.56)	N/A
Office Paper	(2.67)	(1.26)	N/A	(2.30)	(0.89)	N/A	(2.41)	(1.01)	N/A	(3.20)	(1.79)	N/A	(2.01)	(0.61)	N/A
Dimensional Lumber	(0.41)	(0.53)	N/A	(0.30)	(0.42)	N/A	(0.33)	(0.45)	N/A	(0.57)	(0.69)	N/A	(0.34)	(0.46)	N/A
Carpet	(1.11)	(1.98)	N/A	(1.11)	(1.98)	N/A	(1.11)	(1.98)	N/A	(1.11)	(1.98)	N/A	(1.20)	(2.07)	N/A
Tires	(1.11)	(0.51)	N/A	(1.11)	(0.51)	N/A	(1.11)	(0.51)	N/A	(1.11)	(0.51)	N/A	(1.12)	(0.53)	N/A
Food Scraps	N/A	N/A	(0.24)	N/A	N/A	(0.10)	N/A	N/A	(0.14)	N/A	N/A	(0.44)	N/A	N/A	(0.01)
Yard Trimmings	N/A	N/A	0.04	N/A	N/A	0.11	N/A	N/A	0.09	N/A	N/A	(0.07)	N/A	N/A	0.01
Total															

Material	SR vs. landfilling	Recycling vs. landfilling	Composting vs. landfilling	SR vs. LFGTE	Recycling vs. LFGTE	Composting vs. LFGTE	SR vs. LFG Flaring	Recycling vs. LFG Flaring	Composting vs. LFG Flaring	SR vs. LFG No Recovery	Recycling vs. LFG No Recovery	Composting vs. LFG No Recovery	SR vs. WTE	Recycling vs. WTE	Composting vs. WTE
	AVG (MTCO2E/ton)	AVG (MTCO2E/ton)	AVG (MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)	(MTCO2E/ton)
Metal	(4.72)	(5.30)	N/A	(4.72)	(5.30)	N/A	(4.72)	(5.30)	N/A	(4.72)	(5.30)	N/A	(3.61)	(4.19)	N/A
Glass	(0.62)	(0.32)	N/A	(0.62)	(0.32)	N/A	(0.62)	(0.32)	N/A	(0.62)	(0.32)	N/A	(0.63)	(0.33)	N/A
Plastic	(2.06)	(1.56)	N/A	(2.06)	(1.56)	N/A	(2.06)	(1.56)	N/A	(2.06)	(1.56)	N/A	(3.00)	(2.50)	N/A
Paper	(6.43)	(3.26)	N/A	(5.68)	(2.51)	N/A	(5.92)	(2.74)	N/A	(7.51)	(4.33)	N/A	(5.50)	(2.32)	N/A
Wood	(1.50)	(1.94)	N/A	(1.09)	(1.52)	N/A	(1.22)	(1.65)	N/A	(2.10)	(2.53)	N/A	(1.24)	(1.67)	N/A
Food Scraps	N/A	N/A	(0.88)	N/A	N/A	(0.37)	N/A	N/A	(0.53)	N/A	N/A	(1.63)	N/A	N/A	(0.88)
Yard Trimmings	N/A	N/A	0.14	N/A	N/A	0.42	N/A	N/A	0.33	N/A	N/A	(0.26)	N/A	N/A	0.02

AVERAGE Landfill practices

SR EF Weighted for User Inputs	Recycling EF Weighted for User Inputs	Composting EF Weighted for User Inputs
(4.72)	(5.30)	N/A
(0.62)	(0.32)	N/A
(2.06)	(1.56)	N/A
(6.43)	(3.26)	N/A
(1.50)	(1.94)	N/A
N/A	N/A	(0.88)
N/A	N/A	0.14

NO LFG RECOVERY at Landfills

SR EF Weighted for User Inputs	Recycling EF Weighted for User Inputs	Composting EF Weighted for User Inputs
(4.72)	(5.30)	N/A
(0.62)	(0.32)	N/A
(2.06)	(1.56)	N/A
(7.51)	(4.33)	N/A
(2.10)	(2.53)	N/A
N/A	N/A	(1.63)
N/A	N/A	(0.26)

Transportation to MRF/Landfill		Combination Truck EF calcs						
MTCE/ton-mile	CO2/ton-mile	gal/ton-mile	litre/ton-mile	pre-comb factor	litre/ton-mile	MT CO2/litre	MTCO2/ton-mile	MTCE/ton-mile
0.00004	0.00014	0.0118	0.044663	1.185	0.052925655	0.002653275	0.00014	0.00004
		(EPA, 1998)	(EPA, 1998)					
EPA, 1998. Greenhouse Gas Emissions From the Management of Selected Materials, Municipal and Ind. Solid Waste Division, December, 1998.								

To update this tool: (1) the spreadsheet needs to be re-linked to the most recent version of GHG_MSTR.xls, (2) the generation and recovery rates on this sheet need to be updated annually with the new EPA Facts & Figures report, which is usually released around November, (3) the MTCO2E/passenger vehicle/year factor needs to be updated whenever the online GHG Equivalencies Calculator changes

States
<Select a state>
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

Factors	
Lbs per ton	2,000
MTCO2E/passenger vehicle/year	5.46
MTCE to MTCO2E Conversion	3.67
MTCO2E/ton-mile transport to land	0.00014
Annual per	500

Mixed Metal	
Aluminum Cans	29%
Steel Cans	71%
Mixed Plastic	
HDPE	39%
LDPE	19%
PET	42%
Mixed Paper	
Corrugated Cardboard	48%
Magazines/Third-class Mail	8%
Newspaper	24%
Office Paper	20%

User Selections
Landfill Gas Collection
Flaring or Energy Recovery

Years
<Select a year>
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

Thousand tons	2007 Generation and Recovery of MSW					
	Generation	% of Total	Recovery	% of Total	Disposal	% of Total
Metal	20,750	9%	7,230	9%	13,520	9%
Glass	13,580	6%	3,220	4%	10,360	7%
Plastic	30,730	14%	2,090	3%	28,640	20%
Paper	83,010	37%	45,240	56%	37,770	26%
Wood	14,210	6%	1,320	2%	12,890	9%
Food Scraps	31,650	14%	810	1%	30,840	21%
Yard Trimmings	32,630	14%	20,900	26%	11,730	8%
Total	226,560		80,810		145,750	

Source: *Municipal Solid Waste in the United States: 2007 Facts and Figures*, U.S. Environmental Protection Agency, Table 1 and Table 2
Available at: <http://www.epa.gov/osw/nonhaz/municipal/msw99.htm>

2007 Per capita generation and recovery of MSW				
	Per Day	Per Year	% of generation	% of disposal
Generation	4.62	1,686		
Total materials recovery	1.54	562	33%	
Recycling	1.15	420	25%	
Composting	0.39	142	8%	
Total materials disposal	3.08	1,124		
Combustion with energy recovery	0.58	212		19%
Landfill, other disposal	2.5	913		81%
Population (millions)	301.621			

Default transportation distances

Distance to landfill	20 miles
Distance to WTE facility	20 miles

User Defined Tonnage	Tons	Percent of Disposal	
Landfill	42,659	18%	243,744
WTE	201,085	82%	0

Average Disposal	Tons	Percent of Disposal
Landfill	197,844	81%
WTE	45,900	19%